

Born 12th September 1953, Ichapur, India

Secondary education at the Central School, Ambarnath, 1963–69;

All India Higher Secondary School Examination Certificate, 1969

Undergraduate studies at the [Indian Institute of Technology, Kharagpur](#), 1969–74;

B.Sc. in Physical Sciences, 1972; M.Sc. in Physics, 1974

Research at the [Tata Institute of Fundamental Research \(TIFR\), Bombay](#), 1974–82;

Research Associate in Cosmic Rays Group, 1979–84; Ph.D. in Physics, [University of Bombay](#), 1982

Visiting Fellow, [International School of Advanced Studies \(SISSA\), Trieste](#), 1983

Research Associate, [Theory Division, CERN, Geneva](#), 1984–85

Visiting Fellow, [Department of Astrophysics, University of Oxford](#), 1985–86

Research Associate, HEP Theory Group, [Rutherford Appleton Laboratory \(RAL\), Chilton](#), 1987–88

Staff Member of the [Rudolf Peierls Centre for Theoretical Physics, University of Oxford](#), since 1990:

Glasstone Fellow, 1990–92; PPARC Advanced Fellow, 1992–97; Research Fellow, [Wolfson College](#),

1993–97; Departmental Lecturer & Tutor in Physics, [Pembroke College](#), 1997–98; University Lecturer,

Fellow of [Linacre College](#) 1998–; Reader 2000; Professor 2006–; Head, [Particle Theory Group](#) 2011–19



### Awards & Honours:

▷ [National Science Talent Scholarship](#), 1969–78

▷ [George Marx Memorial Lecture](#), 2003

▷ [Glasstone Fellowship](#), University of Oxford, 1990–92

▷ Advanced Fellowship, [Particle Physics & Astronomy Research Council](#) 1992–97

▷ Senior Fellowship, [UK Science & Technology Facilities Council](#) 2006–09

▷ [Niels Bohr Professorship, University of Copenhagen](#) 2013–18

▷ [IUPAP-TIFR Homi Bhabha Medal and Prize](#), 2017

### Academic Service:

• Member (Astrophysics & Cosmology section), [Particle Data Group](#), 2001–

• [Oxford University](#): Joint Committee on Physics & Philosophy, 2005–07 (Chair 2006–07); Glasstone Fellowships Committee 2008–12 (Chair 2011–12); India Strategy Working Group, 2006–13; Strategy Advisory Board, India Oxford Initiative, 2019–

• [Agence d'Evaluation de la Recherche et de l'Enseignement Superieur \(AERES\)](#) Review Panel, 2005–9

• [Astroparticle Physics European Coordination \(ApPEC\)](#), PRC 2005–10, SAC 2010–12

• Steering Committee, [Astroparticle Physics Group, Institute of Physics UK](#), 2006–08

• Science Vision Working Group (Panel A), [ASTRONET](#), 2006–08

• Chair, Astroparticle Physics Panel, [STFC Programmatic Review](#), 2008

• Astroparticle Physics European Research Area Network ([ASPERA](#)): WGs & EC, 2007–19

• International Peer Review Panel, [Danish Council for Independent Research](#), 2010–12

• [Helmholtz Gemeinschaft, Germany](#) Review Panels: Astroparticle Physics, 2011; [DESY](#), 2018

• International Advisory Board, [Helmholtz Alliance on Astroparticle Physics](#), 2012–17

• Editorial Board, [European Physical Journal C](#), 2012–15; [Pramana](#), 2013–; [SciPost](#), 2016–

• Scientific & Technical Advisory Committee, [KM3NeT](#), 2013–20

• Advisory Board, [Gruber Cosmology Prize](#), 2014–20

• IUPAP Working Group 10: [AstroParticle Physics International Committee \(APPIC\)](#), 2014–

• Scientific Advisory Panel, [Institute of Physics, Universiteit Van Amsterdam](#), 2016–

• Scientific Council, [International Center for Theoretical Physics Asia-Pacific, Beijing](#), 2018–

• Steering Committee, [European Centre for Astro Particle Theory](#), 2019–20

**Research Experience:** My research interests are focussed on particle astrophysics and cosmology. My key contributions have been in cosmic ray phenomenology, in using the early universe as a laboratory for new physics, and in seeking a physical understanding of dark matter and dark energy.

**Cosmic Rays & High Energy Astrophysics:** Our experimental cosmic ray studies using plastic track detectors flown on balloons and *SKYLAB* showed that heavy nuclei in low energy cosmic rays are not fully ionised, implying a relatively local (Solar System) origin [390]. To investigate this further we designed an experiment (*Anuradha*) flown on *SPACELAB III*, which had a rotating detector to provide time resolved flux measurements, using the Earth’s magnetic field as a momentum filter.

We investigated cosmic ray acceleration by plasma turbulence and the non-thermal radiation which probes such environments. By combining radio, X-ray and  $\gamma$ -ray data on the young supernova remnant (SNR) *Cassiopeia A* we showed that the magnetic field in the radio emitting region has been significantly amplified over the compressed interstellar field [2]. We showed that 2<sup>nd</sup>-order Fermi acceleration by plasma turbulence generated via the deceleration of the blast wave naturally yields the observed power-law (slightly *convex*) electron spectrum, and explains the rapid rise in synchrotron luminosity (accompanied by spectral flattening) of young SNRs entering the Sedov-Taylor phase [4]. Our analytic solution to the transport equation explains the temporal and spectral evolution of the radio emission from *Cassiopeia A*. We are presently testing the theory using high powered lasers to reproduce a lab-scale version of SNR shocks [362, 363, 364, 105, 366].

I noted [3] that old SNRs in the radiative phase which have expanded to large sizes in the hot interstellar medium can account for the ‘diffuse’ synchrotron radio emission from the Galaxy, thus reconciling the modest magnetic field values inferred from Faraday rotation with the higher values inferred from the synchrotron luminosity. The closest of these stand out as the ‘radio loops’ which extend to high galactic latitudes and we showed that the angular power spectrum of the galactic emission is well matched by the contribution on  $\sim (1 - 10)^0$  scales from  $\mathcal{O}(10^4)$  such old SNRs [87]. We discovered that one of these, Loop I, is visible in supposedly ‘foreground-cleaned’ maps of the cosmic microwave background (CMB), with its anomalous microwave emission possibly arising from magnetised dust grains [92, 99]. Part of it crosses the sky region from which the BICEP2 experiment recently detected ‘*B*-mode’ polarisation, which was interpreted as due to gravitational waves from inflation but subsequently shown by the *Planck* satellite to arise from dust emission.

A nearby SNR may also be responsible for the positron excess in cosmic rays seen by the *PAMELA* satellite, later confirmed by AMS-02 on the Space Station, which has been widely speculated to be due to dark matter annihilation or decay. The positron secondaries created near the shock wave will themselves be accelerated and naturally acquire a harder spectrum than the primary electrons. By fitting to the  $e^- + e^+$  spectrum measured by the *Fermi* satellite, we were able to pick out the most plausible SNR source configuration by doing Monte Carlo simulations [68, 403]. Such nearby SNRs would have a  $\gamma$ -ray brightness consistent with the unidentified extended sources seen by *MILAGRO* and should be detectable by *IceCube* in TeV energy neutrinos. As a corollary *B/C* and  $\bar{p}/p$  should also start flattening (or even rising) with energy [67, 91] — this is currently being checked by AMS-02.

Another context in which 2<sup>nd</sup>-order Fermi acceleration of electrons is important is the  $\gamma$ -ray emission from the ‘Fermi bubbles’ — the giant bi-lobar structure at the Galactic Centre. We have shown that inverse-Compton scattering of starlight and CMB photons by electrons fits the spectrum and morphology of the bubbles, and that the electrons can be accelerated on the necessary short time scale by plasma turbulence behind the shocks [80, 404].

I was a member of the *Pierre Auger Observatory* [148, 154, 160, 166] which established the suppression of the energy spectrum of ultra-high energy cosmic rays at around the ‘GZK cutoff’ expected for primary protons due to photopion production on the CMB [143, 151] and a weak correlation between their arrival directions and nearby active galactic nuclei [139, 142]. I am also a member of *IceCube* [288, 290] which made the first observation of high energy neutrinos of cosmic origin [235, 243, 250, 259, 266] and has recently identified a flaring blazar as a source [312, 310]. *IceCube* has also made competitive measurements of atmospheric neutrino oscillations [236, 257, 278, 300] and placed strong constraints on a sterile neutrino [277, 292]. It will be possible to measure the neutrino mass hierarchy with the *PINGU* infill [383, 280]. My main contribution to these experiments has

been to provide state-of-the-art theoretical and phenomenological inputs for the science analyses. For example searches for ultrahigh energy neutrinos require knowledge of their deep inelastic scattering cross-section which we have computed using parton distribution functions measured at HERA [61, 81]. A study of neutrino absorption by the Earth confirms our calculation up to PeV energies [305], as does a measurement of the inelasticity distribution [314]. Another key target of *Auger* and *IceCube* is the ‘cosmogenic’ neutrino flux [198, 242, 309] which we have computed by analysing the intergalactic propagation of UHE cosmic protons, and imposing the constraint from *Fermi* on the concomitant  $\gamma$ -ray background [73]. Motivated by the observation that the chemical composition is getting heavier at the highest energies, we studied the intergalactic propagation of UHE heavy nuclei and showed that the cosmogenic neutrino flux is then reduced substantially [50, 57, 60, 63]. I joined the *Cherenkov Telescope Array* collaboration [354, 355] and participated in defining its science requirements and assessing the ‘Key Science Projects’, as well as elaborating on the science case for the measurements to be performed [357, 385, 356, 385].

**Particle Physics & the Early Universe:** My work has developed and refined the constraints on fundamental physics coming from cosmology and astrophysics. All particles, known or as yet undiscovered, would have been created in the early universe; analysis of their possible effects on the CMB and the light element abundances from Big Bang nucleosynthesis (BBN), enables interesting constraints to be derived on their properties. The production and interactions of particles can also have observable effects in astrophysical objects such as the Sun and supernovae. Such arguments have provided useful guidance on physics beyond the Standard  $SU(3) \otimes SU(2) \otimes U(1)$  Model of particle physics [23].

By combining cosmological constraints with laboratory bounds on leptonic mixing, we demonstrated that the  $\nu_\tau$  must be stable against weak decay, hence lighter than  $2m_e$  [6]. With the subsequent discovery of large-angle neutrino mixing, stronger mass bounds follow, but these arguments remain relevant to other hypothetical neutral leptons e.g. ‘sterile’ neutrinos. We calculated the ‘thermalisation redshift’ above which a large electromagnetic energy release in the early universe (e.g. from decaying  $\nu_\tau$ s) would be instantly converted into blackbody radiation by radiative Compton scattering, leaving no (Bose-Einstein) distortion in the observed spectrum. We showed that even tiny releases of hydrogen ionising radiation would broaden the last scattering surface and noticeably damp the (then) just discovered ‘acoustic peaks’ in the CMB angular power spectrum [33] — this has proven to be a stringent constraint on late-time annihilations of relic particles, enabling precision data from the *Planck* satellite to rule out such annihilations as the source of the *PAMELA/AMS-02* anomaly

The bounds on leptonic mixing used above came from a search for heavy neutrinos using the *Big European Bubble Chamber* in the WA66 ‘beam dump’ in which I participated [9]. When monojet events seen by the *UA1* experiment were interpreted as due to a light gluino, we proposed a search in WA66 and ruled them out from the absence of any excess of neutral current-like events [8]. We also set a stringent bound on the magnetic moment of tau neutrinos [15].

We showed that the thermal production of massive gravitinos can be disastrous for cosmology, implying a constraint on the temperature to which the universe reheated at the end of inflation [7]. The most restrictive bound comes from consideration of the potential overproduction of D and  $^3\text{He}$  through the photodisintegration of  $^4\text{He}$  by the radiation cascade triggered in the plasma by high energy photons from gravitino decays. This implies that the baryon asymmetry cannot have been created at the GUT scale and has motivated many theoretical attempts to generate it by alternative means such as ‘leptogenesis’ which is linked to neutrino mass [34]. In subsequent work we further refined these bounds and derived new constraints on high energy neutrinos and cosmic rays produced through the decay of metastable relic particles, which have ruled them out as dark matter [13].

Such arguments have wide application, e.g. the Next-to-Minimal-Supersymmetric Standard Model (NMSSM) which addresses the ‘ $\mu$  problem’ due to the mixing of the two Higgs doublets in the MSSM by introducing an additional singlet, is *inconsistent* with cosmology [21]. Unacceptable domain walls form at  $SU(2) \otimes U(1)$  symmetry breaking due to the underlying  $Z_3$  symmetry — the wall network can decay through non-renormalisable terms that violate it but these in turn induce tadpole divergences which destabilise the hierarchy and reintroduce the hierarchy problem. This remains an important constraint on variant models of weak scale supersymmetry which are still consistent with LHC data.

We showed that in supergravity-based inflationary models, the Hubble parameter cannot exceed the gravitino mass [20]. Gravitino overproduction is avoided if the inflaton is in a hidden sector and its potential is sufficiently flat if it is a Goldstone mode [27]. Taking non-renormalisable terms into account, inflation can occur as low as the electroweak scale but still generate the required amplitude of density perturbations [41]. Topological inflation can be realised in the ‘racetrack’ model which solves the dilaton runaway problem [56]. Moreover, other scalar fields can undergo symmetry breaking phase transitions *during* inflation, introducing spectral features [28] and associated non-Gaussianity [69]. We developed a robust technique for deconvolving CMB and large-scale structure data [89] and have found marginal evidence for spectral features [97]. This can be encoded in the EFT of inflation [107]

We proposed that quantum gravity effects might be detectable by looking for high energy Lorentz invariance violation (LIV) through e.g. energy-dependent arrival time dispersion in cosmologically distant  $\gamma$ -ray bursts [30]. This demonstration that the Planck scale is not beyond experimental reach has generated considerable interest. Observations by Cherenkov telescopes and *Fermi* have however ruled out a LIV term  $\propto E_\gamma^2/M_{\text{Pl}}$  in the dispersion relation. However an even smaller (and theoretically more plausible) term  $\propto E_\gamma^3/M_{\text{Pl}}^2$  can decohere oscillations of cosmic neutrinos and alter their flavour ratios away from the large-angle mixing based expectation at a level detectable by *IceCube* [52]

We calculated the error correlation matrix for BBN and highlighted systematic uncertainties in inferring the primordial abundances [31], which allow an additional light neutrino (or equivalent particle) [35]. This imposes constraints on e.g. an additional  $Z'$  to which singlet neutrinos are coupled [10], on a ‘time-varying cosmological constant’ [25], on photon mixing [29] and on a light neutralino [85].

**Dark Matter & Dark Energy:** An attractive particle candidate for dark matter is the lightest supersymmetric state. We have shown that neutralinos in the NMSSM can be significantly lighter than the weak scale [17] — a possibility that has become experimentally interesting recently. Alternatively the dark matter may consist of very massive metastable particles e.g. ‘cryptons’ (bound states from the hidden sector of SUSY breaking). The high energy neutrino flux from their decays is detectable in underground experiments and requires such particles to have lifetimes  $> 10^{16}$  yr [16]. When ultrahigh energy cosmic rays were detected beyond the expected ‘GZK cutoff’ we proposed that these arise from the slow decays of such particles clustered in the galactic halo [32] — the observed spectrum is well matched by that expected from QCD fragmentation [43], while the expected small anisotropy in arrival directions should be detectable with forthcoming data [40]. (This model is now disfavoured because *Auger* data show that the trans-GZK flux is indeed suppressed and high energy photons do *not* dominate over nucleons as would be expected from particle decays, however these calculations remain relevant e.g. constraining models of the *IceCube* events as due to decaying dark matter [308].)

We first emphasised that the dwarf spheroidal satellite galaxies of the Milky Way are good search targets for  $\gamma$ -rays from dark matter annihilation, using dynamical arguments to infer their dark matter content [47, 79, 94]. However dark matter may have an asymmetry like baryons and *not* annihilate — we showed that accreted dark matter can then affect heat transport in the Sun and potentially solve the ‘Solar composition problem’ as well as alter Solar neutrino fluxes [70]. Such dark matter arises in models of new strong dynamics [78] and can have different couplings to protons and neutrons, thus potentially reconciling the signal seen in DAMA with upper limits from XENON [82]. However astrophysical uncertainties alone cannot make these results consistent [84]. We discussed collider probes of such new vector interactions [86]. We have studied dark matter self-interactions in colliding clusters [90] and reassessed the recent claim for a signal in A3827 [95].

The breaking of scale-invariance of primordial perturbations due to phase transitions occurring during inflation can dramatically affect cosmological parameter extraction from CMB and other data, in particular doing away with the need for dark energy [39, 46, 59, 65]. Our recent analysis of the Type Ia supernova Hubble diagram also shows that the evidence for cosmic acceleration is *marginal* [96]. Dark energy may thus be just an artifact of interpreting data in an oversimplified model framework. Moreover searches for its dynamic effects, such as the ‘late ISW effect’ using observations of stacked voids, are, we find, inconsistent with the standard  $\Lambda$ CDM cosmological model [83], as is the number of merging galaxy clusters [93]. Our recent work shows that cosmic acceleration is *anisotropic* [106, 109, 110] so cannot be due to a Cosmological Constant, and that the CMB dipole may not be of kinematic origin [101, 104, 111] thus undermining the Cosmological Principle.

**Invited Talks at Conferences & Workshops:**

1. ICHEP 85: International Conference on High Energy Physics, Bari, Jul 1985
2. ISMD 86: XXVI International Symposium on Multiparticle Dynamics, Seewinkel, Jun 1986 [116]
3. UK HEP Theory X'mas Meeting, Rutherford Appleton Laboratory, Chilton, Dec 1987
4. NATO ASI: *Observational Tests of Cosmological Inflation*, Durham, Dec 1990 [117]
5. UK HEP Theory X'mas Meeting, Rutherford Appleton Laboratory, Chilton, Dec 1990
6. UK HEP Cosener's House Forum: *Dark Matter*, Abingdon, Jun 1991
7. UK Institute of Physics Discussion Meeting: *Dark Matter*, London, Jun 1991
8. NORDIC meeting on Theoretical Physics, Copenhagen, Aug 1993
9. XI DAE Symposium on High Energy Physics, Shantiniketan, Jan 1994
10. UK HEP Forum: *New Horizons in Astroparticle Physics*, Abingdon, Feb 1994
11. UK HEP Forum: *Particle Cosmology*, Abingdon, Jun 1994
12. Royal Astronomical Society Discussion Meeting: *Neutron Stars*, London, Jan 1995
13. UK National Astronomy Week, Cardiff, Apr 1995
14. Inaugural Conference of the Asia-Pacific Centre for Theoretical Physics, Seoul, Sep 1996 [119]
15. WHEPP 96: Fourth Workshop on High Energy Physics Phenomenology, Calcutta, Jan 1996
16. DARK 96: *Dark Matter in Astro- & Particle Physics*, Heidelberg, Sep 1996 [118]
17. WIN 07: XVI Intern. Workshop on Weak Interactions & Neutrinos, Capri, Jun 1997 [120]
18. International Workshop on Synthesis of Nuclei in the Early Universe, Trento, Jun 1997
19. ICTP Workshop: *Highlights in Astroparticle Physics*, Trieste, Nov 1997
20. UK Institute of Physics Annual Conference on High Energy Physics, Manchester, Apr 1998
21. CAPP-98: International Workshop on Cosmology & Particle Physics, Geneva, Jun 1998
22. DARK 98: *Dark Matter in Astro- & Particle Physics*, Heidelberg, Jul 1998
23. NOW 98: EPS Neutrino Oscillation Workshop, Amsterdam, Sep 1998 [379]
24. ICTP Workshop: *The Physics of Relic Neutrinos*, Trieste, Sep 1998
25. DESY Theory Workshop: *Directions Beyond the Standard Model*, Hamburg, Oct 1998
26. JENAM'99: Joint European & National Astronomical Meeting, Toulouse, Sep 1999
27. COSMO-99: *Particle Physics & the Early Universe*, Trieste, Oct 1999 [123]
28. Landelijk Seminarium, NIKHEF, Amsterdam, Dec 1999
29. Annual UK HEP Theory Meeting, Rutherford Appleton Laboratory, Chilton, Dec 1999
30. Nordic Workshop: *Neutrino physics & Cosmology*, Copenhagen, Apr 2000
31. Summer Institute: *Dark Matter & Supersymmetry*, Gran Sasso, Jul 2000
32. XIII Recontres des Blois: *Frontiers of the Universe*, Blois, Jun 2001 [129]

33. International Workshop: *The Physics of Extra Dimensions*, Paris, Jun 2001
34. International Conference: *Deuterium in the Universe*, Meudon, Jun 2001
35. ICHEP 01: Intern. Europhysics Conf. on High Energy Physics, Budapest, Jul 2001 [[126](#)]
36. COSMO-01: *ParticlePhysics & the Early Universe*, Rovaniemi, Sep 2001 [[127](#)]
37. IUCAA Workshop: *Interface of Gravitational & Quantum Realms*, Pune, Dec 2001 [[44](#)]
38. NORDITA Meeting on Astroparticle Physics & Cosmology, Copenhagen, Mar 2002
39. Planck 01: International Conference on Supersymmetry & Brane Worlds, Kazimierz, May 2002
40. Workshop: *Cosmoseismology & Entropy Perturbations*, Portsmouth, Jun 2002
41. International Conference on String/M-theory Phenomenology, Oxford, Jul 2002
42. International Workshop on Branes, Gravity, . . . : *New Interfaces*, London, Sep 2002
43. HEP 2003: Workshop on High Energy Physics and Cosmology, Athens, Apr 2003
44. Planck 03: *From the Planck Scale to the Electroweak Scale*, Madrid, May 2003
45. CAPP-2003: International Workshop on Cosmology & Particle Physics, Geneva, Jun 2003
46. Claude Itzykson meeting: *Which Model(s) for the Early Universe?*, Saclay, Jun 2003
47. Eötvös Graduate Course and Workshop in Physics, Balatonfüred, Jun 2003 [[130](#)]
48. ISMD 03: XXXIII International Symposium on Multiparticle Dynamics, Krakow, Sep 2003 [[128](#)]
49. International Workshop on Astroparticle & High Energy Physics, Valencia, Oct 2003
50. 315th WE-Heraeus-Seminar: *Dark Matter and Dark Energy*, Bad Honnef, Dec 2003
51. Institute of Physics UK Particle Physics Conference 2004, Birmingham, Apr 2004
52. Planck 04: *From the Planck Scale to the Electroweak Scale*, Bad Honnef, May 2004
53. International Conference: *The density Perturbation in the Universe*, Athens, Jun 2004 [[131](#)]
54. *Terrestrial and Cosmic Neutrinos, leptogenesis and Cosmology*, Benasque, Jul 2004
55. ISVHECRI 04: Intern. Symp. on Very High Energy Cosmic Ray Interactions, Pylos, Sep 2004
56. UK High Energy Physics Forum: *Cosmic Particles*, Abingdon, Feb 2005
57. SNS Pisa-UCLA Workshop: *Cosmic Connections*, La Magia, Apr 2005
58. Montpellier-Toulouse meeting: *Dark Energies, Dark matters*, Paris, Apr 2005
59. PASCOS'05: International Conference on Particles, Strings & Cosmology, Gyeongju, Jun 2005
60. COSMO 05: Intern. Workshop on Particle Physics & the Early Universe, Bonn, Sep 2005
61. European Astroparticle Physics Town Meeting, Munich, Nov 2005
62. International Conference: *From Strings to Cosmic Web*, Groningen, Dec 2005
63. Cosmology 2005: *A Reality Check*, Copenhagen, Dec 2005
64. XI IFT-UAM/CSIC Christmas Workshop on Particle Physics, Madrid, Dec 2005
65. Workshop on High Energy Physics Phenomenology, Bhubaneswar, Jan 2006 [[380](#)]

66. Sixth National Astroparticle Symposium, Amsterdam, Feb 2006
67. HEP2006: [Recent Developments in High Energy Physics & Cosmology](#), Ioannina, Apr 2006
68. ToK Workshop on Particle Physics & Cosmology, Warsaw, May 2006
69. Institute of Physics UK, Astroparticle Group meeting, Sheffield, May 2006
70. International Workshop: *The Dark Side of the Universe*, Madrid, Jun 2006
71. International Conference: *Quantum ... Gravity and Cosmology*, Barcelona, Jul 2006
72. DESY Theory Workshop: *The Dark Universe*, Hamburg, Sep 2006
73. *Outstanding questions for the standard cosmological model*, London, Mar 2007
74. *From IRAS to Herschel/Planck*, London, Jul 2007
75. ASPERA workshop for the Astroparticle Roadmap, Phase II, Paris, Jul 2007
76. COSMO 07: Intern. Workshop on Particle Physics & the Early Universe, Falmer, Aug 2007
77. TRR-33 Workshop: *The Dark Universe*, Bad Honnef, Oct 2007
78. AMT Workshop: *Questions for the Universe*, Toulouse, Nov 2007
79. ICGC 07: International Conference on Gravitation & Cosmology, Pune, Dec 2007
80. Rencontre des Particules, Annecy, Jan 2008
81. Workshop on *Nu Horizons*, Allahabad, Feb 2008
82. International Workshop: *Quarks in astrophysics and cosmology*, Puri, Feb 2008
83. Nordic Workshop: *Field Theoretical Applications in Cosmology*, Copenhagen, Mar 2008
84. UK HEP Forum Meeting: *Neutrino Horizons in the 21st Century*, Abingdon, Apr 2008
85. International Conference: *Progress on Old and New Themes in Cosmology*, Avignon, Apr 2008
86. Neutrino 08: Intern. Conf. on Neutrino Physics & Astrophysics, Christchurch, May 2008 [[133](#)]
87. International Conference on Quantum Geometry & Quantum Gravity, Nottingham, Jul 2008
88. [International Conference on Dark Energy and Dark Matter](#), Lyon, Jul 2008 [[134](#)]
89. ICTS Workshop: *Cosmology with CMB and LSS*, Pune, Aug 2008
90. ICTS Workshop: *QCD at High Parton Density*, Panjim, Sep 2008
91. ISSI Workshop: *The Nature of Gravity*, Bern, Oct 2008
92. Royal Astronomical Society Discussion Meeting: *Galaxies and the Elements*, London, Nov 2008
93. IoP UK Meeting: *Searching for Dark Matter Underground & at the LHC*, London, Dec 2008
94. WAPP-08: Workshop on Astroparticle Physics, Ootacamund, Dec 2008
95. ToK Workshop on Particle Physics and Cosmology, Warsaw, Feb 2009
96. Eleventh National Astroparticle Symposium, Leiden, March 2009
97. ICTS Workshop: *Neutrinos in Particle Astrophysics & Cosmology*, Mahabalipuram, Apr 2009
98. *Cosmology and astroparticle physics from the LHC to PLANCK*, Copenhagen, Jun 2009

99. CHIPP Workshop: *Astroparticle Physics*, Lausanne, Jun 2009
100. PPAP Meeting: *Neutrino & Non-accelerator Physics*, Birmingham, Jul 2009
101. *Universe in a Box : LHC, Cosmology & Lattice Field Theory*, Leiden, Aug 2009
102. Workshop on *Origin of mass*, Odense, Nov 2009
103. HEAP 2009: *Cosmic Particles, Jets and Accelerator Science*, Tsukuba, Nov 2009
104. WAPP-09: Workshop on Astroparticle Physics, Darjeeling, Dec 2009
105. [Workshop on the New, the Rare and the Beautiful](#), Zurich, Jan 2010
106. DISCOVERY Centre inauguration, Copenhagen, Jan 2010
107. [ToK Workshop: Particle Physics & Cosmology](#), Warsaw, Feb 2010
108. [Workshop: Frontiers of Cosmology](#), Heraklion, Apr 2010
109. [Cosmology and astroparticle physics from the LHC to PLANCK](#), Copenhagen, Jun 2010
110. [NEB14: Recent developments in gravity](#), Ioannina, Jun 2010
111. [PPC 2010: Workshop on interconnection between particle physics & cosmology](#), Torino, Jul 2010
112. [TeVPA-10: International conf. on TeV Particle Astrophysics](#), Paris, Jul 2010
113. [Darkness visible: Workshop on Dark Matter in Astro- & Particle Physics](#), Cambridge, Aug 2010
114. [UniverseNet Workshop: Confronting Theory with Observations](#), Copenhagen, Aug 2010
115. [SUSY10: Supersymmetry & Unification of Fundamental Interactions](#), Bonn, Aug 2010
116. WAPP-10: Workshop on Astroparticle Physics, Ootacamund, Dec 2010
117. Workshop on *Dark Matter in the LHC Era: Direct and Indirect Searches*, Kolkata, Jan 2011
118. [XIV International Workshop on Neutrino Telescopes](#), Venice, Mar 2011
119. [IoP Nuclear & Particle Physics Divisional Conf.](#), Glasgow, Apr 2011
120. [Workshop on Cosmology & astroparticle physics from LHC to PLANCK](#), Copenhagen, Jun 2011
121. [NuSky2011: International Workshop on Cosmic Rays & Cosmic Neutrinos](#), Trieste, Jun 2011
122. [TeVPA-11: Workshop on TeV Particle Astrophysics](#), Stockholm, Aug 2011
123. [ICRC2011: 32<sup>nd</sup> International Cosmic Ray Conference](#), Beijing, Aug 2011
124. [XXV International Symposium on Lepton Photon Interactions](#), Mumbai, Aug 2011
125. RAS Specialist Discussion Meeting, [Exploring the Non-Thermal Universe](#), London, Nov 2011
126. HEAP 2011: [Gamma-ray universe: Fermi to CTA](#), Tsukuba, Nov 2011
127. [OPERA versus Maxwell and Einstein' event](#), King's College London, Nov 2011
128. [CTA Consortium Meeting](#), Univ Complutense Madrid, Nov 2011
129. [Amazing Particles & Light: Horizons in Accelerators and Enabled Sciences](#), Bangalore, Dec 2011
130. *Advances in Astroparticle Physics & Cosmology*, Darjeeling, Mar 2012
131. [National Symposium on Particles, Detectors and Instrumentation](#), Mumbai, Mar 2012



132. HEP2012: *Recent Developments in High Energy Physics and Cosmology*, Ioannina, Apr 2012
133. Planck 2012: *From the Planck Scale to the Electroweak Scale*, Warsaw, May 2012
134. NORDITA Workshop on *Origin of Mass 2012*, Stockholm, Jun 2012
135. *darkattack2012*, Ascona, Jul 2012
136. *International Symposium on Very High Energy Cosmic Ray Interactions*, Berlin, Aug 2012
137. IAU XXVIII General Assembly: *The Highest-Energy Gamma-ray Universe*, Beijing, Aug 2012
138. Workshop on *Physics of De Sitter Space-time*, Hannover, Sep 2012
139. John Ellis Day, *Outlook in Particle Physics*, London, Oct 2012
140. *IMAPP Jubilee Colloquium*, Nijmegen, Nov 2012
141. *Partikeldagarna*, Stockholm, Nov 2012
142. *ASPERA ad futurum*, Brussels, Nov 2012
143. V F Hess Centenary Symposium, Mumbai, Dec 2012
144. *Time & Matter*, Venice, Mar 2013
145. Nordic CTA Meeting, Stockholm, Mar 2013
146. 47th ESLAB Symposium: *The Universe as seen by PLANCK*, Noordwijk, Apr 2013
147. Latsis Symposium: *Nature at the Energy Frontier*, Zurich, Jun 2013
148. *KSETA Plenary Workshop*, Bad Herrenalb, Feb 2014
149. *New Frontiers in Theoretical Physics*, Cortona, May 2014
150. *Strategy Workshop on Astroparticle in Switzerland*, Geneva, Jun 2014
151. *Frontiers of Fundamental Physics*, Marseille, Jul 2014
152. *DISCRETE 2014*, London, Dec 2014
153. *NuPhys2014*, London, Dec 2014
154. *LahanasFest*, Athens, Jan 2015
155. *Measuring B-mode polarization from Greenland*, Copenhagen, Feb 2015
156. *AMS Days at CERN: The Future of Cosmic Ray Physics*, Geneva, Apr 2015
157. *WylerFest*, Zurich, May 2015
158. *5th Iberian Gravitational-Wave Meeting*, Barcelona, May 2015
159. Workshop on *Alternative matter & alternative gravity*, Heraklion, May 2015
160. *TamavakisFest*, Ioannina, May 2015
161. *Planck 2015*, Ioannina, May 2015
162. *2015: The Spacetime Odyssey Continues*, Stockholm, Jun 2015
163. *Current Themes in High Energy Physics & Cosmology*, Copenhagen, Aug 2015
164. *European Nuclear Physics Conference*, Groningen, Sep 2015

165. [Sixth Quantum Universe Symposium](#), Groningen, Mar 2016
166. [APPEC Town Meeting](#), Paris, April 2016
167. [Axion-like Particles: Theory & Experiment](#), Durham, April 2016
168. [CMB Spectral Distortions](#), Bangalore, Jul 2016
169. [Relativistic astrophysics & gravitational waves](#), Copenhagen, Jul 2016
170. [Current Themes in High Energy Physics & Cosmology](#), Copenhagen, Aug 2016
171. [LHC Days in Split](#), Split, Sep 2016
172. [Danish Astroparticle Physics Meeting](#), Odense, Oct 2016
173. [Dark matter from aeV to ZeV](#), Lumley Castle, Nov 2016
174. [Landelijk Seminarium](#), NIKHEF, Mar 2017
175. [DIS 2017](#), Birmingham, Apr 2017
176. [The future of WIMP dark matter](#), Chicheley Hall, May 2017
177. [Messengers: Astroparticles and Gravitational Waves](#), Stockholm, Jul 2017
178. [DAVCo: DArK matter, neutrinos and their Connections](#), Odense, Sep 2017
179. [Galileo Institute Conference: Collider Physics & the Cosmos](#), Florence, Oct 2017
180. [Probing Fundamental Physics with CMB Spectral Distortions](#), Geneva, Mar 2018
181. [New Probes for Physics Beyond the Standard Model](#), Santa Barbara, Apr 2018
182. [The small-scale structure of cold\(?\) dark matter](#), Santa Barbara, Apr 2018
183. [Symposium on Particle, Astroparticle & Cosmology](#), Tallin, Jun 2018
184. [NORDITA Workshop: Cosmology & Gravitational Physics with Lambda](#), Stockholm, Jul 2018
185. [Current themes in High Energy Physics and Cosmology](#), Copenhagen, Aug 2018
186. [Workshop on The Standard Model & Beyond](#), Corfu, Sep 2018
187. [Hillas Symposium](#), Heidelberg, Dec 2018
188. [XVIII International Workshop on Neutrino Telescopes](#), Venice, Mar 2019 [talk]
189. [International Conference on High-Energy-Density Physics](#), Oxford, Apr 2019
190. [Ninth Quantum Universe Symposium](#), Groningen, Apr 2019
191. [1st CTA Science Symposium](#), Bologna, May 2019
192. [ICTP-AP International Conference on Frontiers of Fundamental Physics](#), Beijing, May 2019
193. [36th International Cosmic Ray Conference](#), Madison, Jul 2019
194. [International Conf. on Fundamental Physics](#), Hyderabad, Sep 2019
195. [15<sup>th</sup> Central European Seminar on Particle Physics & Quantum Field Theory](#), Vienna, Nov 2019
196. [Multimessengers, compact objects and fundamental physics](#), Prague, Dec 2019
197. [AAPCOS2020: Advances in Astroparticle Physics and Cosmology](#), Kolkata, Jan 2020

**Invited Lectures at Schools:**

1. ICTP Summer School in High Energy Physics & Cosmology, Trieste, Jul 1985 [115]
2. Scuola Internazionale Superiore Studi Avanzati (SISSA) Graduate School, Trieste, Jul 1986
3. GIFT School in Theoretical Physics, Peniscóla, Aug 1986
4. Adriatic School on High Energy Physics, Split, Jun 1987
5. Centro Fundamental Materia Condensada (CFMC) Graduate School, Lisbon, Mar 1992
6. Spring School in High Energy Physics & Cosmology, Tenerife, May 1992
7. Tata Institute of Fundamental Research (TIFR) Graduate School, Bombay, Aug 1993
8. Indian Institute of Astrophysics (IoA) Graduate School, Bangalore, Dec 1994,
9. BCSPIN/ICTP Summer School in Physics, Kathmandu, May 1997
10. Autumn School on Theoretical Physics, Santiago de Compostela, Sep 1997
11. XIX UK Institute for Theoretical High Energy Physicists, Oxford, Aug 1998
12. Graduiertenkolleg on Cosmology & Statistical Physics, Heidelberg, Nov 1998
13. IPM School on Large-scale structure formation, Kish, Jan 1999 [122]
14. Bruno Pontecorvo School on Elementary Particles, Capri, May 1999
15. Finnish Particle Cosmology School, Kiljavanranta, Aug 1999
16. NATO Advanced Study Institute: Particle Physics & Cosmology, Cascais, Jul 2000 [124]
17. British Universities Summer School in Elementary Particle Physics, Oxford, Sep 2000
18. British Universities Summer School in Elementary Particle Physics, Manchester, Sep 2001
19. International Graduate School in Mathematics & Physics, Bonn, Jan 2002
20. ICTP Summer School on Particle Physics & Cosmology, Trieste, Jul 2002
21. Second Crete School on String Theory, Kolymbari, June 2003
22. Second Aegean School on the Physics of the Early Universe, Syros, Sep 2003
23. CERN Summer Student Programme: *Introduction to Cosmology*, Geneva, Aug 2004
24. Third Aegean School on the Physics of the Early Universe, Chios, Sep 2005
25. CERN Summer Student Programme: *Introduction to Cosmology*, Geneva, Jul 2006
26. Nordic Winter School in Particle Physics & Cosmology, Gausdal, Jan 2007
27. CERN Summer Student Programme: *Introduction to Cosmology*, Geneva, Jul 2007
28. CERN Summer Student Programme: *Introduction to Cosmology*, Geneva, Jul 2008
29. ICTS School: *Cosmology with CMB and LSS*, Pune, Aug 2008
30. ICTS School: *QCD at High Parton Density*, Dona Paula, Sep 2008
31. Les Houches School: *Searching for Dark Matter*, Les Houches, Mar 2009
32. Corfu Summer School: *The Standard Model & Beyond*, Corfu, Sep 2009

33. DPG Physics School: *Astroparticle Physics*, Bad Honnef, Sep 2009
34. Winter School in Astroparticle Physics, Darjeeling, Dec 2009
35. YETI School in Astroparticle Physics, Durham, Jan 2009
36. [Taller de Altas Energias: \*Astroparticle Physics\*](#), Barcelona, Sep 2010
37. [CORSIKA Winter School in Astroparticle Physics](#), Ooty, Dec 2010
38. [Corfu Summer Institute: \*Unification in the LHC Era\*](#), Corfu, Sep 2011
39. [Intern. School of Cosmic Ray Astrophysics: \*A new era in particle astrophysics\*](#), Erice, Jul 2012
40. [4th International Summer School on Astroparticle Physics](#), Nijmegen, Aug 2012
41. [Nordic Winter School on Particle Physics and Cosmology](#), Gausdal, Jan 2013
42. [International School for AstroParticle Physics \(ISAPP\) 2013](#), Djurönäset, Aug 2013
43. [Corfu Summer School: \*The Standard Model & Beyond\*](#), Sep 2013
44. [Corfu Summer School \*The Standard Model & Beyond\*](#), Sep 2014
45. [ICTP Summer School on Particle Physics](#), Jun 2015
46. [Taller de Altas Energias](#), Benasque, Sep 2016
47. [Nordic Winter School on Particle Physics and Cosmology](#), Skeikampen, Jan 2017
48. [GIAN School: \*Dark Matter: The Astroparticle Connection\*](#), New Delhi, Dec 2017
49. [International School of Cosmic Ray Astrophysics](#), Erice, Aug 2018
50. [Cracow School of Theoretical Physics](#), Zakopane, Jun 2019
51. [Summer Research School: \*Quantum to Cosmos: Ideas and Applications\*](#), Gebze, Jul 2019

#### D.Phil Theses Supervised:

1. [Kevin C. Benson](#), Wadham College, Oxford, 1991–93  
(Thesis: ‘*Aspects of the electroweak phase transition & baryogenesis*’)
2. [Jennifer A. Adams](#), Magdalen College, Oxford, 1992–95  
(Thesis: ‘*Cosmological phase transitions: techniques & applications*’)
3. [Sebastian E. Larsson](#), Christ Church College, Oxford, 1993–98  
(Thesis: ‘*Topological defects from cosmological phase transitions*’)
4. [Michael Birkel](#), Linacre College, Oxford, 1994–97  
(Thesis: ‘*Astroparticle physics beyond the Standard Model*’)
5. [Fermin Viniegra](#), Worcester College, Oxford, 1997–2001  
(Thesis: ‘*Reheating in inflationary cosmology*’) — with B Bassett
6. [Mario Santos](#), Wadham College, Oxford, 1999–2003  
(Thesis: ‘*Primordial effects in the CMB*’) — with P Ferreira
7. [David Skinner](#), Linacre College, Oxford, 1999–2003  
(Thesis: ‘*Cosmology of heterotic M-theory*’)
8. [Paul Hunt](#), St John’s College, Oxford, 2000–06  
(Thesis: ‘*The cosmological implications of inflation*’)

9. [Andrew Taylor](#), Linacre College, Oxford, 2003–06  
(Thesis: ‘*The intergalactic propagation of ultrahigh energy cosmic rays*’)
10. [Francesco Riva](#), Merton College, Oxford, 2004–08  
(Thesis: ‘*Cosmological consequences of supersymmetric flat directions*’) — with J March-Russell
11. [Shaun Hotchkiss](#), Balliol College, Oxford, 2006–10  
(Thesis: ‘*Inflation: beyond the scalar fluctuation power spectrum*’)
12. [Philipp Mertsch](#), Balliol College, Oxford, 2007–10  
(Thesis: ‘*Cosmic ray backgrounds for dark matter indirect detection*’)
13. [Seshadri Nadathur](#), Merton College, Oxford, 2007–11  
(Thesis: ‘*Inflation, large-scale structure & inhomogeneous cosmologies*’)
14. [Felix Kahlhoefer](#), St Catherine’s College, Oxford, 2011–14  
(Thesis: ‘*Complementarity of searches for dark matter*’)
15. [Kyle Allison](#), Balliol College, Oxford, 2010–14  
(Thesis: ‘*The Standard Model to the Planck scale*’) — with G Ross
16. [Jim Talbert](#), Hertford College, Oxford, 2012–16  
(Thesis: ‘*From the LHC to IceCube, a melange of particle phenomenology*’) — with G Bell
17. [David Kraljic](#), Balliol College, Oxford, 2012–16  
(Thesis: ‘*Inhomogeneities in Cosmology*’)
18. [Jeppe Trøst Nielsen](#), Niels Bohr Institute, Copenhagen, 2013–17  
(Thesis: ‘*Testing cosmological models*’)
19. [Amel Durakovic](#), Niels Bohr Institute, Copenhagen, 2014–18  
(Thesis: ‘*On the likely structure and origin of primordial fluctuations*’)
20. [Konstantin Beyer](#), Merton College, Oxford, 2017–  
(working on axion plasma physics) — with G Gregori
21. [Rudin Petrossian-Byrne](#), Balliol College, Oxford, 2017–  
(working on BSM physics) — with J March-Russell
22. [Giacomo Marocco](#), Balliol College, Oxford, 2018–  
(working on non-accelerator physics) — with J Wheeler

## Refereeing

Appointments & Promotions: CERN, Geneva; Demokritos, Athens; DESY, Zeuthen; Fermilab, Batavia; HRI, Allahabad; IISER, Bhopal; IMSc, Chennai; ICTP, Trieste; IUCAA Pune; King’s College, London; LAPTH, Annecy; Michigan State University; MPIK Heidelberg; National Technical University Athens; NISER, Jatni; NORDITA Stockholm; Penn State University; RRI, Bangalore, Royal Holloway, University of London; SINP Kolkata; SISSA Trieste; TIFR Mumbai; Tufts University; Universität Aachen; University of Athens; University of Bath; University of California, Berkeley; University of California, Los Angeles; University of California, Riverside; University of Cambridge; University of Crete; Universität Dortmund; University of Durham; University of Edinburgh; University of Geneva; Universität Göttingen; Universität Hamburg; Universität Karlsruhe; University of Lancaster; University of Lyon; University of Massachusetts, Amherst; University of Montpellier 2; University of New Mexico; University of Nottingham; Universität Potsdam; University of Southampton; Universität Wuppertal; Universität Zurich

Grant applications: Academy of Finland; Agence Nationale de la Recherche, France; Alexander von Humboldt Stiftung, Germany; Australian Research Council; Department of Atomic Energy, India; Department of Energy, USA; Department of Science & Technology, India; Deutsche Forschungsgemeinschaft, Germany; Engineering & Physical Sciences Research Council, UK; European Commission; European Research Council; European Space Agency; Fondazione Cariparo, Italy; Fundamenteel Onderzoek der Materie, Netherlands; International Centre for Theoretical Physics, Trieste; Istituto Nazionale di Fisica Nucleare, Italy; Leverhulme Foundation, UK; Ministero dell'Istruzione, Italy; Ministry of Education, Greece; National Research Foundation, South Africa; National Science Foundation, USA; Natural Sciences and Engineering Research Council, Canada; Nederlandse Organisatie voor Wetenschappelijk Onderzoek; Newton Institute, Cambridge; RANNIS Iceland; Royal Society of New Zealand; The Royal Society, UK; Science & Technology Facilities Council, UK; Swiss National Science Foundation; Tata Institute of Fundamental Research, Mumbai

Book proposals: Cambridge University Press, Oxford University Press

Journals: Astronomy & Astrophysics, Astrophysical Journal, Astroparticle Physics, Astrophysics & Space Science, Classical & Quantum Gravity, Computer Physics Communications, European Physical Journal C, Europhysics Letters, Journal of Cosmology & Astroparticle Physics, Journal of High Energy Physics, International Journal of Modern Physics A, Modern Physics Letters, Monthly Notices of the Royal Astronomical Society, Nature, Nuclear Physics B, Physics Letters B, Physical Review D, Physical Review Letters, Pramana, Reports on Progress in Physics, Science

## Organisation of Conferences, Schools & Workshops:

### ▷ Main Organiser:

- UK Theoretical Cosmology Network meeting, Oxford, 15 May 1996, 26 Mar 1997, 20 May 1998
- EU Research & Training School: *Supersymmetry & the Early Universe*, Oxford, 26–29 Sep 2002
- IceCube collaboration meeting, Oxford, 21–24 Sep 2005
- ASPERA Workshop: *Theory and Astroparticle Physics*, Oxford, 17 Mar 2008
- EU Research & Training School: *Fundamental Physics & Cosmology*, Oxford, 22–26 Sep 2008
- First LINK Workshop: *Probing Physics beyond the SM with CTA*, Abingdon, 12 Nov 2010
- GrahamFest, Oxford, 30 Sep 2011
- IoP/IPPP Workshop: *New paths to particle dark matter*, Oxford, 29–30 Mar 2012
- NBIA PhD School: *Neutrinos underground and in the heavens*, Copenhagen, 23–27 Jun 2014
- 2<sup>nd</sup> NBIA-APCTP Workshop: *Cosmology & Astroparticle Physics*, Copenhagen, 18–22 Aug 2012
- NBIA-Oxford Colloquium, Copenhagen, 13–15 Apr 2015
- NBIA PhD School: *Neutrinos underground and in the heavens II*, Copenhagen, 1–5 Aug 2016
- NBIA Workshop: *Self-interacting dark matter*, Copenhagen, 1–5 Aug 2017

### ▷ Local Organising/Advisory Committee:

- SUSY 98, Oxford, 11–17 Jul 1998
- Kogan Memorial Meeting: *From Fields to Strings*, Oxford, 8–10 Jan 2004
- First International Conference on *String/M-theory Phenomenology*, Oxford, 6–11 Jul 2002
- UK Neutrino Network meeting, Oxford, 29 Nov 2006
- Astroparticle Physics UK meeting, Oxford, 18–20 Jun 2008
- Rudolf Peierls Symposium on Theoretical Physics, Oxford, 5–6 Jul 2018
- British Univ. Summer School in Theoretical Elementary Particle Physics, Oxford, 20–31 Aug 2018
- *Higgs Couplings 2019*, Oxford, 30 Sep–4 Oct 2019

### ▷ Organising Committee:

- UK Institute for Theoretical High Energy Physics, Cambridge, 1–7 Sep 1991
- UK HEP Forum: *Cosmology after COBE*, Abingdon, 20–21 Jun 1992
- International Europhysics Conference on High Energy Physics, Brussels, 28 Jul–3 Aug 1995
- 28th International Conference on High Energy Physics, Warsaw, 25–31 Jul 1996
- UK HEP Forum: *New Horizons in Neutrino Physics*, Abingdon, 8–9 May 1999
- EU Network School: *The Early Universe*, CERN, 19–22 Apr 2001
- IPPP Workshop: *Phenomenology of Ultra-high-energy Cosmic Rays*, Durham, 21 June 2002

- UK HEP Forum: *The World according to WMAP*, Abingdon, 7–8 Jun 2003
  - Astrophysics/Cosmology Session, *SUSY'05*, Durham, 18–23 Jul 2005
  - *Dalitz Memorial Meeting*, Oxford, 3 Jun 2006
  - EU Network School: *The Origin of the Universe*, Mytilene, 24–29 Sep 2007
  - IoP/RAS meeting: *The Search for Dark Matter*, London, 26 Nov 2007
  - International Workshop: *Cosmology with the CMB & LSS*, Pune, 18–31 Aug 2008
  - PPAP Community Meeting: *Neutrino & Non-accelerator Physics*, Birmingham, 15 July 2009
  - 9th Hellenic School of Elementary Particle Physics & Gravity, Corfu, 30 Aug–20 Sep 2009
  - EU Network School: *Particle Physics & Cosmology*, Barcelona, 28 Sep–2 Oct 2009
  - 10th Hellenic School of Elementary Particle Physics & Gravity, Corfu, 29 Aug–5 Sep 2010
  - EU Network School: *Frontiers of Particle Cosmology*, Lecce, 13–18 Sep 2010
  - ICATPP Conference: *Cosmic Rays for Particle and Astroparticle Physics*, Como, 7–8 Oct 2010
  - *Cherenkov Telescope Array Collaboration Meeting*, Rutherford Lab, 8–11 Nov 2010
  - Astroparticle Physics session: *RAS National Astronomy Meeting*, Llandudno, 17–21 Apr 2011
  - ICTP Workshop: *Looking at the Neutrino Sky*, Trieste, 20–24 Jun 2011
  - CERN Theory Institute: *Dark Matter Underground and in the Heavens*, Geneva, 18–29 Jul 2011
  - 11th Hellenic School of Elementary Particle Physics & Gravity, Corfu, 4–18 Sep 2011
  - XII Workshop on High Energy Physics Phenomenology, Mahabaleshwar, 2–8 Jan 2012
  - 12th Hellenic School of Elementary Particle Physics & Gravity, Corfu, 8–27 Sep 2012
  - Danish National Astronomy Meeting, Sandbjerg Estate, 18–19 Jun 2013
  - 13th Hellenic School of Elementary Particle Physics & Gravity, Corfu, 31 Aug–27 Sep 2013
  - 1st APCTP-NBIA joint workshop on Cosmology and Astroparticle Physics, Pohang, 21–25 Oct 2013
  - 14th Hellenic School of Elementary Particle Physics & Gravity, Corfu, 3–21 Sep 2014
  - *Dark Matter@LHC*, Oxford, 25–27 Sep 2014
  - 15th Hellenic School of Elementary Particle Physics & Gravity, Corfu, 1–27 Sep 2015
  - 16th Hellenic School of Elementary Particle Physics & Gravity, Corfu, 31 Aug–23 Sep 2016
  - Nordic Winter School: *Cosmology and Particle Physics*, Skeikampen, 2–7 Jan 2017
  - *Corfu Summer Institute*, Corfu, 2–28 Sep 2017
  - *Current themes in high energy physics & cosmology*, Copenhagen, 13–17 Aug 2018
  - *Workshop on the Standard Model and Beyond*, Corfu, 31 Aug–9 Sep 2018
  - 36th International Cosmic Ray Conference, Madison, 24 Jul–1 Aug 2019
  - 21st International Symposium on Very High Energy Cosmic Ray Interactions, Ooty, 4–8 Jun 2020
  - *International Workshop on Laboratory Astrophysics with Intense Lasers* (remote), 7–8 Dec 2020
  - 37th International Cosmic Ray Conference, Berlin, 12–23 Jul 2021
- ▷ **International Scientific/Advisory Committee:**
- *Trends in Astroparticle Physics*, Stockholm, 22–25 Sep 1994
  - *Beyond the Desert*, Castle Ringberg, 6–12 June 1999
  - COSMO-01, Rovaniemi, 30 Aug–4 Sep 2001
  - WIN'02, Canterbury, 21–26 Jan 2002
  - COSMO-03, Ambleside, 24–30 Aug 2003
  - *Quantum gravity phenomenology*, Ladek Zdroj, 4–14 Feb 2004
  - 3rd International workshop on Ultra High Energy Cosmic Rays, Leeds, 22–24 Jul 2004
  - WIN'05, Delphi, 6–11 Jun 2005
  - WIN'07, Kolkata, 15–20 Jan 2007
  - ICGC'07, Pune, 17–21 Dec 2007
  - DISCRETE'08, Valencia, 11–16 Dec 2008
  - *Radiation Matter Interaction Under Extreme Conditions*, Varanasi, 19–20 Dec 2008
  - *Dark Matter in Astrophysics & Particle Physics*, Cambridge, 2–6 Aug 2010
  - DISCRETE'10, Rome, 6–11 Dec 2010
  - *Primordial Features and Non-Gaussianities*, Allahabad, 14–18 Dec 2010
  - TAUP 2011, Munich, 5–9 Sep 2011
  - *Lepton-Photon Conference*, Mumbai, 22–27 Aug 2011
  - VLVnT11 – *Very Large Volume Neutrino Telescopes*, Erlangen, 12–14 Oct 2011
  - WHEPP12: *Workshop on High Energy Physics Phenomenology*, Mahabaleshwar, 2–15 Jan 2012

- COSGRAV12: [Modern Perspectives of Cosmology & Gravitation](#), Kolkata, 7–11 Feb 2012
- ICHEP2012: [36th International Conf. on High Energy Physics](#), Melbourne, 4–11 Jul, 2012
- [Darkattack2012](#), Ascona, 15–20 Jul 2012
- [TeVPA 2012](#), Mumbai, 11–15 Dec 2012
- [33<sup>rd</sup> ICRC 2013](#), Rio de Janeiro, 2–9 Jul 2013
- [TeVPA 2013](#), Irvine, 26–29 Aug 2013
- [TeVPA 2014](#), Amsterdam, 23–28 Jun 2014
- [Cosmo Cruise 2015](#), 2–9 Sep 2015
- [VLVnT–2015: Very Large Volume Neutrino Telescopes](#), Rome, 2–16 Sep 2016
- [TeVPA 2016](#), Geneva, 12–16 Sep 2016
- [Winter School on AstroParticle Physics](#), Ootacamund, 21–29 Dec 2016
- [DISCRETE 2016](#), Warsaw, 28 Nov–3 Dec 2016
- [International Neutrino Summer School](#), Fermilab, 7–18 Aug 2017
- [TeVPA 2017](#), Columbus, 7–11 Aug 2017
- [International Neutrino Summer School](#), Mainz, 21 May–1 Jun 2018
- [TeVPA 2018](#), Berlin, 27–31 Aug 2018
- [PPNT19](#), Uppsala, 7–9 Oct 2019
- [TeVPA 2019](#), Sydney, 2–12 Dec 2019

### Participation in Experiments:

- [Big European Bubble Chamber WA66 Beam Dump Collaboration](#) (Data analysis 1985)
- [Pierre Auger Observatory](#) (Institutional Representative, 2003–13; Publications Committee)
- [IceCube](#) (Collaboration Board Member, 2004–; Editor, Yellow Book ; Publications Committee)
- [Cherenkov telescope Array](#) (Collaboration Member, 2010–; Requirements Review Committee; Co-editor of Special Issue; Review of Key Science Projects)

### Research Grants:

1. SERC AF Starter Research Grant (*‘Cosmological Probes of Physics Beyond the SM’*)  
PI, 1993–98 [GR/H90162] – £10,000
2. EU Third Framework Programme (*‘Theoretical Astroparticle’* network)  
(Annecy + Barcelona, Copenhagen, Geneva, Gran Sasso, Munich, Oxford, Paris, Stockholm)  
UK Scientist-in-Charge, 1993–97 [CHRX-CT93-0120] — €57,140
3. EU 4th Framework Programme (*‘Beyond the Standard Model’* TMR network)  
(Paris + Bonn, Geneva, Lisbon, Madrid, Oxford, Pisa, Thessaloniki, Trieste, Valencia)  
Co-I with G Ross (PI) *et al*, 1996–00 [FMRX-CT96-0090] — €132,000
4. British Council ‘Acciones Integradas’ Programme (*‘Large-scale Structure’* network)  
(Barcelona, Cambridge, Durham, Oxford)  
Co-I with G Efstathiou (PI) *et al*, 1997–98 — £2,900
5. PPARC Rolling Grant (*‘Theoretical Studies of Elementary Particles’*)  
Co-I with G Ross (PI) *et al*, 1999–03 [PPA/G/O/2000/00469]; — £360,692
6. PPARC Special Program Grant (*‘Neutrino Mass’*)  
Co-I with G Ross (PI), 2000–02 [PPA/G/S/1998/00561] — £87,287
7. EU 5th Framework Programme (Marie Curie training site *‘Particle Astrophysics’*)  
Co-I with J Binney and J Silk (PI), 2000–03 — €158,400
8. EU 5th Framework Programme (*‘Physics Across the Present Energy Frontier’* TMR network)  
(Paris + Bonn, Geneva, Lisbon, Madrid, Oxford, Pisa, Thessaloniki, Trieste, Valencia)  
Co-I with G Ross (PI) *et al*, 2000–04 [HPRN-CT-2000-00148] — €145,000
9. EU 5th Framework Programme (*‘Supersymmetry and the Early Universe’* TMR network)  
Network Coordinator, 2000–04 [HPRN-CT-2000-00152] — €1.49 M



10. Leverhulme Foundation Major Grant (*‘Dark Matter’*)  
Co-I with J Binney and J Silk (PI), 2000–05 [F/08776A] — £433,134
11. EU Marie Curie fellowship (*‘Cosmic Ray Probe of Physics beyond the SM’*)  
Scientist-in charge (awarded to R Toldra), 2000–02 [MCFI-1999-00465] — €107,072
12. Joint Research Equipment Initiative (*‘Beowulf Supercomputer’*)  
Co-I with J Silk (PI) *et al*, 2000–05 — £127,151
13. EU Marie Curie fellowship (*‘Non-Baryonic Dark Matter’*)  
Scientist-in charge (awarded to F Ferrer), 2001–03 [MCFI-2001-00645] — €107,072
14. PPARC Rolling Grant (*‘Theoretical Studies of Elementary Particles’*)  
Co-I with G Ross (PI) *et al*, 2003–08 [PPA/G/O/2002/00479] — £562,204
15. PPARC Special Program Grant (*‘Neutrino Physics’*)  
Co-I with G Ross (PI), 2004–06 [PPA/G/S/2003/00138] — £72,919
16. PPARC Research Grant (*‘Operation of the Pierre Auger Observatory ...’*)  
Co-applicant with A Watson (PI) *et al*, 2004–07 [PPA/G/S/2003/00073] — £475,495.68
17. PPARC Senior Fellowship (*‘Auger & IceCube: Probes of the high energy universe’*)  
PI, 2006–09 [PPA/C506205/1] — £118,692
18. EU 6th Framework Programme Marie Curie RTN (*‘The Origin of the Universe’*)  
Network Coordinator, 2006–10 [MRTN-CT-2006-035863] — €3.53 M
19. John Fell Fund *Strengthening Oxford-India Research Links in Theoretical Physical Sciences*  
PI (with J. Cardy *et al*) 2006–12 — £25,313
20. STFC Research Grant (*‘UHE cosmic ray research with the Pierre Auger Observatory’*)  
PI, 2008–11 [PPA/E007007/1] — £42,428
21. PPARC Rolling Grant (*‘Theoretical Studies of Elementary Particles’*)  
Co-I with G Ross (PI) *et al*, 2008–11 [ST/G000492/1] — £1,900,748
22. UKIERI grant (*‘Interdisciplinary Oxford-India Research Network in Theoretical Physics’*)  
Co-I (with J. Cardy *et al*), 2008–11 — £67,372
23. STFC Consolidated Grant (*‘Theoretical Particle Physics Research’*)  
PI, 2011–14 [ST/J000507/1] — £989,202
24. IPPP Associateship (*‘Phenomenology of Dark Matter’*)  
PI, 2011–12 — £4,000
25. DNRF Niels Bohr Professorship (*‘Connecting Inner Space & Outer Space’*)  
PI, 2013–18 [506600-50-36547] — 29 MDKK
26. STFC Consolidated Grant (*‘Theoretical Particle Physics Research’*)  
PI, 2014–17 [ST/L000474/1] — £1,107,540
27. EPSRC grant (*‘Particle acceleration in magnetised shocks’*)  
Co-I (with G. Gregori (PI) & A. Bell), 2016–19 — £566,044
28. Time award on STFC Central Laser Facility: £59,542 (2015–16: £44,275, 2019–20: £15267)
29. STFC Consolidated Grant (*‘Theoretical Studies of Elementary Particles’*)  
PI, 2017–20 [ST/P000770/1] — £711,506
30. STFC Consolidated Grant (*‘Theoretical Studies of Particles & Strings’*)  
Co-I (with G. Salam *et al*), 2020–23 [ST/T000864/1] — £1,141,212

### Participation in Networks:

- ▷ Scientist-in-Charge @ Oxford, EU network on *‘Theoretical Astroparticle Physics’*, 1993–97  
(Annecy + Barcelona, Copenhagen, Geneva, Gran Sasso, Munich, Oxford, Paris, Stockholm)
- ▷ Member, Oxford node of EU network on *‘Beyond the Standard Model’*, 1996–00  
(Paris + Bonn, Geneva, Lisbon, Madrid, Oxford, Pisa, Thessaloniki, Trieste, Valencia)

- ▷ Co-ordinator, EU network on ‘*Supersymmetry and the Early Universe*’, 2000–04  
(Oxford/Lancaster/King’s College + Bonn, Geneva, Helsinki, Ioannina/Thessaloniki, Madrid/Barcelona/Granada, Orsay/Annecy/Marseilles, Trieste, Warsaw)
- ▷ Member, Oxford node of [European Network of Theoretical Astroparticle Physics](#), 2004–
- ▷ Member, [UK Neutrino Network](#), 2004–
- ▷ Member, Oxford node of EU network on ‘*Quest for Unification*’, 2004–08  
(Paris + Salonicki, Lisbon, Madrid, Bonn, Oxford, Pisa, Trieste, Valencia, Geneva)
- ▷ Co-ordinator, EU network on ‘*Origin of the Universe*’, 2006–10  
(Oxford + Lancaster, King’s College London, Annecy, Barcelona, Bonn, Copenhagen, Geneva, Helsinki, Ioannina, Munich, Padova, Paris, Seoul, Warsaw)
- ▷ Co-ordinator, [Oxford-India network on Theoretical Physical Sciences](#), 2006–12
- ▷ Oxford representative, UK-India Education & Research Initiative Network on ‘*Neutrino & the Fundamental Laws of Nature*’, 2007–10
- ▷ Member, UKIERI Network on ‘*Theoretical Physical Sciences*’, 2008–11
- ▷ Member, Oxford node of EU network on ‘*Unification in the LHC era*’, 2009–13  
(Paris + Salonicki, Lisbon, Madrid, Bonn, Oxford, Pisa, Trieste, Valencia, Geneva)
- ▷ Associate Member, DFG Research Training Group on ‘*Models of Gravity*’, 2013–

### External Appointments:

- ▷ Maxwell Visiting Fellow, [King’s College, London](#), 2000–05
- ▷ Adjunct Professor, [Tata Institute of Fundamental Research](#), Mumbai, 2006–09
- ▷ Adjunct Professor, [Saha Institute of Nuclear Physics](#), Kolkata, 2008–13
- ▷ Scientific Associate, [Discovery Center, Niels Bohr Institute](#), Copenhagen, 2010–20
- ▷ Scientific Associate, [Institute of Particle Physics Phenomenology](#), Durham, 2011–12
- ▷ Niels Bohr Professor, [Niels Bohr International Academy](#), Copenhagen, 2013–18
- ▷ Affiliate Professor, [Niels Bohr Institute](#), Copenhagen, 2018–23
- ▷ Adjunct Professor, [Raman Research Institute](#), Bangalore, 2019–22

### Public Understanding of Science

I worked (1988–89) with [Eklavya](#), a NGO in Bhopal concerned with science teaching and outreach. My main task was to launch a monthly newsletter on science and technology ([Srote](#)) for regional vernacular newspapers. We set up the supporting library and desktop publishing facility and wrote a number of articles for the newsletter.

I have engaged in the following science outreach activities in the UK:

- ▷ Oxford Physics: Publicity Committee (1995–96); Participation in Open Days; Science, Engineering & Technology Weeks; Assessment Panel, Undergraduate Speaking Competition (2001–04)
- ▷ Continuing Education, Oxford: Summer School: ‘*Blowing up the universe*’, 15–22 Jul 1995; School: ‘*Cosmic antimatter*’, 23 Jan 1999; Summer School: ‘*Constructing the Universe*’, 24–31 Jul 1999
- ▷ Consultant to BBC science programme makers on several occasions
- ▷ Radio interviews, e.g. BBC Thames Valley, 12 Jan 2000, LBC, London, 27 Apr 2000
- ▷ Assisted the [Royal Institution, London](#) to organise topical exhibition
- ▷ Filmed interview for new [Space Galleries at Royal Greenwich Observatory](#) (Dec 2007)
- ▷ Debate: *The fate of the universe: Does dark energy exist?*, Imperial College, London, July 2009
- ▷ Popular level talks:

- ‘*Why do science?*’, Kingsway Camden’s College, London, 10 May 1993
- ‘*A magical mystery tour of the universe*’
  - St Phillip & James Primary School, Oxford, 9 Oct 1997
  - St Barnabas Primary School, Oxford, 14 Jun 2004
- ‘*Why is the sky dark at night?*’
  - SET’95 Public Lecture, Oxford, 17 Mar 1995
  - Cherwell School, Oxford, 26 Mar 1996
  - SET’97 ‘Frontier Physics for Teachers’, Cosener’s House, Abingdon, 15 Mar 1997
  - Oxford Space & Astronomical Society, Oxford, 9 Feb 1998
- ‘*Seeing the edge of the universe*’
  - Linacre College Seminar, Oxford, 12 Oct 1999
  - ‘Oxford Festival of Science’ Programme, Peers School, Oxford, 26 Jan 2000
  - Charterhouse School, Godalming, 6 Mar 2001
  - IOP Lecture, Shrewsbury School, 28 Sep 2001
  - New College ‘Discovery Evening’, Oxford, 15 Nov 2001
  - St Edward’s School, Oxford, 13 Mar 2002
  - Taunton School, 10 May 2002
  - Georgia Tech Summer School, Oxford, 17 Jul 2002
  - Linacre Lecture at King’s School, Canterbury, 18 Sep 2003
  - National AimHigher Masterclass for Sixth Form students, Oxford, 6 Dec 2004
  - Jadavpur University, Kolkata, 5 Jan 2005
  - British Council, Kolkata, 7 Jan 2005
  - Dudley Residential Masterclass, Oxford, 21 Mar 2005
  - Open Day talk, Department of Physics, Oxford, 30 Jun 2005
  - Headington School, Oxford, 28 Nov 2005
  - Admissions talk, Department of Physics, Oxford, 13 Dec 2005
  - AVM School Bandra, Mumbai, 20 Dec 2006
  - Cherwell School, Oxford, 17 Jan 2007
  - InfoSys lecture, [Homi Bhabha Centre for Science Education, Mumbai](#), 22 Dec 2008
  - [International Year of Astronomy lecture](#), Green Templeton College, Oxford, 3 Mar 2009
  - [Chipping Norton Amateur Astronomical Society](#), 21 Mar 2011
  - [Folkeuniversitet i København](#), 5 & 7 Dec 2017
  - [Jawaharlal Nehru University, New Delhi](#), 19 Dec 2017
  - [Manthan, Hyderabad](#), 3 Sep 2019
- ‘*The road to quantum gravity*’
  - ‘Frontier Physics for Teachers’ Workshop, Cosener’s House, Abingdon, 4 Mar 2000
  - ‘Oxford Access Scheme’ Summer School, Dept of Physics, Oxford, 23 Aug 2000
  - Georgia Tech Summer School, Oxford, 9 Jul 2001
  - IOP ‘Young Physicist’s Conference’, Dept of Physics, Oxford, 25 Nov 2001
  - [Linacre Seminar](#), Oxford, 12 Feb 2002
  - A K Raychoudhury Symposium, Scottish Church College, Kolkata, 5 Jan 2005
  - [Oxford University Physics Society](#), 26 Apr 2012
- ‘*Discovering brane-world*’
  - Meeting of Heads of Physics, Rugby Group, Cheltenham College, 24 Feb 2001
  - ‘Oxford Access Scheme’ Summer School, Dept of Physics, Oxford, 22 Aug 2001
- ‘*Cosmology in wonderland*’, IOP ‘Physics Update’ Meeting, Oxford, 10 Dec 2004
- ‘*Dark matter vs. modified gravity*’
  - [Oxford Space & Astronomical Society](#), 1 Nov 2010
  - Oxford Undergraduate Student Conference, St Catherine’s College, 16 Apr 2013
- ‘*Darkness visible: the search for the missing mass of the universe*’
  - [Public talk at Lepton Photon 2011](#), TIFR, Mumbai, 27 Aug 2011

- Larsen & Toubro “GuruSpeak” Forum, Mumbai, 30 Aug 2011
- Cambridge University Scientific Society, 11 Oct 2011
- Folkeuniversitetet, NBI, Copenhagen, 8 Dec 2014

▷ Articles & letters in scientific/academic magazines:

- *‘Lifetime significance’*, Physics World, 1987
- *‘Shadow of a star: the neutrino story of Supernova 1987a’*, THES, Sep 1997 (book review)
- *‘Could the end be in sight for high energy cosmic rays?’*, Physics World, Sep 2002, p.23
- *‘The solution to Olbers’ paradox’*, Physics World, Oct 2002, p.17
- *‘Does dark energy really exist?’*, Physics World, Jul 2004
- *‘Lambda marks the spot: the biggest problem in theoretical physics’*, Plus Magazine, Jun 2009

▷ My work was reported on in:

- Astronomy: *‘Skeptics of dark energy raise concerns, but remain outnumbered’*, Jan 2020
- Astronomy Today: *‘Quantum Gravity - revealed by gamma ray bursts?’*, 2001
- Bild der Wissenschaft: *‘Ist die dunkle energie eine illusion?’*, Jun 2006, p.54
- Boston Globe: *‘Was it just dust?’*, Sep 2014
- CERN Bulletin: *‘Astroparticle Physics Gets Organized’*, Dec 2008
- CERN Courier: *‘Neutrino Oscillations NOW’*, Nov 1998, p.17; *‘Directions beyond the Standard Model’*, Mar 1999, p.23; *‘Relic neutrinos, a challenge for the next millennium’*, Mar 1999, p.25; *‘UK theorists investigate new trends’*, Mar 2000, p.6; *‘Testing models for quantum gravity’*, Sep 2002
- Daily Express: *‘The expansion of the universe is NOT accelerating’*, Oct 2016
- Daily Mail: *‘Shedding light on dark matter’*, Sep 2012; *‘The universe might NOT be accelerating: Controversial new study claims dark energy theory is ‘rather shaky’*, Oct 2016
- De Morgen: *‘Zijn de kreukels in de oerknal nu al een illusie?’*, Apr 2014; *‘Deze onderzoeken kunnen ons begrip van de werkelijkheid op zn kop zetten (als ze kloppen)’*, Apr 2020
- De Volkskrant: *‘Waarnemingen overkoken allervroegste heelal nu al onder vuur’*, Apr 2014; *‘Het heelal dijt steeds sneller uit, maar waarom, dat zit theoretici nogal dwars’*, May 2017
- Die Zeit: *‘Scotland Dark jagt Mister Wimp’*, Feb 2013; *‘Supernova statt Gravitationswellen?’*, Apr 2014
- Discover: *‘Some Scientists Are Skeptical Dark Energy Even Exists – But Others Push Back’*, Jan 2020
- Frontline: *Chasing supernovae*, Nov 2011; *‘New window to the universe’*, Jun 2014; *The dark side of the universe*, Apr 2017
- Gizmodo: *The Universe Might Be Expanding Like a Lumpy Balloon*, Apr 2020
- Horizon: *‘Dark energy is the biggest mystery in cosmology, but it may not exist at all’*, 3 Sep 2018
- Inside Science: *‘Dark Energy Skeptics Raise Concerns, But Remain Outnumbered’*, Jan 2020
- Kijk: *‘Dijt ons heelal toch niet steeds sneller uit?’*, 27 Oct 2016
- Nature: *‘Cosmic rays without end’*, 3 Sep 1998; *‘Quantum gravity: Testing time for theories’*, 18 Mar 1999; *‘Relativity: Special treatment’*, 4 Jul 2002; *‘Quantum gravity: an astrophysical constraint’*, 28 Aug 2003; *‘Physicists question model of the universe’*, 12 Apr 2007; *‘Bursting dark energy’s bubble’*, 2 Nov 2007; *‘Cosmology: Out of the darkness’*, 10 Oct 2012
- Newsweek: *‘There’s a huge void in space and we are living inside it, scientists say’*, 7 June 2017; *‘Dark energy: Mystery force driving expansion of universe might not exist at all’*, 9 Sep 2018
- Observer: *‘The hunt for neutrinos in the Antarctic’*, 23 Jan 2011
- New Scientist: *‘Mystery of gravity wave shakes astronomers’*, 24 Mar 1988, p.24; *‘Fourth’ neutrino upsets the theories*, 2 Feb 1991; *‘Supernova sheds light on cold dark matter’*, 18 Feb 1995, p.17; *‘Has SUSY shown her shadowy face’*, 30 Mar 1996, p.15; *‘In the beginning’*, 25 Apr 1998, p.7; *‘The crypton factor’*, 27 Jun 1998, p.16; *‘Quantum foam’*, 19 Jun 1999, p.28 (also *‘Quantum players’*, 24 Jul); *‘Is dark energy a mirage?’*, 6 Dec 2003, p.10; *‘Particle physicist takes on Newton and Einstein’*, 28 Apr 2007; *‘Dark energy may just be a cosmic illusion’*, 7 Mar 2008; *‘A MAGIC test for string theory?’*, 8 Sep 2007; *‘Moon used as giant particle detector’*, 5 Aug 2009; *‘Heart of darkness could explain Sun mysteries’*, 14 Jul 2010; *‘Dark energy is not an illusion after all’*, 16 Mar 2011; *‘Largest structure challenges Einstein’s smooth cosmos’*, 16 Jan 2013; *‘Hints of lightweight dark matter get even stronger’*, 10 May 2013; *‘Star dust casts doubt on recent big bang wave result’*, 15 Apr 2014; *‘Bestaat donkere energie toch niet?’*, Dec 2019; *‘Kosmologen, koester je kettlers!’*, Apr 2020

- Physics Today: [Europe sets priorities in astroparticle physics](#), Feb 2010; [‘Remarkable gravitational lensing by the galaxy cluster Abell 3827’](#), Jun 2015
- Physics World: [‘Gamma-ray bursts could test quantum gravity’](#), Jun 1998; [‘Particle physics: the next generation’](#), Dec 1999, p.43; [‘The new universe around the next corner’](#), Dec 1999, p.79; [‘Quantum gravity’s new phenomenon’](#), Mar 2002, p.9; [‘Quantum gravity phenomenology’](#), Nov 2003, p.43; [‘Asking the big questions in London’](#), Jul 2009; [‘Dark energy and the balance of blogging’](#), Jul 2009; [‘Are CDMS and XENON both right about dark matter?’](#), Apr 2013; [‘PAMELA reasserts positron excess’](#), Aug 2013; [‘Does the positron ‘excess’ really exist?’](#), Nov 2013; [‘Cosmic neutrinos named Physics World 2013 Breakthrough of the Year’](#), Dec 2013; [‘Have galactic ‘radio loops’ been mistaken for B-mode polarization?’](#), Apr 2014; [‘Could pulsars explain the positron excess?’](#), Apr 2014; [‘A look back at how the dust fell on BICEP2’](#), Sep 2014 [‘BICEP2 gravitational wave result bites the dust thanks to new Planck data’](#), Sep 2014; [‘Galactic dust sounds death knell for BICEP2 gravitational wave claim’](#), Feb 2015; [‘What can cosmic rays tell us about dark matter?’](#), Apr 2015; [‘Is dark energy becoming marginalized?’](#), Jun 2015; [‘Supernovae analysis finds scant evidence for dark energy’](#), Oct 2016; [‘The dark energy deniers’](#), Jun 2018; [‘Dark energy debate reignited by controversial analysis of supernovae data’](#), Oct 2019
- Pour La Science: [‘Désintégration de cryptons’](#), Oct 1998, p.32
- Quanta: [‘No Dark Energy? No Chance, Cosmologists Contend’](#), Dec 2019
- Science: [‘Java applet lets readers bite into research’](#), 2 Jul 1999, p.34
- Science News: [‘A little mass goes a long way’](#), Jan 1999, p.76
- Science Week: [‘Gamma ray bursts: tests of quantum gravity’](#), 24 Jul 1998
- Scientific American: [‘String instruments’](#), 1 Oct 1998; [‘Doom & gloom by 2100’](#), 1 July 2004; [‘Faster-than-light neutrinos show science in action’](#), 23 Sep 2011; [‘No, Astronomers Haven’t Decided Dark Energy Is Nonexistent’](#), 26 Oct 2016
- Sky & Telescope: [‘Ultrahigh-energy cosmic rays’](#), Mar 2003
- Smithsonian Magazine: [‘The “Gravitational Wave” finding may have actually just been some dust’](#), 17 Apr 2014
- Spektrum: [‘Ist die Dunkle Energie ein gigantischer Irrtum?’](#), Dec 2019; [Zweifel an der Dunklen Energie](#), Apr 2020
- The Guardian: [‘Faster than light particles found’](#), 22 Sep 2011; [‘New light cast on dark matter’](#), 25 May 2013
- The Hindu: [‘Gamma-ray telescope takes shape’](#), Jul 2013
- The Independent: [‘Dark energy: A cosmic mirage?’](#), 7 Jan 2004
- The Telegraph: [‘Telescope’ buried a mile under the Antarctic ice to find source of cosmic rays](#), 18 Oct 2010; [Telescope buried in Antarctic ice detects elusive neutrinos](#), 21 Nov 2013
- Videnskab: [Gennembrud pa Sydpolen: Nu kan neutrinoer bruges til astronomi](#), 30 Aug 2015; [Ny form for astronomi: Fysikere fanger neutrino fra fjern galakse](#), 12 Jul 2018
- Wired: [‘Dark matter may be building up inside the Sun’](#), 9 Jul 2010, [‘Does Dark Energy Really Exist? Cosmologists Battle It Out’](#), Jan 2020

**Publications (with  $\leq 10$  co-authors):**

- [1] [Detection of relativistic iron nuclei in the plastic track detector CR-39](#)  
Nuclear Instruments & Methods 163 (1979) 183–187  
(with S. Biswas, N. Durgaprasad, P.J. Kajarekar & V.S. Venkatavaradan)
- [2] [A lower limit to the magnetic Field in Cassiopeia-A](#)  
Monthly Notices of the Royal Astronomical Society 191 (1980) 855–861  
(with R. Cowsik)
- [3] [Does the galactic synchrotron background originate in old supernova remnants?](#)  
Monthly Notices of the Royal Astronomical Society 199 (1982) 97–108
- [4] [The evolution of supernova remnants as radio sources](#) \* ADS:50+ CITES<sup>1</sup>  
Monthly Notices of the Royal Astronomical Society 207 (1984) 745–775; [erratum](#) 209, 719  
(with R. Cowsik)
- [5] [Astrophysical consequences of  \$n - \bar{n}\$  oscillations](#)  
Nature 309 (1984) 727
- [6] [Cosmological & experimental constraints on the tau neutrino](#) \* INSPIRE: TOPCITE 100+<sup>2</sup>  
Physics Letters 148B (1984) 347–354  
(with A.M. Cooper)
- [7] [The cosmology of decaying gravitinos](#) \* TOPCITE 250+  
Nuclear Physics B259 (1985) 175–188  
(with J. Ellis & D.V. Nanopoulos)
- [8] [Bounds on light gluinos from the BEBC beam dump experiment](#)  
Physics Letters 160B (1985) 212–216  
(with A.M. Cooper & M.A. Parker + WA66 collaboration)
- [9] [Search for heavy neutrino decays in the BEBC beam dump experiment](#) TOPCITE 100+  
Physics Letters 160B (1985) 207–211  
(with A.M. Cooper, S.J. Haywood & M.A. Parker + WA66 collaboration)
- [10] [Primordial nucleosynthesis, additional neutrinos & neutral currents from the superstring](#)  
Physics Letters 167B (1986) 457–463 TOPCITE 100+  
(with J. Ellis, K. Enqvist & D.V. Nanopoulos)
- [11] [Neutron oscillations & the primordial magnetic field](#)  
Astrophysics Letters & Communications 27 (1989) 293–297
- [12] [Low mass photinos & supernova 1987A](#)  
Physics Letters 215B (1988) 404–410  
(with J. Ellis, K.A. Olive & D.W. Sciama)
- [13] [Astrophysical constraints on massive, unstable neutral relic particles](#) TOPCITE 250+  
Nuclear Physics B373 (1992) 399–437  
(with J. Ellis, G.B. Gelmini, J. Lopez & D.V. Nanopoulos)
- [14] [On the implications of a 17-keV neutrino](#)  
Physics Letters 260B (1991) 381–388  
(with A. Hime, R.J.N. Phillips & G.G. Ross)
- [15] [Bound on the tau neutrino magnetic moment from the BEBC beam dump experiment](#)  
Physics Letters B280 (1992) 153–158 TOPCITE 50+  
(with A.M. Cooper-Sarkar, J. Guy, W. Venus, P.O. Hulth & K. Hultqvist)

- [16] [Cosmic neutrinos from unstable relic particles](#) TOPCITE 100+  
Nuclear Physics B392 (1993) 111–133 [hep-ph/9209236]  
(with P. Gondolo & G.B. Gelmini)
- [17] [Neutralino dark matter in a class of unified theories](#)  
Nuclear Physics B392 (1993) 83–110 [hep-ph/9209292]  
(with S.A. Abel & I.B. Whittingham)
- [18] [Cosmological constraints on perturbative supersymmetry breaking](#)  
Physics Letters B342 (1995) 40–46 [hep-ph/9409350]  
(with S.A. Abel)
- [19] [Remarks on the KARMEN anomaly](#) TOPCITE 100+  
Physics Letters B352 (1995) 365–371; erratum B356, 617 [hep-ph/9503295]  
(with V. Barger & R.J.N Phillips)
- [20] [Successful supersymmetric inflation](#) TOPCITE 100+  
Nuclear Physics B461 (1996) 597–623 [hep-ph/9506283]  
(with G.G. Ross)
- [21] [On the cosmological domain wall problem for the minimally extended supersymmetric standard model](#) \* Nuclear Physics B454 (1995) 663–681 [hep-ph/9506359] TOPCITE 100+  
(with S.A. Abel & P.L. White)
- [22] [A supersymmetric resolution of the KARMEN anomaly](#)  
Physics Letters B374 (1996) 87–92 [hep-ph/9511357]  
(with D. Choudhury)
- [23] [Big bang nucleosynthesis & physics beyond the standard model](#) TOPCITE 250+  
Reports on Progress in Physics 59 (1996) 1493–1610 [hep-ph/9602260]
- [24] [No crisis for big bang nucleosynthesis](#) TOPCITE 50+  
Physical Review D54 (1996) R3681–R3685 [astro-ph/9603045]  
(with P.J. Kernan)
- [25] [Nucleosynthesis bounds on a time-varying cosmological “constant”](#) TOPCITE 50+  
Astroparticle Physics 6 (1997) 197–203 [astro-ph/9605055]  
(with M. Birkel)
- [26] [Evading the cosmological domain wall problem](#) TOPCITE 50+  
Physical Review D55 (1997) 5129–5135 [hep-ph/9608319]  
(with S. Larsson & P.L. White)
- [27] [Natural supergravity inflation](#) TOPCITE 50+  
Physics Letters B391(1997) 271–280 [hep-ph/9608336]  
(with J.A. Adams & G.G. Ross)
- [28] [Multiple inflation](#) \* TOPCITE 100+  
Nuclear Physics B503 (1997) 405–425 [hep-ph/9704286]  
(with J.A. Adams & G.G. Ross)
- [29] [Ruling out a critical density baryonic universe](#)  
Physics Letters B408 (1997) 59–68 [hep-ph/9705331]  
(with M. Birkel)
- [30] [Tests of quantum gravity from observations of  \$\gamma\$ -ray bursts](#) \* TOPCITE 1000+  
Nature 393 (1998) 763–765 [astro-ph/9712103]  
(with G. Amelino-Camelia, J. Ellis, N.E. Mavromatos & D.V. Nanopoulos)

- [31] [Quantifying uncertainties in primordial nucleosynthesis without Monte Carlo simulations](#)  
Physical Review D 58 (1998) 063506 [astro-ph/9803177] TOPCITE 100+  
(with G. Fiorentini, E. Lisi & F.L. Villante)
- [32] [Extremely high energy cosmic rays from relic particle decays](#) \*  
Astroparticle Physics 9 (1998) 297–309 [hep-ph/9804285] TOPCITE 250+  
(with M. Birkel)
- [33] [CMB anisotropy in the decaying neutrino cosmology](#) \*  
Monthly Notices of the Royal Astronomical Society 301 (1998) 210–214 [astro-ph/9805108] TOPCITE 50+  
(with J.A. Adams & D.W. Sciama)
- [34] [Scale of  \$SU\(2\)\_R\$  symmetry breaking & leptogenesis](#)  
Physics Letters B 458 (1999) 73–78 [hep-ph/9812276]  
(with E. Ma & U. Sarkar)
- [35] [Big bang nucleosynthesis limit on  \$N\_\nu\$](#)   
Physical Review D 59 (1999) 123520 [hep-ph/9901404] TOPCITE 100+  
(with E. Lisi & F. Villante)
- [36] [Implementing quadratic supergravity inflation](#)  
Physics Letters B 469 (1999) 46–54 [hep-ph/9908380]  
(with G. German & G.G. Ross)
- [37] [A supersymmetric solution to the KARMEN anomaly](#)  
Physical Review D 61 (2000) 095009 [hep-ph/9911365] TOPCITE 50+  
(with D. Choudhury, H. Dreiner & P. Richardson)
- [38] [Thermalisation after inflation](#)  
Journal of High Energy Physics 11 (2000) 012 [hep-ph/0009078] TOPCITE 50+  
(with S. Davidson)
- [39] [On the APM power spectrum & CMB anisotropy: Evidence for a phase transition during inflation](#)  
Monthly Notices of the Royal Astronomical Society 324 (2001) 977–987 [astro-ph/0011398] TOPCITE 50+  
(with J. Barriga, E. Gaztañaga & M. Santos)
- [40] [The anisotropy of the ultra-high energy cosmic rays](#)  
Astroparticle Physics 17 (2002) 319–340 [astro-ph/0103085]  
(with N.W. Evans & F. Ferrer)
- [41] [Low-scale inflation](#)  
Nuclear Physics B 608 (2001) 423–450 [hep-ph/0103243] TOPCITE 50+  
(with G. German & G.G. Ross)
- [42] [No cosmological domain wall problem for weakly coupled fields](#)  
Physical Review D 65 (2002) 025002 [hep-ph/0106272]  
(with H. Casini)
- [43] [The high energy cosmic ray spectrum from relic particle decay](#)  
Nuclear Physics B 621 (2002) 495–520 [hep-ph/0108098] TOPCITE 100+  
(with R. Toldra)
- [44] [Possible astrophysical tests of quantum gravity](#)  
Modern Physics Letters A 17 (2002) 1025–1035 [gr-qc/0204092] TOPCITE 50+
- [45] [The clustering of ultra-high energy cosmic rays and their sources](#)  
Physical Review D 67 (2003) 103005 [astro-ph/0212533] TOPCITE 50+  
(with N.W. Evans & F. Ferrer)



- [46] [An alternative to the cosmological ‘concordance model’](#) TOPCITE 100+  
Astronomy & Astrophysics 412 (2003) 35–44 [astro-ph/0304237]  
(with A. Blanchard, M. Douspis & M. Rowan-Robinson)
- [47] [A ‘baedeker’ for the dark matter annihilation signal](#) \* TOPCITE 100+  
Physical Review D 69 (2004) 123501 [astro-ph/0311145]  
(with N.W. Evans & F. Ferrer)
- [48] [Reply to ‘Comment on “The clustering of ultra-high energy cosmic rays and their sources”’](#)  
Physical Review D 69 (2004) 128302 [astro-ph/0403527]  
(with N.W. Evans & F. Ferrer)
- [49] [Have atmospheric Cerenkov telescopes observed dark matter?](#) TOPCITE 50+  
Journal of Cosmology & Astroparticle Physics 09 (2004) 002 [astro-ph/0404205]  
(with D Hooper, I Calle Perez, J Silk and F Ferrer)
- [50] [The impact of heavy nuclei on the cosmogenic neutrino flux](#) TOPCITE 100+  
Astroparticle Physics 23 (2005) 11–17 [astro-ph/0407618]  
(with D. Hooper and A. Taylor)
- [51] [Multiple inflation and the WMAP ‘glitches’](#) \* TOPCITE 100+  
Physical Review D 70 (2004) 103518 [astro-ph/0408138]  
(with P. Hunt)
- [52] [Probing Planck scale physics with IceCube](#) TOPCITE 50+  
Physical Review D 72 (2005) 065019 [hep-ph/0506168]  
(with L. Anchordoqui, H. Goldberg, M. Gonzalez-Garcia, F. Halzen & D. Hooper)
- [53] [Exotic neutrino interactions at the Pierre Auger Observatory](#) TOPCITE 50+  
Astroparticle Physics 25 (2006) 14–32 [hep-ph/0508312]  
(with L. Anchordoqui, T. Han & D. Hooper)
- [54] [Large-scale galaxy correlations as a test for dark energy](#)  
Astronomy & Astrophysics 449 (2006) 925–928 [astro-ph/0512085]  
(with A. Blanchard, M. Douspis & M. Rowan-Robinson)
- [55] [Probing low- \$x\$  QCD with ultra-high energy cosmic neutrinos at Auger](#) TOPCITE 50+  
Physical Review D 74 (2006) 043008 [hep-ph/0605086]  
(with L. Anchordoqui, A.M. Cooper-Sarkar & D. Hooper)
- [56] [Racetrack inflation and assisted moduli stabilisation](#) TOPCITE 50+  
Nuclear Physics B 766 (2007) 1–20 [hep-th/0503178]  
(with Z. Lalak & G.G. Ross)
- [57] [The intergalactic propagation of ultra-high energy cosmic ray nuclei](#) TOPCITE 50+  
Astroparticle Physics 27 (2007) 199–212 [astro-ph/0608085]  
(with D. Hooper & A. Taylor)
- [58] [High-energy neutrinos from astrophysical accelerators of cosmic ray nuclei](#) TOPCITE 50+  
Astroparticle Physics 29 (2008) 1–13 [astro-ph/0703001]  
(with L. Anchordoqui, D. Hooper & A. Taylor)
- [59] [Multiple inflation & the WMAP ‘glitches’ II. Data analysis & parameter extraction](#)  
Physical Review D 76 (2007) 123504 [arXiv:0706.2443] TOPCITE 50+  
(with P. Hunt)
- [60] [Predictions for the cosmogenic neutrino flux in light of new data from the Pierre Auger Observatory](#)  
Physical Review D 76 (2007) 123008 [arXiv:0709.0734] TOPCITE 50+  
(with L. Anchordoqui, D. Hooper & A. Taylor)

- [61] [Predictions for high energy neutrino cross-sections from the ZEUS global PDF fits](#)  
Journal of High Energy Physics 01 (2008) 075 [arXiv:0710.5303] TOPCITE 100+  
(with A.M. Cooper-Sarkar)
- [62] [Is the evidence for dark energy secure?](#) TOPCITE 50+  
General Relativity & Gravitation 40 (2008) 269–284 [arXiv:0710.5307]
- [63] [The intergalactic propagation of ultra-high energy cosmic ray nuclei: an analytic approach](#)  
Physical Review D 77 (2008) 103007 [arXiv:0802.1538]  
(with D. Hooper & A. Taylor)
- [64] [Fine tuning and the ratio of tensor to scalar density fluctuations from cosmological inflation](#)  
Journal of Cosmology & Astroparticle Physics 10 (2008) 015 [arXiv:0804.2634]  
(with S. Hotchkiss, G. German and G.G. Ross)
- [65] [Constraints on large-scale inhomogeneities from WMAP-5 and SDSS](#) TOPCITE 50+  
Monthly Notices of the Royal Astronomical Society 401 (2010) 547–558 [arXiv:0807.4508]  
(with P. Hunt)
- [66] [Neutrino diagnostics of ultra-high energy cosmic ray protons](#) TOPCITE 50+  
Physical Review D 79 (2009) 083009 [arXiv:0902.3993]  
(with M. Ahlers & L. Anchordoqui)
- [67] [Testing astrophysical models for the PAMELA positron excess with cosmic ray nuclei](#)  
Physical Review Letters 103 (2009) 081104 [arXiv:0905.3152] TOPCITE 100+  
(with P. Mertsch)
- [68] [On cosmic ray acceleration in supernova remnants and the FERMI/PAMELA data](#) \*  
Physical Review D 80 (2009) 123017 [arXiv:0909.4060] TOPCITE 100+  
(with M. Ahlers and P. Mertsch)
- [69] [Non-gaussianity from violation of slow-roll in multiple inflation](#)  
Journal of Cosmology & Astroparticle Physics 05 (2010) 024 [arXiv:0910.3373]  
(with S. Hotchkiss)
- [70] [Asymmetric dark matter and the Sun](#) \* TOPCITE 100+  
Physical review Letters 105 (2010) 011301 [arXiv:1003.4505]  
(with M.T. Frandsen)
- [71] [Systematic effects in the extraction of the ‘WMAP haze’](#)  
Journal of Cosmology & Astroparticle Physics 10 (2010) 019 [arXiv:1004.3056]  
(with P. Mertsch)
- [72] [Using cosmic neutrinos to search for non-perturbative physics at the Pierre Auger Observatory](#)  
Physical Review D 82 (2010) 043001 [arXiv:1004.3190]  
(with L.A. Anchordoqui, H. Goldberg, D. Gora, T. Paul, M. Roth & L.L. Winders)
- [73] [GZK Neutrinos after the Fermi-LAT diffuse photon flux measurement](#) \* TOPCITE 100+  
Astroparticle Physics 34 (2010) 106–115 [arXiv:1005.2620]  
(with M. Ahlers, L.A. Anchordoqui, M.C. Gonzalez-Garcia & F. Halzen)
- [74] [Cosmogenic photons as a test of ultra-high energy cosmic ray composition](#)  
Astroparticle Physics 34 (2011) 340–343 [arXiv:1007.1306]  
(with D. Hooper & A.M. Taylor)
- [75] [Mixed dark matter from technicolour](#) TOPCITE 50+  
Physical Review D 83 (2011) 015007 [arXiv:1007.4839]  
(with A. Belyaev, M. Frandsen and F. Sannino)

- [76] *Probing the anisotropic local universe and beyond with SNe Ia data* TOPCITE 100+  
Monthly Notices of the Royal Astronomical Society 414 (2011) 264–271 [arXiv:1011.6292]  
(with J. Colin, R. Mohayaee and A. Shafieloo)
- [77] *Reconciling the local void with the CMB* TOPCITE 50+  
Physical Review D83 (2011) 063506 [arXiv:1012.3460]  
(with Seshadri Nadathur)
- [78] *Light asymmetric dark matter from new strong dynamics* TOPCITE 50+  
Physical Review D84 (2011) 051703(R) [arXiv:1103.4350]  
(with M.T. Frandsen & K. Schmidt-Hoberg)
- [79] *Dark matter profiles and annihilation in dwarf spheroidal galaxies: prospectives for present and future gamma-ray observatories - I. The classical dSphs* TOPCITE 50+  
Monthly Notices of the Royal Astronomical Society 418 (2011) 1526–1556 [arXiv:1104.0412]  
(with A. Charbonnier *et al*)
- [80] *Fermi gamma-ray ‘bubbles’ from stochastic acceleration of electrons* \* TOPCITE 100+  
Physical Review Letters 107 (2011) 091101 [arXiv:1104.3585]  
(with P. Mertsch)
- [81] *The high energy neutrino cross-section in the Standard Model and its uncertainty* \* TOPCITE 100+  
Journal of High Energy Physics 08 (2011) 042 [arXiv : 1106.3723]  
(with A.M. Cooper-Sarkar & P. Mertsch)
- [82] *Direct detection of dark matter in models with a light Z’* TOPCITE 100+  
Journal of High Energy Physics 09 (2011) 128 [arXiv:1107.2118]  
(with M.T. Frandsen, F. Kahlhoefer & K. Schmidt-Hoberg)
- [83] *The integrated Sachs-Wolfe imprints of cosmic superstructures: a problem for  $\Lambda$ CDM* TOPCITE 50+  
Journal of Cosmology & Astroparticle Physics 06 (2012) 042 [arXiv:1109.4126]  
(with S. Nadathur & S. Hotchkiss)
- [84] *Resolving astrophysical uncertainties in dark matter direct detection* TOPCITE 100+  
Journal of Cosmology & Astroparticle Physics 01 (2012) 024 [arXiv:1111.0292]  
(with M.T. Frandsen, F. Kahlhoefer, C. McCabe and K. Schmidt-Hoberg)
- [85] *Gravitino cosmology with a very light neutralino*  
Physical Review D85 (2012) 065027 [arXiv:1111.5715]  
(with H.K. Dreiner, M. Hanussek and J.-S. Kim)
- [86] *LHC and Tevatron bounds on the dark matter direct detection cross-section for vector mediators* TOPCITE 100+  
Journal of High Energy Physics 07 (2012) 123 [arXiv:1204.3839]  
(with M.T. Frandsen, F. Kahlhoefer, A. Preston and K. Schmidt-Hoberg)
- [87] *Loops and spurs: The angular power spectrum of the galactic synchrotron background*  
Journal of Cosmology & Astroparticle Physics 06 (2013) 041 [arXiv:1304.1078]  
(with Philipp Mertsch)
- [88] *The unbearable lightness of being: CDMS versus XENON* TOPCITE 100+  
Journal of Cosmology & Astroparticle Physics 07 (2013) 023 [arXiv:1304.6066]  
(with Mads Frandsen, Felix Kahlhoefer, Chris McCabe & Kai Schmidt-Hoberg)
- [89] *Reconstruction of the primordial power spectrum of curvature perturbations using multiple data sets* TOPCITE 50+  
Journal of Cosmology & Astroparticle Physics 01 (2014) 025 [arXiv:1308.2317]  
(with P. Hunt)
- [90] *Colliding clusters and dark matter self-interactions* TOPCITE 100+  
Monthly Notices of the Royal Astronomical Society, 437 (2014) 2865–2881 [arXiv:1308.3419]  
(with Mads Frandsen, Felix Kahlhoefer & Kai Schmidt-Hoberg)

- [91] [AMS-02 data confronts acceleration of cosmic ray secondaries in nearby sources](#) TOPCITE 50+  
Physical Review D 90 (2014) 061301(R) [arXiv:1402.0855]  
(with Philipp Mertsch)
- [92] [Fingerprints of Galactic Loop I on the cosmic microwave background](#) \* TOPCITE 50+  
Astrophysical Journal Letters 789 (2014) L29 [arXiv:1404.1899 ]  
(with Hao Liu and Philipp Mertsch)
- [93] [How rare is the Bullet Cluster \(in a  \$\Lambda\$ CDM universe\)?](#)  
Journal of Cosmology & Astroparticle Physics 04 (2015) 050 [arXiv:1412.7719]  
(with David Kraljic)
- [94] [Dark matter annihilation & decay in dwarf spheroidal galaxies: The classical & ultrafaint dSphs](#) TOPCITE 100+  
Monthly Notices of the Royal Astronomical Society 453 (2015) 849-867 [arXiv:1504.02048]  
(with Vincent Bonnivard, Celine Combet, Mike Daniel, Stefan Funk, Alex Geringer-Sameth, Jim Hinton, David Maurin, Justin Read, Matt Walker & Mark Wilkinson)
- [95] [On the interpretation of dark matter self-interactions in Abell 3827](#) TOPCITE 100+  
Monthly Notices of the Royal Astronomical Society 452 (2015) L54 [arXiv:1504.06576]  
(with Felix Kahlhoefer, Kai Schmidt-Hoberg & Janis Kummer)
- [96] [Marginal evidence for cosmic acceleration from Type Ia supernovae](#) \* TOPCITE 100+  
Nature Scientific Reports 6 (2016) 35596 [arXiv:1506.01354]  
(with Jeppe Trøst Nielsen & Alberto Guffanti)
- [97] [Search for features in the spectrum of primordial perturbations using Planck and other datasets](#)  
Journal of Cosmology & Astroparticle Physics 12 (2015) 052 [arXiv:1510.03338]  
(with P. Hunt)
- [98] [The prompt atmospheric neutrino flux in the light of LHCb](#) TOPCITE 50+  
Journal of High Energy Physics 02 (2016) 130 [arXiv:1511.06346]  
(with Rhorry Gauld, Juan Rojo, Luca Rottoli and Jim Talbert)
- [99] [Footprints of Galactic Loop I on cosmic microwave background maps](#)  
Journal of Cosmology & Astroparticle Physics 03 (2016) 023 [arXiv:1511.08207]  
(with Sebastian von Hausegger, Hao Liu and Philipp Mertsch)
- [100] [Frames of most uniform Hubble flow](#)  
Journal of Cosmology & Astroparticle Physics 10 (2016) 016 [arXiv:1607.07377]  
(with David Kraljic)
- [101] [High redshift radio galaxies and divergence from the CMB dipole](#)  
Monthly Notices of the Royal Astronomical Society 471 (2017) 1045–1055 [arXiv:1703.09376]  
(with J. Colin, R. Mohayaee and M. Rameez)
- [102] [Axion driven cosmic magnetogenesis during the QCD crossover](#)  
Physical Review Letters 121 (2018) 021301 [arXiv:1708.07614]  
(with F. Miniati, G. Gregori & B. Reville)
- [103] [Reconstruction of a direction-dependent primordial power spectrum from Planck CMB data](#)  
Journal of Cosmology & Astroparticle Physics 02 (2018) 012 [arXiv:1711.08441]  
(with Amel Durakovic, Paul Hunt, Suvodip Mukherjee & Tarun Souradeep)
- [104] [The dipole anisotropy of AllWISE galaxies](#)  
Monthly Notices of the Royal Astronomical Society 477 (2018) 1772 [arXiv:1712.03444]  
(with J. Colin, R. Mohayaee and M. Rameez)

- [105] [Analytical estimates of proton acceleration in laser-produced turbulent plasmas](#)  
Journal of Plasma Physics 84 (2018) 905840608 [arXiv:1808.04356]  
(with K. Beyer, A. Bott, H.-S. Park, B. Reville & G. Gregori)
- [106] [Evidence for anisotropy of cosmic acceleration](#)  
Astronomy & Astrophysics 631 (2019) L13 [arXiv:1808.04597]  
(with J. Colin, R. Mohayaee and M. Rameez)
- [107] [Reconstructing the EFT of inflation from cosmological data](#)  
SciPost 7 (2019) 049 [arXiv:1904.00991]  
(with Amel Durakovic, Paul Hunt & Subodh Patil)
- Under review:
- [108] [Is there really a ‘Hubble tension’?](#)  
[arXiv:1911.06456]  
(with M. Rameez)
- [109] [A response to Rubin & Heitlauf: “Is the expansion of the universe accelerating? All signs still point to yes”](#) [arXiv:1912.04257]  
(with J. Colin, R. Mohayaee and M. Rameez)
- [110] [The impact of peculiar velocities on supernova cosmology](#)  
Monthly Notices of the Royal Astronomical Society, submitted [arXiv:2003.10420]  
(with R. Mohayaee and M. Rameez)
- [111] [A test of the cosmological principle with quasars](#) <sup>♥</sup>  
Astrophysical Journal Letters, submitted [arXiv:2009.14826]  
(with N. Secrest, S. von Hausegger, M. Rameez, R. Mohayaee and J. Colin)
- [112] [Generating ultra-dense pair beams using 400 GeV/c protons](#)  
Physical Review , submitted [arXiv:2011.04398]  
(with C.D. Arrowsmith, N. Shukla, N. Charitonidis, R. Boni, H. Chen, T. Davenne, D.H. Froula, B.T. Huffman, Y. Kadi, B. Reville, S. Richardson, J.L. Shaw, L. O. Silva, R.M.G.M. Trines, R. Bingham, G. Gregori)
- [113] [Blast from the past: Constraints on the dark sector from the BEBC WA66 beam dump experiment](#) <sup>♥</sup> SciPost Physics, submitted [arXiv:2011.08153 [hep-ph]]  
(with G. Marocco)
- [114] [Explaining cosmic ray antimatter with secondaries from old supernova remnants](#) <sup>♥</sup>  
Physical Review D, submitted arXiv:2012.12853 [astro-ph.HE]  
(with P. Mertsch and A. Vittino)

Selected invited talks, lectures and reviews:

- [115] [Particle physics & the standard cosmology](#)  
‘Superstrings, Supergravity & Unified Theories’, eds. G. Furlan *et al* (World-Scientific, 1986), pp. 465–493
- [116] [Cosmological and astrophysical constraints on particle physics](#)  
Proc. XXVI International Symp. on Multiparticle Dynamics, Seewinkel, eds. M. Markytan *et al*, (World Scientific, 1986), pp. 863–873
- [117] [Non-baryonic dark matter](#)  
‘Observational Tests of Cosmological Inflation’, NATO ASI C348, Durham eds. T. Shanks *et al* (Kluwer Academic, 1991), pp. 91–102

- [118] [Primordial nucleosynthesis & dark matter](#)  
'Dark Matter in Astro- & Particle Physics', Heidelberg, eds. H.V. Klapdor & Y. Ramachers (World Scientific, 1997) pp. 235–249 [astro-ph/9611232]
- [119] [Supersymmetric inflation & large-scale structure](#)  
'Current Topics in Physics', Seoul, eds. Y.M. Cho *et al* (World Scientific, 1998) Vol. 2, pp. 961-971 [hep-ph/9610248]
- [120] [Cosmological implications of neutrinos](#)  
'Weak Interactions & Neutrinos 1997', Capri, eds. F. Fiorillo *et al*, Nuclear Physics B (Proc. Suppl.) 66A (1998) 168–180 [hep-ph/9710273]
- [121] [Big bang nucleosynthesis: Reprise](#)  
'Dark Matter in Astrophysics & Particle Physics', Heidelberg eds. H.V. Klapdor & L. Baudis (Adam Hilger, 1999) pp. 108–130 [astro-ph/9903183]
- [122] [The standard big bang cosmology](#)  
'Large Scale Structure Formation', Kish, eds. R. Mansouri & R. Brandenberger (Kluwer Academic, 2000) pp. 37–96
- [123] [Cosmic ray signatures of massive relic particles](#)  
COSMO-99: Proc. 3rd Intern. Workshop on Particle Physics & the Early Universe, Trieste, eds. U. Cotti *et al* (World Scientific, 2000) pp. 77–90 [hep-ph/0005256]
- [124] [Introduction to big bang cosmology](#)  
'Recent Developments in Particle Physics & Cosmology', Cascais, eds. G. Branco, Q. Shafi & J. Silva-Marcos (Kluwer Academic, 2001) pp.219–280
- [125] [Evidence for an inflationary phase transition from the LSS and CMB data](#)  
Nuclear Physics B (Proc. Suppl.) 95 (2001) pp. 66–69 [astro-ph/0012284]  
(with J. Barriga, E. Gaztañaga & M. Santos)
- [126] [New results in cosmology](#)  
Proc. International Conf. on High Energy Physics, Budapest, 12-18 July 2001, JHEP PRHEP-hep2001/299 [hep-ph/0201140]
- [127] [Ultra high energy cosmic rays & new physics](#)  
COSMO-01: Proc. Fifth International Workshop on Particle Physics & the Early Universe, Rovaniemi, 31 Aug–4 Sep 2001 [hep-ph/0202013]
- [128] [New physics from ultrahigh energy cosmic rays](#)  
Acta Physica Polonica B35 (2004) 351–364 [hep-ph/0312223]
- [129] [Measuring the baryon content of the universe: BBN vs CMB](#)  
'Frontiers of the Universe', eds. C. Celnekier & J. Tran Thanh Van (The Gioi Publishers, 2004) pp. 53-64 [astro-ph/0205116]
- [130] [Neutrinos from the Big Bang](#)  
Proc. Indian National Science Academy, 70A (2004) 163–178 [hep-ph/0302175]
- [131] [Measuring the cosmological density perturbation](#)  
Proc. 'The Density Perturbation in the Universe', Athens, 25-26 June 2004, eds. M. Axenides *et al*, Nuclear Physics B (Proc. Suppl.) 148 (2005) 1–6 [hep-ph/0503271]
- [132] [Einstein's universe: the challenge of dark energy](#)  
'The legacy of Albert Einstein', ed. S.R. Wadia (World Scientific 2007) pp.207–224
- [133] [Implications of cosmic ray results for UHE neutrinos](#)  
Proc. Neutrino 2008, Christchurch, 25-31 May 2008, eds. J. Adams *et al*, [arXiv:0811.0375]

- [134] [Does cosmological structure formation require dark energy?](#)  
'Dark Energy and Dark Matter', Lyon, 7–11 July 2008, eds. E. Pécontal *et al*, EAS Pub. Ser. 36 (2009) 3
- [135] [Theory summary: Very high energy cosmic rays](#)  
European Physical Journal Web Conf. 52 (2013) 12001
- [136] [Is dark matter self-interacting?](#)  
Nature Astronomy 2 (2018) 856

### With the Pierre Auger Observatory Collaboration:

- [137] [An upper limit to the photon fraction in cosmic rays above  \$10^{19}\$  eV from the Pierre Auger Observatory](#) Astroparticle Physics 27 (2007) 155–168 TOPCITE 100+
- [138] [Anisotropy studies around the galactic centre at EeV energies with the Pierre Auger Observatory](#) Astroparticle Physics 27 (2007) 244–253 [astro-ph/0607382] TOPCITE 50+
- [139] [Correlation of the highest-energy cosmic rays with nearby extragalactic objects](#) Science 318 (2007) 938–943 [arXiv:0711.2256] TOPCITE 500+
- [140] [Upper limit on the cosmic ray  \$\gamma\$  flux above  \$10^{19}\$  eV using the surface detector of the Pierre Auger observatory](#) Astroparticle Physics 29 (2008) 243–256 [arXiv:0712.1147] TOPCITE 100+
- [141] [Upper limit on the diffuse flux of UHE tau neutrinos from the Pierre Auger Observatory](#) Physical Review Letters 100 (2008) 211101 [arXiv:0712.1909] TOPCITE 100+
- [142] [Correlation of the highest-energy cosmic rays with the positions of nearby active galactic nuclei](#) Astroparticle Physics 29 (2008) 188–204; erratum 30 (2008) 45 [arXiv:0712.2843] TOPCITE 250+
- [143] [Observation of the suppression of the flux of cosmic rays above  \$4 \times 10^{19}\$  eV](#) Physical Review Letters 101 (2008) 061101 [arXiv:0806.4302] TOPCITE 500+
- [144] [Upper limit on the cosmic-ray photon fraction at EeV energies from the Pierre Auger Observatory](#) Astroparticle Physics 31 (2009) 399–406 [arXiv:0903.1127] TOPCITE 100+
- [145] [Limit on the diffuse flux of UHE tau neutrinos with the surface detector of the Pierre Auger Observatory](#) Physical Review D79 (2009) 102001 [arXiv:0903.3385] TOPCITE 100+
- [146] [Atmospheric effects on extensive air showers observed with the surface detector of the Pierre Auger observatory](#) Astroparticle Physics 32 (2009) 89–99, erratum 33, 65–67 [arXiv:0906.5497] TOPCITE 50+
- [147] [Search for muon neutrinos from gamma-ray bursts with the IceCube neutrino telescope](#) Astrophysical Journal 710 (2010) 346–359 [arXiv:0907.2227] TOPCITE 100+
- [148] [The fluorescence detector of the Pierre Auger Observatory](#) Nuclear Instruments & Methods A620 (2010) 227–251 [arXiv:0907.4282] TOPCITE 250+
- [149] [A study of the effect of molecular and aerosol conditions in the atmosphere on air fluorescence measurements at the Pierre Auger Observatory](#) Astroparticle Physics 33 (2010) 108–129 [arXiv:1002.0366] TOPCITE 100+
- [150] [Measurement of the depth of maximum of extensive air showers above  \$10^{18}\$  eV](#) Physical Review Letters 104 (2010) 091101 [arXiv:1002.0699] TOPCITE 500+
- [151] [Measurement of the energy spectrum of cosmic rays above  \$10^{18}\$  eV using the Pierre Auger Observatory](#) Physics Letters B685 (2010) 239–246 [arXiv:1002.1975] TOPCITE 500+
- [152] [Update on the correlation of the highest energy cosmic rays with nearby extragalactic matter](#) Astroparticle Physics 34 (2010) 314–326 [arXiv:1009.1855] TOPCITE 250+

- [153] [The northern site of the Pierre Auger Observatory](#)  
New Journal of Physics 12 (2010) 035001
- [154] [The exposure of the hybrid detector of the Pierre Auger Observatory](#) TOPCITE 50+  
Astroparticle Physics 34 (2011) 368–381 [arXiv:1010.6162]
- [155] [Advanced functionality for radio analysis in the offline software framework of the PAO](#)  
Nuclear Instruments & Methods A635 (2011) 92–102 [arXiv:1101.4473] TOPCITE 50+
- [156] [The Pierre Auger Observatory scaler mode for the study of solar activity modulation of galactic cosmic rays](#) Journal of Instrumentation 6 (2011) P01003
- [157] [Search for first harmonic modulation in the RA distribution of cosmic rays detected at the Pierre Auger Observatory](#) Astroparticle Physics 34 (2011) 627–639 [arXiv:1103.2721] TOPCITE 100+
- [158] [Anisotropy and chemical composition of ultra-high energy cosmic rays using arrival directions measured by the Pierre Auger Observatory](#)  
Journal of Cosmology & Astroparticle Physics 06 (2011) 022 [arXiv:1106.3048]
- [159] [The lateral trigger probability function for the ultra-high energy cosmic ray showers detected by the Pierre Auger Observatory](#) Astroparticle Physics 35 (2011) 266–276 [arXiv:1111.6645]
- [160] [Trigger and aperture of the surface detector array of the Pierre Auger Observatory](#)  
Nuclear Instruments & Methods A 613 (2010) 29 [arXiv:1111.6764] TOPCITE 100+
- [161] [The effect of the geomagnetic field on cosmic ray energy estimates and large scale anisotropy searches on data from the Pierre Auger Observatory](#)  
Journal of Cosmology & Astroparticle Physics 11 (2011) 022 [arXiv:1111.7122]
- [162] [Search for signatures of magnetically-induced alignment in the arrival directions measured by the Pierre Auger Observatory](#) Astroparticle Physics 35 (2012) 354–361 [arXiv:1111.2472]
- [163] [Description of atmospheric conditions at the Pierre Auger Observatory using the Global Data Assimilation System](#) Astroparticle Physics 35 (2012) 591–597 [arXiv:1201.2276] TOPCITE 50+
- [164] [Search for ultrahigh energy neutrinos in highly inclined events at the Pierre Auger Observatory](#)  
Physical review D 84 (2011) 122005, D85 (2012) 029902 [arXiv:1202.1493] TOPCITE 50+
- [165] [Measurement of the proton-air cross-section at  \$\sqrt{s} = 57\$  TeV with the Pierre Auger Observatory](#) Physical Review Letters 109 (2012) 062002 [arXiv:1208.1520] TOPCITE 250+
- [166] [The rapid atmospheric monitoring system of the Pierre Auger Observatory](#)  
Journal of Instrumentation 7 (2012) P09001 [arXiv:1208.1675]
- [167] [Antennas for the detection of radio emission pulses from cosmic-ray](#) TOPCITE 50+  
Journal of Instrumentation 7 (2012) P10011 [arXiv:1209.3840]
- [168] [Search for point-like sources of ultra-high energy neutrinos at the Pierre Auger Observatory and improved limit on the diffuse flux of tau neutrinos](#) TOPCITE 50+  
Astrophysical Journal 755 (2012) L4 [arXiv:1210.3143]
- [169] [A search for anisotropy in the arrival directions of ultra high energy cosmic rays recorded at the Pierre Auger Observatory](#)  
Journal of Cosmology & Astroparticle Physics 1204 (2012) 040 [arXiv:1210.3602]
- [170] [Large scale distribution of arrival directions of cosmic rays detected above  \$10^{18}\$  eV at the Pierre Auger Observatory](#) TOPCITE 50+  
Astrophysical Journal Supplement 203 (2012) 34 [arXiv:1210.3736]
- [171] [Results of a self-triggered prototype system for radio-detection of extensive air showers at the Pierre Auger Observatory](#) Journal of Instrumentation 7 (2012) P11023 [arXiv:1211.0572]



- [172] [A search for point sources of EeV neutrons](#)  
Astrophysical Journal 760 (2012) 148 [arXiv:1211.4901]
- [173] [Constraints on the origin of cosmic rays above  \$10^{18}\$  eV from large scale anisotropy searches at the Pierre Auger Observatory](#) TOPCITE 100+  
Astrophysical Journal 762 (2012) L13 [arXiv:1212.3083]
- [174] [Ultra-high energy neutrinos at the Pierre Auger Observatory](#) TOPCITE 50+  
Advances in High Energy Physics 2013 (2013) 708680 [arXiv:1304.1630]
- [175] [Bounds on the density of sources of ultra-high energy cosmic rays from the Pierre Auger Observatory](#) TOPCITE 50+  
Journal of Cosmology & Astroparticle Physics 05 (2013) 009 [arXiv:1305.1576]

### With the IceCube Collaboration:

- [176] [First year performance of the IceCube neutrino telescope](#) TOPCITE 500+  
Astroparticle Physics 26 (2006) 155–173 [astro-ph/0604450]
- [177] [Limits on the high-energy gamma and neutrino fluxes from the SGR 1806-20 giant flare of December 27th, 2004 with the AMANDA-II detector](#)  
Physical Review Letters 97 (2006) 221101 [astro-ph/0607233]
- [178] [Five years of searches for point sources of astrophysical neutrinos with the AMANDA-II neutrino telescope](#) Physical Review D75 (2007) 102001 [astro-ph/0611063] TOPCITE 100+
- [179] [Search for neutrino-induced cascades from gamma-ray bursts with AMANDA](#) TOPCITE 50+  
Astrophysical Journal 664 (2007) 397–410 [astro-ph/0702265]
- [180] [The search for muon neutrinos from northern hemisphere  \$\gamma\$ -ray bursts with AMANDA](#)  
Astrophysical Journal 674 (2007) 357–370 [arXiv:0705.1186] TOPCITE 50+
- [181] [Multi-year search for a diffuse flux of muon neutrinos with AMANDA-II](#) TOPCITE 100+  
Physical Review D76 (2007) 042008, Erratum D 77, 089904 [arXiv:0705.1315]
- [182] [Detection of atmospheric muon neutrinos with the IceCube 9-string detector](#)  
Physical Review D76 (2007) 027101 [arXiv:0705.1781]
- [183] [Search for ultra high-energy neutrinos with AMANDA-II](#) TOPCITE 100+  
Astrophysical Journal 675 (2008) 1014–1024 [arXiv:0711.3022]
- [184] [Search for point sources of high energy neutrinos with final data from AMANDA-II](#)  
Physical Review D79 (2009) 062001 [arXiv:0809.1646] TOPCITE 100+
- [185] [Solar energetic particle spectrum on 2006 December 13 determined by IceTop](#)  
Astrophysical Journal 689 (2008) L65–L68 [arXiv:0810.2034]
- [186] [The IceCube data acquisition system: signal capture, digitization, and time stamping](#)  
Nuclear Instruments & Methods A601 (2009) 294–316 [arXiv:0810.4930] TOPCITE 250+
- [187] [Search for high-energy muon neutrinos from the “naked-eye” GRB 080319B with the IceCube neutrino telescope](#)  
Astrophysical Journal 701 (2009) 1721–1731; [erratum](#) 708, 911 [arXiv:0902.0131]
- [188] [Determination of the atmospheric neutrino flux and searches for new physics with AMANDA-II](#)  
Physical Review D 79 (2009) 102005 [arXiv:0902.0675] TOPCITE 100+
- [189] [Limits on a muon flux from neutralino annihilations in the Sun with the IceCube 22-string detector](#) Physical Review Letters 102 (2009) 201302 [arXiv:0902.2460] TOPCITE 100+

- [190] [First neutrino point-source results from the 22-String IceCube detector](#) TOPCITE 50+  
Astrophysical Journal 701 (2009) L47–L51 [arXiv:0905.2253]
- [191] [Measurement of sound speed vs. depth in South Pole ice for neutrino astronomy](#)  
Astroparticle Physics 33 (2010) 277–286 [arXiv:0909.2629]
- [192] [Limits on a muon flux from Kaluza-Klein dark matter annihilations in the Sun from the IceCube 22-string detector](#) Physical Review D81 (2010) 057101 [arXiv:0910.4480]
- [193] [Extending the search for neutrino point sources with IceCube above the horizon](#) TOPCITE 50+  
Physical Review Letters 103 (2009) 221102 [arXiv:0911.2338]
- [194] [Calibration and characterization of the IceCube photomultiplier tube](#) TOPCITE 250+  
Nuclear Instruments & Methods A618 (2010) 139–152 [arXiv:1002.2442]
- [195] [Measurement of acoustic attenuation in South Pole ice](#)  
Astroparticle Physics 34 (2011) 382–393 [arXiv:1004.1694]
- [196] [The energy spectrum of atmospheric neutrinos between 2 and 200 TeV with the AMANDA-II detector](#) Astroparticle Physics 34 (2010) 48–58 [arXiv:1004.2357] TOPCITE 50+
- [197] [Measurement of the anisotropy of cosmic ray arrival directions with IceCube](#) TOPCITE 100+  
Astrophysics Journal 718 (2010) L194–L198 [arXiv:1005.2960]
- [198] [The first search for extremely-high energy cosmogenic neutrinos with the IceCube Neutrino Observatory](#) Physical Review D82 (2010) 072003 [arXiv:1009.1442] TOPCITE 50+
- [199] [Search for a Lorentz-violating sidereal signal with atmospheric neutrinos in IceCube](#)  
Physical Review D 82 (2010) 112003 [arXiv:1010.4096] TOPCITE 50+
- [200] [Search for relativistic magnetic monopoles with the AMANDA-II neutrino telescope](#)  
European Physical Journal C69 (2010) 361–378
- [201] [Measurement of the atmospheric neutrino energy spectrum from 100 GeV to 400 TeV with IceCube](#) Physical Review D83 (2011) 012001 [arXiv:1010.3980] TOPCITE 100+
- [202] [Time-integrated searches for point-like sources of neutrinos with the 40-string IceCube detector](#)  
Astrophysical Journal 732 (2011) 18 [arXiv:1012.2137] TOPCITE 100+
- [203] [Limits on neutrino emission from gamma-ray bursts with the 40 string IceCube detector](#)  
Physical Review Letters 106 (2011) 141101 [arXiv:1101.1448] TOPCITE 100+
- [204] [First search for atmospheric and extraterrestrial neutrino-induced cascades with the IceCube detector](#) Physical review D 84 (2011) 072001 [arXiv:1101.1692] TOPCITE 50+
- [205] [Search for dark matter from the galactic halo with the IceCube neutrino observatory](#)  
Physical Review 84 (2011) 022004 [arXiv:1101.3349] TOPCITE 100+
- [206] [Search for neutrino-induced cascades with five years of AMANDA data](#)  
Astroparticle Physics 34 (2011) 420–430
- [207] [Constraints on high-energy neutrino emission from SN 2008D](#)  
Astronomy & Astrophysics 527 (2011) A28 [arXiv:1101.3942]
- [208] [Background studies for acoustic neutrino detection at the South Pole](#)  
Astroparticle Physics 35 (2012) 312–324 [arXiv:1103.1216]
- [209] [Constraints on the extremely-high energy cosmic neutrino flux with the IceCube 2008–09 data](#)  
Physical Review D 83 (2011) 092003, erratum: D 84, 079902 [arXiv:1103.4250] TOPCITE 100+
- [210] [Time-dependent searches for point sources of neutrinos with the 40- and 22-string configurations of IceCube](#) Astrophysical Journal 744 (2012) 1 [arXiv:1104.0075]

- [211] [A search for a diffuse flux of astrophysical muon neutrinos with the IceCube 40-string detector](#) Physical Review D84 (2011) 082001 [arXiv:1104.5187] TOPCITE 100+
- [212] [Observation of anisotropy in the arrival directions of galactic cosmic rays at multiple angular scales with IceCube](#) Astrophysical Journal 740 (2011) 16 [arXiv:1105.2326] TOPCITE 100+
- [213] [Neutrino analysis of the 2010 September Crab Nebula flare and time-integrated constraints on neutrino emission from the Crab using IceCube](#) Astrophysical Journal 745 (2012) 45 [arXiv:1106.3484]
- [214] [IceCube sensitivity for low-energy neutrinos from nearby supernovae](#) Astronomy & Astrophysics 535 (2011) 109, Corrigendum 563 (2014) C1 [arXiv:1108.0171] TOPCITE 100+
- [215] [Searches for periodic neutrino emission from binary systems with 22 and 40 strings of IceCube](#) Astrophysical Journal 748 (2012) 118 [arXiv:1108.3023]
- [216] [Observation of an anisotropy in the galactic cosmic ray arrival direction at 400 TeV with IceCube](#) Astrophysical Journal 746 (2012) 33 [arXiv:1109.1017] TOPCITE 100+
- [217] [The design and performance of IceCube DeepCore](#) Astrophysical Journal 35 (2012) 615–624 [arXiv:1109.6096] TOPCITE 250+
- [218] [Searching for soft relativistic jets in core-collapse supernovae with the IceCube optical follow-up program](#) Astronomy & Astrophysics, 539 (2012) A60 [arXiv:1111.7030]
- [219] [Multi-year search for dark matter annihilations in the Sun with the AMANDA-II and IceCube detectors](#) Physical Review D85 (2012) 042002 [arXiv:1112.1840] TOPCITE 100+
- [220] [All-particle cosmic ray energy spectrum measured with 26 IceTop stations](#) Astroparticle Physics 44 (2013) 40–58 [arXiv:1202.3039]
- [221] [A search for UHE tau neutrinos with IceCube](#) Physical Review D86 (2012) 022005 [arXiv:1202.4564]
- [222] [An absence of neutrinos associated with cosmic ray acceleration in gamma-ray bursts](#) Nature 484 (2012) 351 [arXiv:1204.4219] TOPCITE 250+
- [223] [Use of event-level neutrino telescope data in global fits for theories of new physics](#) Journal of Cosmology & Astroparticle Physics 1211 (2012) 057 [arXiv:1207.0810] TOPCITE 50+
- [224] [Cosmic ray composition & energy spectrum 1-30 PeV using the 40-String configuration of IceTop & IceCube](#) Astroparticle Physics 42 (2013) 15–32 [arXiv:1207.3455] TOPCITE 50+
- [225] [IceTop: The surface component of IceCube](#) Nuclear Instruments and Methods in Physics Research A700 (2013) 188–220 [arXiv:1207.6326] TOPCITE 100+
- [226] [Lateral distribution of muons in IceCube cosmic ray events](#) Physical Review D87 (2013) 012005 [arXiv:1208.2979]
- [227] [An improved method for measuring muon energy using the truncated mean of  \$dE/dx\$](#)  Nuclear Instruments and Methods in Physics Research A703 (2013) 190–198 [arXiv:1208.3430]
- [228] [Search for relativistic magnetic monopoles with IceCube](#) Physical Review D87 (2013) 022001 [arXiv:1208.4861]
- [229] [Searches for high-energy neutrino emission in the Galaxy with the combined IceCube-AMANDA detector](#) Astrophysical Journal 763 (2013) 33 [arXiv:1210.3273]
- [230] [Observation of cosmic ray anisotropy with the IceTop air shower array](#) Astrophysical Journal 765 (2013) 55 [arXiv:1210.5278] TOPCITE 100+

- [231] [Search for galactic PeV gamma rays with the IceCube neutrino observatory](#) TOPCITE 50+  
Physical Review D87 (2013) 062002 [arXiv:1210.7992]
- [232] [Search for dark matter annihilations in the Sun with the 79-string IceCube detector](#) TOPCITE 250+  
Physical Review Letters 110 (2013) 131302 [arXiv:1212.4097]
- [233] [Measurement of the atmospheric  \$\nu\_e\$  flux in IceCube](#) TOPCITE 100+  
Physical Review Letters 110 (2013) 151105 [arXiv:1212.4760]
- [234] [Measurement of South Pole ice transparency with the IceCube LED calibration system](#) TOPCITE 100+  
Nuclear Instruments & Methods A711 (2013) 73-89 [arXiv:1301.5361]
- [235] [First observation of PeV-energy neutrinos with IceCube](#) TOPCITE 500+  
Physical Review Letters 111 (2013) 021103 [arXiv:1304.5356]
- [236] [Measurement of atmospheric neutrino oscillations with IceCube](#) TOPCITE 100+  
Physical Review Letters 111 (2013) 081801 [arXiv:1305.3909]
- [237] [Observation of the cosmic-ray shadow of the Moon with IceCube](#) TOPCITE 50+  
Physical Review D 89 (2014) 102004 [arXiv:1305.6811]
- [238] [IceCube search for dark matter annihilation in nearby galaxies and galaxy clusters](#) TOPCITE 100+  
Physical Review D 88 (2013) 122001 [arXiv:1307.3473]
- [239] [Measurement of the cosmic ray energy spectrum with IceTop-73](#) TOPCITE 100+  
Physical Review D 88 (2013) 042004 [arXiv:1307.3795]
- [240] [Search for time-independent neutrino emission from astrophysical sources with 3 years of IceCube data](#) Astrophysical Journal 779 (2013) 132 [arXiv:1307.6669]
- [241] [Improvement in fast particle track reconstruction with robust statistics](#)  
Nuclear Instruments and Methods in Physics Research A736 (2014) 143-149 [arXiv:1308.5501]
- [242] [Probing the origin of cosmic-rays with extremely high energy neutrinos using the IceCube Observatory](#) Physical Review D88 (2013) 112008 [arXiv:1310.5477] TOPCITE 100+
- [243] [Evidence for high-energy extraterrestrial neutrinos at the IceCube detector](#) TOPCITE 1000+  
Science 342 (2013) 1242856 [arXiv:1311.5238]
- [244] [South Pole glacial climate reconstruction from multi-borehole laser particulate stratigraphy](#)  
Journal of Glaciology 59 (2013) 1117
- [245] [Energy reconstruction methods in the IceCube neutrino telescope](#) TOPCITE 250+  
Journal of Instrumentation 9 (2014) P03009 [arXiv:1311.4767]
- [246] [The IceProd framework: distributed data processing for the IceCube neutrino observatory](#)  
Journal of Parallel and Distributed Computing 75 (2014) 198 [arXiv:1311.5904]
- [247] [Search for a diffuse flux of astrophysical muon neutrinos with the IceCube 59-string configuration](#) TOPCITE 100+  
Physical Review D89 (2014) 062007 [arXiv:1311.7048]
- [248] [Search for neutrino-induced particle showers with IceCube-40](#) TOPCITE 50+  
Physical Review D 89 (2014) 102001 [arXiv:1312.0104]
- [249] [Search for non-relativistic magnetic monopoles with IceCube](#)  
European Physical Journal C74 (2014) 2938 [arXiv:1402.3460]
- [250] [Observation of high-energy astrophysical neutrinos in three years of IceCube data](#) TOPCITE 1000+  
Physical Review Letters 113 (2014) 101101 [arXiv:1405.5303]
- [251] [Searches for extended and point-like neutrino sources with four years of IceCube data](#) TOPCITE 100+  
Astrophysical Journal 796 (2014) 109 [arXiv:1406.6757]

- [252] [Multipole analysis of IceCube data to search for dark matter accumulated in the Galactic halo](#) European Physical Journal C75 (2015) 20 [arXiv:1406.6868] TOPCITE 50+
- [253] [Multimessenger search for sources of gravitational waves and high-energy neutrinos: Results for initial LIGO-Virgo and IceCube](#) Physical Review D90 (2014) 102002 [arXiv:1407.1042]
- [254] [Searches for small-scale anisotropies from neutrino point sources with three years of IceCube data](#) Astroparticle Physics 66 (2015) 39-52 [arXiv:1408.0634] TOPCITE 50+
- [255] [Development of a general analysis and unfolding scheme and its application to measure the energy spectrum of atmospheric neutrinos with IceCube](#) European Physical Journal C75 (2015) 116 [arXiv:1409.4535]
- [256] [Atmospheric and astrophysical neutrinos above 1 TeV Interacting in IceCube](#) Physical Review D91 (2015) 022001 [arXiv:1410.1749] TOPCITE 250+
- [257] [Determining neutrino oscillation parameters from atmospheric muon neutrino disappearance with three years of IceCube DeepCore data](#) Physical Review D91 (2015) 072004 [arXiv:1410.7227] TOPCITE 100+
- [258] [Search for prompt neutrino emission from gamma-ray bursts with IceCube](#) Astrophysical Journal 805 (2015) L5 [arXiv:1412.6510] TOPCITE 100+
- [259] [Flavor ratio of astrophysical neutrinos above 35 TeV in IceCube](#) Physical Review Letters 114 (2015) 171102 [arXiv:1502.03376] TOPCITE 100+
- [260] [Searches for time dependent neutrino sources with IceCube data from 2008 to 2012](#) Astrophysical Journal 796 (2015) 109 [arXiv:1503.00598]
- [261] [Measurement of the atmospheric  \$\nu\_e\$  spectrum with IceCube](#) Physical Review D 91 (2015) 122004 [arXiv:1504.03753]
- [262] [Search for dark matter annihilation in the Galactic centre with IceCube-79](#) European Physical Journal C75 (2015) 10, 492 [arXiv:1505.07259] TOPCITE 50+
- [263] [Detection of a Type II<sub>n</sub> Supernova in optical follow-up observations of IceCube neutrino events](#) Astrophysical Journal 811 (2015) 52 [arXiv:1506.03115]
- [264] [Characterization of the atmospheric muon flux in IceCube](#) Astroparticle Physics 78 (2016) 1–27 [arXiv:1506.07981]
- [265] [A combined maximum-likelihood analysis of the high-energy astrophysical neutrino flux measured with IceCube](#) Astrophysical Journal 809 (2015) 98 [arXiv:1507.03991] TOPCITE 250+
- [266] [Evidence for astrophysical muon neutrinos from the northern sky with IceCube](#) Physical Review Letters 115 (2015) 081102 [arXiv:1507.04005] TOPCITE 250+
- [267] [Search for transient astrophysical neutrino emission with IceCube-DeepCore](#) Astrophysical Journal 816 (2016) no.2, 75 [arXiv:1509.05029]
- [268] [Search for astrophysical tau neutrinos in three years of IceCube data](#) Physical Review D 93 (2016) 022001 [arXiv:1509.06212] TOPCITE 50+
- [269] [Searches for relativistic magnetic monopoles in IceCube](#) European Physical Journal C76 (2016) 133 [arXiv:1511.01350]
- [270] [First combined search for neutrino point-sources in the Southern Hemisphere with the ANTARES and IceCube neutrino telescopes](#) Astrophysical Journal 823 (2016) 65 [arXiv:1511.02149] TOPCITE 50+

- [271] [Search for correlations between the arrival directions of IceCube neutrino events and ultrahigh-energy cosmic rays detected by the Pierre Auger Observatory and the Telescope Array](#)  
Journal of Cosmology & Astroparticle Physics 01 (2016) 037 [arXiv:1511.09408] TOPCITE 50+
- [272] [Improved limits on dark matter annihilation in the Sun with the 79-string IceCube detector & implications for supersymmetry](#)  
Journal of Cosmology & Astroparticle Physics 04 (2016) 022 [arXiv:1601.00653] TOPCITE 100+
- [273] [An all-sky search for three flavors of neutrinos from gamma-ray bursts with the IceCube Neutrino Observatory](#) Astrophysical Journal 824 (2016) 115 [arXiv:1601.06484] TOPCITE 50+
- [274] [High-energy neutrino follow-up search of gravitational wave event GW150914 with ANTARES and IceCube](#) Physical Review D93 (2016) 122010 [arXiv:1602.05411] TOPCITE 100+
- [275] [Anisotropy in cosmic-ray arrival directions in the Southern Hemisphere with six years of data from the IceCube detector](#) Astrophysical Journal 826 (2016) 220 [arXiv:1603.01227]
- [276] [Lowering IceCube's energy threshold for point source searches in the southern sky](#)  
Astrophysical Journal 824 (2016) L28 [arXiv:1605.00163]
- [277] [Searches for sterile neutrinos with the IceCube detector](#)  
Physical Review Letters 117 (2016) 071801 [arXiv:1605.01990] TOPCITE 100+
- [278] [Neutrino oscillation studies with IceCube-DeepCore](#)  
Nuclear Physics B908 (2016) 161-177
- [279] [All-flavour search for neutrinos from dark matter annihilations in the Milky Way with IceCube/DeepCore](#)  
European Physics Journal C76 (2016) 1-14 [arXiv:1606.00209] TOPCITE 50+
- [280] [PINGU: A vision for neutrino and particle physics at the South Pole](#)  
Journal of Physics G: Nuclear & Particle Physics 44 (2017) 054006 [arXiv:1607.02671]  
(with the IceCube-Gen2 collaboration) TOPCITE 50+
- [281] [Search for sources of high energy neutrons with four years of data from the IceTop detector](#)  
Astrophysical Journal 830 (2016) 129 [arXiv:1607.05614]
- [282] [Constraints on ultra-high-energy cosmic ray sources from a search for neutrinos above 10 PeV with IceCube](#)  
Physical Review Letters 117 (2016) 241101, Erratum: 119 (2017) 259902 [arXiv:1607.05886] TOPCITE 50+
- [283] [Observation and characterisation of a cosmic muon neutrino flux from the northern hemisphere using six years of IceCube data](#) Astrophysical Journal 833 (2016) 1 [arXiv:1607.08006] TOPCITE 250+
- [284] [First search for dark matter annihilations in the Earth with the IceCube Detector](#)  
European Physical Journal C 77 (2017) 82 [arXiv:1609.01492]
- [285] [All-sky search for time-integrated neutrino emission from astrophysical sources with 7 years of IceCube data](#) Astrophysical Journal 835 (2017) 151 [arXiv:1609.04981]
- [286] [Very high-energy gamma-ray follow-up program using neutrino triggers from IceCube](#)  
Journal of Instrumentation 11 (2016) P11009 [arXiv:1610.01814] (with the IceCube & MAGIC & VERITAS Collaborations)
- [287] [The contribution of Fermi-2LAC blazars to the diffuse TeV-PeV neutrino flux](#)  
Astrophysical Journal 835 (2017) 45 [arXiv:1611.03874] TOPCITE 100+
- [288] [The IceCube Neutrino Observatory: Instrumentation and Online Systems](#)  
Journal of Instrumentation 12 (2017) P03012 [arXiv:1612.05093] TOPCITE 250+

- [289] [Search for annihilating dark matter in the Sun with 3 years of IceCube data](#) TOPCITE 100+  
European Journal of Physics C 77 (2017) 146 [arXiv:1612.05949]
- [290] [The IceCube realtime alert system](#)  
Astroparticle Physics 92 (2017) 30 [arXiv:1612.06028]
- [291] [Neutrinos and cosmic rays observed by IceCube, in Special issue on “Origins of Cosmic Rays”](#)  
Advances in Space Research 62 (2018) 2902–2930 [arXiv:1701.03731]
- [292] [Search for sterile neutrino mixing using three years of IceCube DeepCore data](#) TOPCITE 50+  
Physical Review D 95 (2017) 112002 [arXiv:1702.05160]
- [293] [Multiwavelength follow-up of a rare IceCube neutrino multiplet](#)  
Astronomy & Astrophysics 607 (2017) A115 [arXiv:1702.06131]
- [294] [Extending the search for muon neutrinos coincident with gamma-ray bursts in IceCube data](#)  
Astrophysical Journal 843 (2017) 112 [arXiv:1702.06868] TOPCITE 50+
- [295] [Search for high-energy neutrinos from gravitational wave event GW151226 and candidate LVT151012 with ANTARES and IceCube](#) TOPCITE 50+  
Physical Review D 96 (2017) 022005 [arXiv:1703.06298]
- [296] [Search for astrophysical sources of neutrinos using cascade events in IceCube](#)  
Astrophysical Journal 846 (2017) 136 [arXiv:1705.02383]
- [297] [Measurement of the  \$\nu\_\mu\$  energy spectrum with IceCube-79](#)  
European Physics Journal C 77 (2017) 692 [arXiv:1705.07780]
- [298] [Search for neutrinos from dark matter annihilations in the centre of the Milky Way with 3 years of IceCube/DeepCore](#) European Physics Journal C 77 (2017) 627 [arXiv:1705.08103]
- [299] [Constraints on Galactic neutrino emission with seven years of IceCube data](#)  
Astrophysical Journal 849 (2017) 67 [arXiv:1707.03416]
- [300] [Measurement of atmospheric neutrino oscillations at 6–56 GeV with IceCube DeepCore](#)  
Physical Review Letters 120 (2018) 071801 [arXiv:1707.07081] TOPCITE 50+
- [301] [Neutrino interferometry for high-precision tests of Lorentz symmetry with IceCube](#)  
Nature Physics 14 (2018) 961 [arXiv:1709.03434]
- [302] [Search for nonstandard neutrino interactions with IceCube DeepCore](#)  
Physical Review D 97 (2018) 072009 [arXiv:1709.07079]
- [303] [Multi-messenger observations of a binary neutron star merger](#) TOPCITE 1000+  
Astrophysical Journal Letters 848 (2017) L12 [arXiv:1710.05833]
- [304] [Search for high-energy neutrinos from binary neutron star merger GW170817 with ANTARES, IceCube, and the Pierre Auger Observatory](#) TOPCITE 100+  
Astrophysical Journal 850 (2017) L35 [arXiv:1710.05839]
- [305] [Measurement of the multi-TeV neutrino cross section with IceCube using Earth absorption](#)  
Nature 551 (2017) 596 [arXiv:1711.08119]
- [306] [A search for neutrino emission from fast radio bursts with six years of IceCube data](#)  
Astrophysical Journal 857 (2018) 117 [arXiv:1712.06277]
- [307] [Computational techniques for the analysis of small signals in high-statistics neutrino oscillation experiments](#) Nuclear Instruments & Methods A 977 (2020) 164332 [arXiv:1803.05390]
- [308] [Search for neutrinos from decaying dark matter with IceCube](#)  
European Physical Journal C 78 (2018) 831 [arXiv:1804.03848]

- [309] [Differential limit on the extremely-high-energy cosmic neutrino flux in the presence of astrophysical background from nine years of IceCube data](#) TOPCITE 100+  
Physical Review D 98 (2018) 062003 [arXiv:1807.01820]
- [310] [Neutrino emission from the direction of the blazar TXS 0506+056 prior to the IceCube-170922A alert](#) TOPCITE 250+  
Science 361 (2018) 147 [arXiv:1807.08794]
- [311] [Constraints on minute-scale transient astrophysical neutrino sources](#)  
Physical Review Letters 122 (2019) 051102 [arXiv:1807.11492]
- [312] [Multimessenger observations of a flaring blazar coincident with high-energy neutrino IceCube-170922A](#) TOPCITE 250+  
Science 361 (2018) 146 [arXiv:1807.08816]
- [313] [Joint constraints on galactic diffuse neutrino emission from ANTARES and IceCube](#)  
Astrophysical Journal 868 (2018) L20 [arXiv:1808.03531]
- [314] [Measurements using the inelasticity distribution of multi-TeV neutrino interactions in IceCube](#)  
Physical Review D99 (2019) 032004 [arXiv:1808.07629]
- [315] [Search for multi-messenger sources of gravitational waves and high-energy neutrinos with Advanced LIGO during its first observing run, ANTARES and IceCube](#)  
Astrophysical Journal 870 (2019) 134 [arXiv:1810.10693]
- [316] [Detection of the temporal variation of the Sun's cosmic ray shadow with the IceCube detector](#)  
Astrophysical Journal 872 (2019) 133 [arXiv:1811.02015]
- [317] [Search for steady point-like sources in the astrophysical muon neutrino flux with 8 years of IceCube data](#) European Physical Journal C 79 (2019) 234 [arXiv:1811.07979]
- [318] [All-sky measurement of the anisotropy of cosmic rays at 10 TeV and mapping of the local interstellar magnetic field](#) Astrophysical Journal 871 (2019) 96 [arXiv:1812.05682]
- [319] [Measurement of atmospheric tau neutrino appearance with IceCube DeepCore](#)  
Physical Review D99 (2019) 032007 [arXiv:1901.05366]
- [320] [Investigation of two Fermi-LAT gamma-ray blazars coincident with high-energy neutrinos detected by IceCube](#) Astrophysical Journal 880 (2019) 103 [arXiv:1901.10806]
- [321] [A search for transient optical counterparts to high-energy IceCube neutrinos with Pan-STARRS1](#) Astronomy & Astrophysics 626 (2019) A117 [arXiv:1901.11080]
- [322] [Neutrinos below 100 TeV from the southern sky employing refined veto techniques to IceCube data](#) Astroparticle Physics 116 (2020) 102392 [arXiv:1902.05792]
- [323] [Development of an analysis to probe the neutrino mass ordering with atmospheric neutrinos using three years of IceCube DeepCore data](#)  
European Physical Journal C80 (2020) 9 [arXiv:1902.07771]
- [324] [Cosmic ray spectrum and composition from PeV to EeV using 3 years of data from IceTop and IceCube](#) Physical Review D100 (2019) 082002 [arXiv:1906.04317]
- [325] [Search for sources of astrophysical neutrinos using seven years of IceCube cascade events](#)  
Astrophysical Journal 886 (2019) 12 [arXiv:1907.06714]
- [326] [Velocity independent constraints on spin-dependent DM-nucleon interactions from IceCube & PICO](#) European Physical Journal C 80 (2020) 819 [arXiv:1907.12509]
- [327] [Search for PeV gamma-ray emission from the Southern Hemisphere with 5 years of data from the IceCube Observatory](#) Astrophysical Journal 891 (2020) 9 [arXiv:1908.09918]



- [328] [A search for MeV to TeV neutrinos from Fast Radio Bursts with IceCube](#) *Astrophysical Journal* 890 (2020) 111 [arXiv:1908.09997]
- [329] [Efficient propagation of systematic uncertainties from calibration to analysis with the SnowStorm method in IceCube](#) *Journal of Cosmology & Astroparticle Physics* 10 (2019) 048 [arXiv:1909.01530]
- [330] [A search for neutrino point-source populations in 7 years of IceCube data with neutrino-count statistics](#) *Astrophysical Journal* 893 (2020) 102 [arXiv:1909.08623]
- [331] [Design and performance of the first IceAct demonstrator at the South Pole](#) *Journal of Instrumentation* 15 (2020) T02002 [arXiv:1910.06945]
- [332] [Time-integrated neutrino source searches with 10 years of IceCube data](#) *Physical Review Letters* 124 (2020) 051103 [arXiv:1910.08488]
- [333] [Combined sensitivity to the neutrino mass ordering with JUNO, the IceCube Upgrade, and PINGU](#) *Physical Review D* 101 (2020) 032006 [arXiv:1911.06745]
- [334] [Constraints on neutrino emission from nearby galaxies using the 2MASS Redshift Survey and IceCube](#) *Journal of Cosmology & Astroparticle Physics* 07 (2020) 042 [arXiv:1911.11809]
- [335] [Searches for neutrinos from cosmic-ray interactions in the Sun using seven years of IceCube data](#) *Journal of Cosmology & Astroparticle Physics*, in press [arXiv:1912.13135]  
(with the IceCube Collaboration)
- [336] [A search for IceCube events in the direction of ANITA neutrino candidates](#) *Astrophysical Journal* 892 (2020) 53 [arXiv:2001.01737]
- [337] [Characteristics of the diffuse astrophysical electron and tau neutrino flux with six years of IceCube high energy cascade data](#) *Physical Review Letters* 125 (2020) 121104 [arXiv:2001.09520]
- [338] [In-situ calibration of the single-photoelectron charge response of the IceCube photomultiplier tubes](#) *Journal of Instrumentation* 15 (2020) P06032 [arXiv:2002.00997]
- [339] [Combined search for neutrinos from dark matter self-annihilation in the Galactic Centre with ANTARES & IceCube](#) *Physical Review D* 102 (2020) 082002 [arXiv:2003.06614]
- [340] [IceCube search for high-energy neutrino emission from TeV pulsar wind nebulae](#) *Astrophysical Journal* 898 (2020) 117 [arXiv:2003.12071]
- [341] [An eV-scale sterile neutrino search using eight years of atmospheric muon neutrino data from the IceCube Neutrino Observatory](#) *Physical Review Letters* 125 (2020) 141801 [arXiv:2005.12942]
- [342] [Searching for eV-scale sterile neutrinos with eight years of atmospheric neutrinos at the IceCube neutrino telescope](#) *Physical Review D* 102 (2020) 052009 [arXiv:2005.12943]
- [343] [Cosmic ray spectrum from 250 TeV to 10 PeV using IceTop](#) *Physical Review D* 102 (2020) 122001 [arXiv:2006.05215]
- [344] [Measurements of the time-dependent cosmic-ray Sun shadow with seven years of IceCube data – Comparison with the Solar cycle and magnetic field models](#) *Physical Review D*, in press [arXiv:2006.16298]
- [345] [Multimessenger gamma-ray and neutrino coincidence alerts using HAWC and IceCube sub-threshold data](#) *Astrophysical Journal*, in press [arXiv:2008.10616]

Under review:

- [346] [ANTARES and IceCube combined search for neutrino point-like and extended sources in the Southern sky](#) *Astroparticle Physics*, submitted [arXiv:2001.04412]

- [347] *The IceCube high-energy starting event sample: Description and flux characterisation with 7.5 years of data* Physical Review D, submitted [arXiv:2011.03545]
- [348] *Measurement of the high-energy all-flavor neutrino-nucleon cross section with IceCube* Physical Review Letters, submitted [arXiv:2011.03560]
- [349] *Measurement of astrophysical tau neutrinos in IceCube's high-energy starting events* Physical Review Letters, submitted [arXiv:2011.03561]
- [350] *Search for sub-TeV neutrino emission from transient sources with three years of IceCube data* Astrophysical Journal, submitted [arXiv:2011.05096]
- [351] *A search for time-dependent astrophysical neutrino emission with IceCube data from 2012–2017* Astrophysical Journal, submitted [arXiv:2012.01079]
- [352] *Follow-up of astrophysical transients in real time with the IceCube Neutrino Observatory* Astrophysical Journal, submitted [arXiv:2012.04577]
- [353] *LeptonInjector & LeptonWeighter: A neutrino event generator and weighter for neutrino observatories* Physical Review D, submitted [arXiv:2012.10449]  
(with the IceCube collaboration)

### With the Cherenkov Telescope Array Collaboration:

- [354] *Design concepts for the Cherenkov Telescope Array* TOPCITE 500+  
Experimental Astronomy 32 (2011) 193–316 [arXiv:1008.3703]
- [355] *Introducing the CTA concept* TOPCITE 500+  
Astroparticle Physics 43 (2013) 3–18
- [356] *Special issue on “Seeing the high-energy universe with the Cherenkov Telescope Array”*  
Astroparticle Physics 43 (2013) 1–365  
(Edited with J. Hinton, J. Knapp and D. Torres)
- [357] *Prospects for CTA observations of the young SNR RX J1713.7-3946*  
Astrophysical Journal 840 (2017) 74 [arXiv:1704.04136]
- [358] *Pre-construction estimates of the CTA sensitivity to a dark matter signal from the Galactic centre* Journal of Cosmology & Astroparticle Physics, to appear [arXiv:2007.16129]
- [359] *Sensitivity of the Cherenkov Telescope Array for probing cosmology and fundamental physics with gamma-ray propagation*  
Journal of Cosmology & Astroparticle Physics, to appear [arXiv:2010.01349]

### With LHC DM Collaboration:

- [360] *Simplified models for dark matter searches at the LHC* TOPCITE 250+  
Physics of the Dark Universe 9-10 (2015) 8–23 [arXiv:1506.03116] (with J Abdallah *et al*)
- [361] *Dark matter benchmark models for early LHC Run-2 searches* TOPCITE 250+  
Physics of the Dark Universe 26 (2019) 100371 [arXiv:1507.00966] (with D Abercrombie *et al*)

### With Laser Plasma Physics Collaborations:

- [362] *Magneto-optic probe measurements in low density-supersonic jets*  
Journal of Instrumentation 12 (2017) P12001  
(with M. Oliver, T. White, P. Maybe, M. Kühn-Kauffeldt, L. Döhl, R. Bingham, R. Clarke, P. Graham, R. Heathcote, M. Koenig, Y. Kuramitsu, D.Q. Lamb, J. Meinecke, T. Michel, F. Miniati, M. Notley, B. Reville, Y. Sakawa, A.A. Schekochihin, P. Tzeferacos, N. Woolsey, H.-S. Park & G. Gregori)

- [363] [Electron acceleration by wave turbulence in a magnetised plasma](#)  
Nature Physics 14 (2018) 475  
(with A. Rigby, F. Cruz, B. Albertazzi, R. Bamford, A. R. Bell, J. E. Cross, F. Fraschetti, P. Graham, Y. Hara, P. M. Kozłowski, Y. Kuramitsu, D. Q. Lamb, S. Lebedev, J. R. Marques, F. Miniati, T. Morita, M. Oliver, B. Reville, Y. Sakawa, C. Spindloe, R. Trines, P. Tzeferacos, L. O. Silva, R. Bingham, M. Koenig & G. Gregori)
- [364] [Supersonic plasma turbulence in the laboratory](#)  
Nature Communications 10 (2019) 1758  
(with T.G. White, M.T. Oliver, P. Mabey, M. Kühn-Kauffeldt, A. Bott, L. Döhl, A. Bell, R. Bingham, R. Clarke, J. Foster, G. Giacinti, P. Graham, R. Heathcote, M. Koenig, Y. Kuramitsu, D.Q. Lamb, J. Meinecke, T. Michel, F. Miniati, M. Notley, B. Reville, D. Ryu, Y. Sakawa, M.P. Selwood, J. Squire, R.H.H. Scott, P. Tzeferacos, N. Woosley, A.A. Schekochihin & G. Gregori)
- [365] [Maser radiation from collisionless shocks: application to astrophysical jets](#)  
High Power Laser Science & Engineering 7 (2019) e17  
(with D. Speirs, R. Bingham, K. Ronald, A. Phelps, M. Koepke, A. Cairns, A. Rigby, F. Cruz, R. Trines, R. Bamford, B. Kellett, B. Albertazzi, J. Cross, F. Fraschetti, P. Graham, P. Kozłowski, Y. Kuramitsu, F. Miniati, T. Morita, M. Oliver, B. Reville, Y. Sakawa, C. Spindloe, M. Koenig, L.O. Silva, D.Q. Lamb, P. Tzeferacos, S. Levedev, G. Gregori)
- [366] [Transport of high-energy charged particles through spatially intermittent turbulent magnetic fields](#) Astrophysical Journal 892 (2020) 114 [arXiv:1808.04430]  
(with L.E. Chen, A. Bott, P. Tzeferacos, A. Rigby, A. Bell, R. Bingham, C. Graziani, J. Katz, M. Koenig, C.K. Li, R. Petrasso, H.-S. Park, J.S. Ross, D. Ryu, D. Ryutov, T.G. White, B. Reville, J. Matthews, J. Meinecke, F. Miniati, E.G. Zweibel, A.A. Schekochihin1, D.Q. Lamb, D.H. Froula, G. Gregori)
- [367] [Strong suppression of heat conduction in a laboratory analogue of a galaxy-cluster turbulent plasma](#) Nature?, submitted  
(with J. Meicecke, P. Tzeferacos, J.S. Ross, A.F. Bott, S. Feister, H.-S. Park, A.R. Bell, R. Blandford, D. Berger, R. Bingham, A. Casner, L.E. Chen, J. Foster, D.H. Froula, C. Goyon, D. Kalantar, M. Koenig, B. Lahmann, C.-K. Li, P. Michel, C. Palmer, R. Petrasso, B. Remington, B. Reville, A. Rigby, D. Ryu, D. Ryutov, G. Swadling, A. Zylstra, F. Miniati, S. Sarkar, A.A. Schekochihin, D.Q. Lamb, G. Gregori)
- [368] [Generating ultra-dense pair beams using 400 GeV/c protons](#)  
Physical Review C, submitted [arXiv:2011.04398]  
(with C.D. Arrowsmith, N. Shukla, N. Charitonidis, R. Boni, H. Chen, T. Davenne, D.H. Froula, B.T. Huffman, Y. Kadi, B. Reville, S. Richardson, J.L. Shaw, L. O. Silva, R.M.G.M. Trines, R. Bingham, G. Gregori)

### With the Particle Data Group:

- [369] [Big-bang nucleosynthesis](#) (in ‘The Review of Particle Physics’, Particle Data Group)  
Physical Review D66 (2002) 010001-162 TOPCITE 5000+
- [370] [Big-bang nucleosynthesis](#) (in the ‘Review of Particle Physics’ by the Particle Data Group)  
Physics Letters B592 (2004) 1 [astro-ph/0406663] TOPCITE 5000+
- [371] [Big-bang nucleosynthesis](#) (in the ‘Review of Particle Physics’, Particle Data Group)  
Journal of Physics G 33 (2006) 1 [astro-ph/0601514] TOPCITE 5000+
- [372] [Big-bang nucleosynthesis](#) (in the ‘Review of Particle Physics’ by the Particle Data Group)  
Physics Letters B667 (2008) 1 TOPCITE 5000+
- [373] [Big-bang nucleosynthesis](#) (in the ‘Review of Particle Physics’ by the Particle Data Group)  
Journal of Physics G 37 (2010) 075021 TOPCITE 5000+

- [374] *Big-bang nucleosynthesis* (in the ‘Review of Particle Physics’ by the Particle Data Group)  
Physical Review D86 (2012) 010001 TOPCITE 5000+
- [375] *Big-bang nucleosynthesis* (in the ‘Review of Particle Physics’ by the Particle Data Group)  
Chinese Physics C38 (2014) 339 [arXiv:1412.1408] TOPCITE 5000+
- [376] *Big-bang nucleosynthesis* (in the ‘Review of Particle Physics’ by the Particle Data Group)  
Chinese Physics C40 (2016) 100001 TOPCITE 5000+
- [377] *Big-bang nucleosynthesis* (in the ‘Review of Particle Physics’ by the Particle Data Group)  
Physical Review D 98 (2018) 030001 TOPCITE 5000+
- [378] *Big-bang nucleosynthesis* (in the ‘Review of Particle Physics’ by the Particle Data Group)  
Progress in Theoretical & Experimental Physics 2020 (2020) 083C01 TOPCITE 500+

### Reports:

- [379] *Summary of the NOW’98 Phenomenology Working Group: The BBN limit on  $N_\nu$*   
[hep-ph/9906251] (with S.M. Bilenky *et al*)
- [380] *Working group report: Astroparticle and neutrino physics*  
Pramana 67 (2006) 735–742 (with R. Gandhi, S. Mohanty, T. Souradeep *et al.*)
- [381] *Fundamental physics at the intensity frontier* TOPCITE 250+  
[arXiv:1205.2671] (with J.L. Hewett *et al*)
- [382] *PINGU sensitivity to the neutrino mass hierarchy*  
Proc. Snowmass 2013 [arXiv:1306.5846] (with the IceCube collaboration)
- [383] *Letter of Intent: The Precision IceCube Next Generation Upgrade (PINGU)* TOPCITE 250+  
[arXiv:1401.2046] (with the IceCube-PINGU Collaboration)
- [384] *IceCube-Gen2: A Vision for the Future of Neutrino Astronomy in Antarctica* TOPCITE 250+  
[arXiv:1412.5106] (with the IceCube-Gen2 Collaboration)
- [385] *Science with the Cherenkov Telescope Array* TOPCITE 100+  
World-Scientific, 2019 [arXiv:1709.07997]
- [386] *Spectral Distortions of the CMB as a probe of inflation, recombination, structure formation and particle physics* Bulletin of the American Astronomical Society 51 (2019) 184 [arXiv:1903.04218]  
(with J. Chluba, A. Kogut, S.P. Patil, M.H. Abitbol, N. Aghanim, Y. Ali-Haïmoud, M.A. Amin, J. Aumont, N. Bartolo, K. Basu, E.S. Battistelli, R. Battye, D. Baumann, I. Ben-Dayan, B. Bolliet, J.R. Bond, F.R. Bouchet, C.P. Burgess, C. Burigana, C.T. Byrnes, G. Cabass, D.T. Chuss, S. Clesse, P.S. Cole, L. Dai, P. de Bernardis, J. Delabrouille, V. Desjacques, G. de Zotti, J.A.D. Diacoumis, E. Dimastrogiovanni, E. Di Valentino, J. Dunkley, R. Durrer, C. Dvorkin, J. Ellis, H.K. Eriksen, M. Fasiello, D. Fixsen, F. Finelli, R. Flauger, S. Galli, J. Garcia-Bellido, M. Gervasi, V. Gluscevic, D. Grin, L. Hart, C. Hernandez-Monteagudo, J.C. Hill, D. Jeong, B.R. Johnson, G. Lagache, E. Lee, A. Lewis, M. Liguori, R. Khatri, K. Kohri, E. Komatsu, K.E. Kunze, A. Mangilli, S. Masi, J. Mather, S. Matarrese, M.A. Miville-Deschênes, T. Montaruli, M. Munchmeyer, S. Mukherjee, T. Nakama, F. Nati, A. Ota, L.A. Page, E. Pajer, V. Poulin, A. Ravenni, C. Reichardt, M. Remazeilles, A. Rotti, J.A. Rubino-Martin, A. Sarkar, G. Savini, D. Scott, P.D. Serpico, J. Silk, T. Souradeep, D.N. Spergel, A.A. Starobinsky, R. Subrahmanyam, R.A. Sunyaev, E. Switzer, A. Tartari, H. Tashiro, R. Basu Thakur, T. Trombetti, B. Wallisch, B.D. Wandelt, I.K. Wehus, E.J. Wollack, M. Zaldarriaga, M. Zannoni)
- [387] *Neutrino astronomy with the next generation IceCube Neutrino Observatory*  
Astro2020 decadal survey, submitted [arXiv:1911.02561]

- [388] *IceCube-Gen2: The window to the extreme universe*  
Journal of Physics G, to appear [arXiv:2008.04323] (with the IceCube Collaboration)
- [389] *AMS-100 – The Next Generation Magnetic Spectrometer in Space*  
Experimental Astronomy, submitted [arXiv:?]  
(with S. Schael, S.P. Wakely, J. Berdugo, G. Bertone, P. Blasi, T. Bretz, M. Cirelli, M. Czapalla, B. Dachwald, L. Derome, P. von Doetinchem, F. Donato, L. Drury, M. Duranti, H. Gast, S. Haino, B. Heber, M. Kraemer, P. Lipari, P.S. Marrocchesi, P. Mertsch, I. Moskalenko, T. Nakada, P. Salati, M. Schluse, K.U. Schroeder, C. Senatore, P.D. Serpico, L. Shchutska)
- Conference papers:** Over 2000 to date, e.g.
- [390] *Energy spectra & charge states of low energy cosmic rays in the SKYLAB experiment*  
Space Research XX (1980) 259–262  
(with S. Biswas, N. Durgaprasad & V.S. Venkatavaradan)
- [391] *Gamma ray emission from supernova remnants*  
in ‘Non-Solar Gamma Rays’, ed. M. Rycroft (Pergamon Press, 1980), p.57–60 (with R. Cowsik)
- [392] *The evolution of supernova remnants as radio sources*  
Proc. IAU Symp. 101: ‘Supernova remnants & their X-ray emission’, Venice, ed. J. Danziger & P. Gorenstein, (Reidel, 1983), p.187–192 (with R. Cowsik)
- [393] *Neutrino detectors as probes of massive cosmological relics*  
Proc. 2nd Intern. Workshop on ‘Theoretical & Phenomenological Aspects of Underground Physics’, eds. A. Morales *et al*, Nuclear Physics B (Proc. Suppl.) 28A (1992) 405–408
- [394] *Successful supersymmetric inflation*  
Proc. International EPS Conf. on High Energy Physics, Brussels, ed. J. Lemonne *et al* (World Scientific, 1996), p.95–98 [hep-ph/9510369]
- [395] *The cosmic ray energy spectrum & related measurements with the Pierre Auger Observatory*  
Submissions to the 31<sup>st</sup> ICRC, Lodz (2009) [arXiv:0906.2189] TOPCITE 50+
- [396] *Studies of cosmic ray composition & air shower structure with the Pierre Auger Observatory*  
ing Submissions to the 31<sup>st</sup> ICRC, Lodz (2009) [arXiv:0906.2319] TOPCITE 50+
- [397] *Astrophysical sources of cosmic rays & related measurements with the Pierre Auger Observatory*  
Submissions to the 31<sup>st</sup> ICRC, Lodz (2009) [arXiv:0906.2347] TOPCITE 50+
- [398] *Light asymmetric dark matter*  
Proc. 6<sup>th</sup> Patras Workshop on Axions, WIMPs & WISPs, Zurich, 5–9 Jul 2010, eds. J. Jaeckel *et al* (with M. T. Frandsen)
- [399] *The Pierre Auger Observatory I: The cosmic ray energy spectrum & related measurements*  
Contribution to the 32<sup>nd</sup> ICRC, Beijing (2011) [arXiv:1107.4809] TOPCITE 100+
- [400] *The Pierre Auger Observatory II: Studies of cosmic ray composition & hadronic interactions*  
Contribution to the 32<sup>nd</sup> ICRC, Beijing (2011) [arXiv:1107.4804] TOPCITE 100+
- [401] *The Pierre Auger Observatory III: Other astrophysical observations* TOPCITE 50+  
Contribution to the 32<sup>nd</sup> ICRC, Beijing (2011) [arXiv:1107.4805]
- [402] *The Pierre Auger Observatory V: Enhancements* TOPCITE 100+  
Contribution to the 32<sup>nd</sup> ICRC, Beijing (2011) [arXiv:1107.4807]
- [403] *The ‘PAMELA anomaly’ indicates a nearby cosmic ray accelerator*  
Proc. 12<sup>th</sup> ICATPP, Como, eds. S. Giani *et al* (World Scientific, 2011) 535–543 [arXiv:1108.1753]  
(with P. Mertsch)

- [404] [2nd-order Fermi acceleration as the origin of the Fermi bubbles](#)  
Nuclear Instruments and Methods in Physics Research A, 692 (2012) 265–268 [arXiv:1108.1754]  
(with P. Mertsch)
- [405] [Quantifying uncertainties in the high energy neutrino cross-section](#)  
Pramana 79 (2012) 1301–1308 [arXiv:1108.1755] (with A.M. Cooper-Sarkar & P. Mertsch)
- [406] [The angular power spectrum of the Galactic synchrotron background](#)  
Proc. 33rd ICRC, Rio de Janeiro (2013) (with P. Mertsch)
- [407] [A hadronic explanation of the lepton anomaly](#) Journal of Physics, Conf. Series 531 (2014) 012008  
(with P. Mertsch)
- [408] [Combined analysis of cosmic-ray anisotropy with IceCube and HAWC](#)  
Submissions to the 35<sup>th</sup> ICRC, Busan (2017) [arXiv:1708.03005]  
(with the HAWC & IceCube collaborations)
- [409] [CTA contributions to the 35th International Cosmic Ray Conference](#)  
Submissions to the 35<sup>th</sup> ICRC, Busan (2017) [arXiv:1709.03483]
- [410] [The IceCube Neutrino Observatory Part I: Searches for the sources of astrophysical neutrinos](#)  
Submissions to the 35<sup>th</sup> ICRC, Busan (2017) [arXiv:1710.01179]
- [411] [The IceCube Neutrino Observatory Part II: the atmospheric and astrophysical neutrino flux](#)  
Submissions to the 35<sup>th</sup> ICRC, Busan (2017) [arXiv:1710.01191] TOPCITE 100+
- [412] [The IceCube Neutrino Observatory Part III: Cosmic rays](#)  
Submissions to the 35<sup>th</sup> ICRC, Busan (2017) [arXiv:1710.01194]
- [413] [The IceCube Neutrino Observatory Part IV: Searches for beyond the Standard Model physics](#)  
Submissions to the 35<sup>th</sup> ICRC, Busan (2017) [arXiv:1710.01197]
- [414] [The IceCube Neutrino Observatory Part V: Solar flares, Supernovae, Event reconstruction, ...](#)  
Submissions to the 35<sup>th</sup> ICRC, Busan (2017) [arXiv:1710.01201]
- [415] [The IceCube Neutrino Observatory Part VI: IceCube-Gen2](#)  
Submissions to the 35<sup>th</sup> ICRC, Busan (2017) [arXiv:1710.01207]
- [416] [The IceCube Neutrino Observatory, the Pierre Auger Observatory & the Telescope Array: Joint Contribution to the 35th International Cosmic Ray Conference \(ICRC 2017\)](#)  
[arXiv:1801.01854]
- [417] [Atmospheric neutrino results from IceCube-DeepCore and plans for PINGU](#)  
Journal of Physics Conference Series 888 (2017) 012023
- [418] [The IceCube Neutrino Observatory – Contributions to the 36th International Cosmic Ray Conference \(ICRC2019\)](#) PoS-ICRC2019 [arXiv:1907.11699]
- [419] [Cherenkov Telescope Array \(CTA\) Contributions to the 36th International Cosmic Ray Conference \(ICRC2019\)](#) PoS-ICRC2019 [arXiv:1911.12077]

\* 20 best publications

<sup>1</sup>ADS: 360 refereed papers/68,549 cites,  $h$ -index=94; Web of Science: 386 papers/68,593 cites,  $h$ =87  
ArXiv: 392 articles; GOOGLE SCHOLAR: 128,956 cites,  $h$ =119; SCOPUS: 359 documents, 70,224 cites,  $h$ =92  
<sup>2</sup>INSPIRE: 334 papers/99987 cites,  $h_{\text{HEP}}$ =113 (excluding *Review of Particle Physics*: 324 papers/40360 cites)  
[Of my refereed papers (excluding *Review of Particle Physics*), 12 are ‘renowned’ (500+ cites), 23 ‘famous’  
(250–500 cites), 86 ‘very well-known’ (100–250 cites), 83 ‘well-known’ (50–99 cites) & 83 ‘known’ (10–49 cites)]