

CONDENSED MATTER SEMINAR

Thursday 5 November at 16.00

X-Ray impact on planet formation: an experimental view”

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How do planets form in the disks surrounding young stars? Stars like classical T Tauri emit copious amounts of X-rays, in addition to UV photons, as confirmed by Chandra/XMM observations of targets in the Taurus molecular cloud. Soft (<1 keV) and hard (>1 keV) stellar X-rays impinge and are absorbed by the protoplanetary disk during its million year lifetime. Yet, the effects of stellar X-rays on protoplanetary matter remain elusive due to a lack of fundamental X-ray radiochemical data. Because X-rays are known to penetrate deeper in matter than UV photons or electrons this interaction could have far-reaching consequences in the earliest stages of planet formation.

To unveil the microphysical effects of X-rays on cosmic dust we tackle this problem via laboratory astrophysics. We simulate cosmic dust with solid-state laboratory analogs, and simulate high doses of X-rays using synchrotron radiation. Dust nanoparticles are irradiated with synchrotron X-rays until reaching astrophysically-relevant doses. Our experiments show that large doses of X-rays can significantly impact the structural, optical and isotopic properties of the smallest dust grains. I will provide an overview of what this could entail in the context of primordial planet formation and of our future work.

Host: Anna Jungbluth

Zoom ID: