

Spatiotemporal Quantum Engineering with Picometer and Attosecond Precision

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We have developed spatiotemporal wave-packet engineering in which the ultrafast wave-packet interference in a molecule is visualized and controlled with precisions on the picometer spatial and attosecond temporal scales [1,2]. This high-precision wave-packet engineering has been applied to ultrafast computing with molecular wavefunctions that executes discrete Fourier transform within 150 fs, faster than the current fastest supercomputers by three orders of magnitudes [3,4]. These ultrafast approaches are now being applied to cold and ultracold systems such as solid para-hydrogen [5] and laser-cooled atoms and molecules to explore quantum many-body dynamics.

References

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