

PHYSICS AND ASTRONOMY COLLOQUIUM

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Atto-science:

What we learn while converting many photons into one.

Attosecond pulse generation can be understood through quantum trajectories of an ionizing electron. A trajectory begins from a bound state and returns to the same state after an excursion in the continuum. Quantum trajectories, such as these, map onto an interferometer – an electron interferometer created by light. This mapping makes it obvious that weak fields perturb attosecond pulse generation and thereby we can construct a perturbative nonlinear optics on top of the non-perturbative process. I will show how this allows us develop an all optical method to fully characterize the space-time structure of attosecond pulses.



A (sheared) interferometer can measure most properties of light so we should be able to measure most properties of the electron. I will show how high harmonic or attosecond spectroscopy can image molecular orbitals or follow chemical dynamics of small molecules.

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