

54th Annual Meeting of the APS Division of Atomic, Molecular and Optical Physics
Monday–Friday, June 5–9, 2023; Spokane, Washington

Session U04: Focus Session: Imaging of Molecular Dynamics

2:00 PM–4:00 PM, Thursday, June 8, 2023
Room: Conference Theater

Chair: Thomas Wolf, SLAC National Accelerator Laboratory

Abstract: U04.00007 : Multi-Particle Cumulant Mapping for Coulomb Explosion Imaging: the Algorithm
3:48 PM–4:00 PM

← Abstract

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Covariance mapping is widely used to study correlations of different variables in the dataset. The power of the method has been demonstrated in multi-particle imaging, including two- and three-body covariance on molecules of biological relevance and Coulomb explosion imaging (CEI) of molecular dissociation dynamics. While covariance for two particles is rather straightforward, for four-body correlations, one needs to extend covariance mapping to cumulant mapping, which has been tested in recent measurements of strong field ionization of formaldehyde. Here, I will discuss the details of how to compute cumulant mapping for the momentum sum of all four fragments of the formaldehyde molecule, and how one can perform the calculation with a faster and better algorithm.