Abstract Submitted
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3D particle tracking velocimetry using dynamic discrete tomography for plasma physics applications[1] DMITRY MOSEEV, Max-Planck Institute for Plasma Physics, Garching, Germany, ANDREAS ALPERS, PETER GRITZMANN, Technical University of Munich, Garching, Germany, MIRKO SALEWSKI, Technical University of Denmark, Roskilde, Denmark — 3D particle tracking velocimetry (PTV) is a diagnostic technique which is widely used for studying flows, combustion, and plasmas. Current tomographic particle tracking methods are based on the multiplicative algebraic reconstruction technique and used for reconstructing the distribution of multi-pixel sized particles as greylevel images. Reconstructions obtained by these methods do not necessarily match the experimental data. We propose a new algorithm which can be used for tracking dust particles in tokamaks and stellarators, as well as in low-temperature and complex plasmas. The dynamic discrete tomography algorithm is efficient for data from two projection directions and exact. The non-uniqueness can be detected and tracked individually. The algorithm performance is proportional to N3 on average where N is the number of particles in the reconstruction. There is a room for further improvement of the computational cost scaling. Information from previously reconstructed frames is incorporated in the reconstruction procedure that is formulated as a discrete optimization problem, which has not been applied in PTV previously.

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