

Abstract Submitted
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Advances in Velocimetry Techniques for Plasma Turbulence BENJAMIN BROWN, T. MUNSAT, Y. SECHREST, N. SEN, University of Colorado — The HOP-V (Hybrid OPTical-flow Velocimetry) code has been developed for extracting time-resolved 2-D velocity maps from turbulence imaging diagnostics. The HOP-V code combines optical-flow and local pattern-matching techniques to derive “dense” velocity fields at the full temporal resolution and a fraction of the spatial resolution of the underlying image frames, often tens of pixels per side and thousands of timepoints in duration, with temporal and spatial resolution sufficient to resolve the relevant coherence decay quantities. Recent work has resulted in a new module to the HOP-V code, using a “next generation” optical flow approach capable of obtaining accurate flow-fields from highly nonrigid motion, as is commonly the case in turbulent scalar measurements. This approach not only derives flow fields containing local curl, but also simultaneously provides a decomposition of the flow field into a coherent pattern with separable small-scale patterns. This can be particularly important in separating the local “swirling” motion from flows having a more global impact on transport.

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