Abstract Submitted
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Diagnosis of Acceleration, Reconnection, Turbulence, and Heating[1] MIKAL T. DUFOR, ANDREW J. JEMIOLO, AMY KEESEE, PAUL CASSAK, WEICHAO TU, EARL E. SCIME, West Virginia University, Department of Physics and Astronomy — The DARTH (Diagnosis of Acceleration, Reconnection, Turbulence, and Heating) experiment is an intermediate-scale, experimental facility designed to study magnetic reconnection at and below the kinetic scale of ions and electrons. The experiment will have non-perturbative diagnostics with high temporal and three-dimensional spatial resolution, giving it the capability to investigate kinetic-scale physics. Of specific scientific interest are particle acceleration, plasma heating, turbulence and energy dissipation during reconnection. Here we will describe the magnetic field system and the two plasma guns used to create flux ropes that then merge through magnetic reconnection. We will also describe the key diagnostic systems: laser induced fluorescence (LIF) for ion vdf measurements, a 300 GHz microwave scattering system for sub-mm wavelength fluctuation measurements and a Thomson scattering laser for electron vdf measurements. The vacuum chamber is designed to provide unparalleled access for these particle diagnostics. The scientific goals of DARTH are to examine particle acceleration and heating during, the role of three-dimensional instabilities during reconnection, how reconnection ceases, and the role of impurities and asymmetries in reconnection.

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