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Optical Measurements of Dense Hypervelocity Plasmoids from Coaxial and Railgun Plasma Accelerators[1] ANDREW CASE, SARAH MESSER, RICHARD BOMGARDNER, SAMUEL BROCKINGTON, DOUGLAS WITHERSPOON, HyperV Technologies Corporation, RAY ELTON, University of Maryland — High velocity dense plasma jets are under continued experimental development for fusion applications including refueling, disruption mitigation, momentum injection/rotation drive, and magnetized target fusion. We present measurements taken on the plasmoids produced by a half-scale coaxial plasmoid accelerator, a full scale coaxial plasmoid accelerator, and a novel minirailgun accelerator. The data presented includes spectroscopic measurements of velocity and density, two point interferometric measurements of line integrated density and velocity, and fast framing camera imaging. Results from these measurements are in agreement with each other and with time of flight measurements taken using photodiodes, as well as total plasmoid momentum measurements taken using a ballistic pendulum technique. Plasma density is greater than 5×10^{15} cm^{-3}, and velocities range up to 100 km/s, with a small component in some cases exceeding 120 km/s.

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