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Development of Exploding Wire Plasma System for Studying Magnetic Reconnection LANDRY HORIMBERE, Dept. of Physics, University of Maryland, D. R. STONE, IREAP, University of Maryland, J. C. RODGERS, U.S. Naval Research Laboratory, D. P. LATHROP, Dept., of Physics, IREAP, IPST, University of Maryland — We are developing an exploding wire plasma system to study magnetic field reconnection at high densities with a range of magnetic helicities. Magnetic helicity is a measure of the topological interlinkage of magnetic field loops and is conserved during reconnection. Magnetic reconnection plays a central role in energy transfer between magnetic fields and in the separation and merging of plasma structures. As a mode of magnetic energy dissipation, reconnection plays an important role in magnetic confinement devices for fusion research, in space weather phenomena such as solar flares, and in the energy transfer between the solar wind and earths magnetosphere. Past experiments exploring the interaction of plasmas arcs with various helicity configurations have, in the counter helical case1, yielded high soft X-ray fluxes and evidence of residual plasma structures. Our experiment will investigate higher particle, field and energy densities and as well as the effect of turbulent phase transition on the evolution of reconnecting plasmas. To reach this parameter space, our experimental plasma is produced using the exploding wire method combined with an externally applied quadrapole guiding field to produce a highly no liner screw pinch collision. We have constructed the experimental chamber and are in the process of constructing and testing the pulse power and diagnostic systems.

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