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Simulations of high energy density plasma physics and laboratory astrophysics experiments J.P. CHITTENDEN, A. MAROCCHINO, S.V. LEBEDEV, R.A. SMITH, Imperial College, A. CIARDI, Observatoire de Paris, C.A. JENNINGS, Sandia National Laboratory — We show how 3D resistive MHD simulations can be used in the design and interpretation of Laboratory Astrophysics and High Energy Density Plasma Physics experiments at Imperial College, Sandia National Laboratory and Centre d'Etudes de Gramat. Using pulsed power generators to drive conical wire arrays, provides a mechanism of generating radiatively cooled hypersonic jets which model the interaction of jets from young stellar objects with the ISM and the deflection of these jets by side-winds. Radial wire arrays can be used to study magnetically launched jets, the effects of field topology on jet stability and episodic jets. Radial arrays also represent a high intensity compact radiation source, with potential applications to inertial confinement fusion. The collision of a magnetically accelerated foil with a gaseous target can be used to study of shock waves with strong radiative cooling. The interaction of a short pulse laser with cluster media can generate expanding blast waves in high energy density plasmas. Simulations of experiments with two cylindrical expanding blast waves, show the evolution of a complex 3D Mach stem, which can be compared to tomographic experimental data.

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