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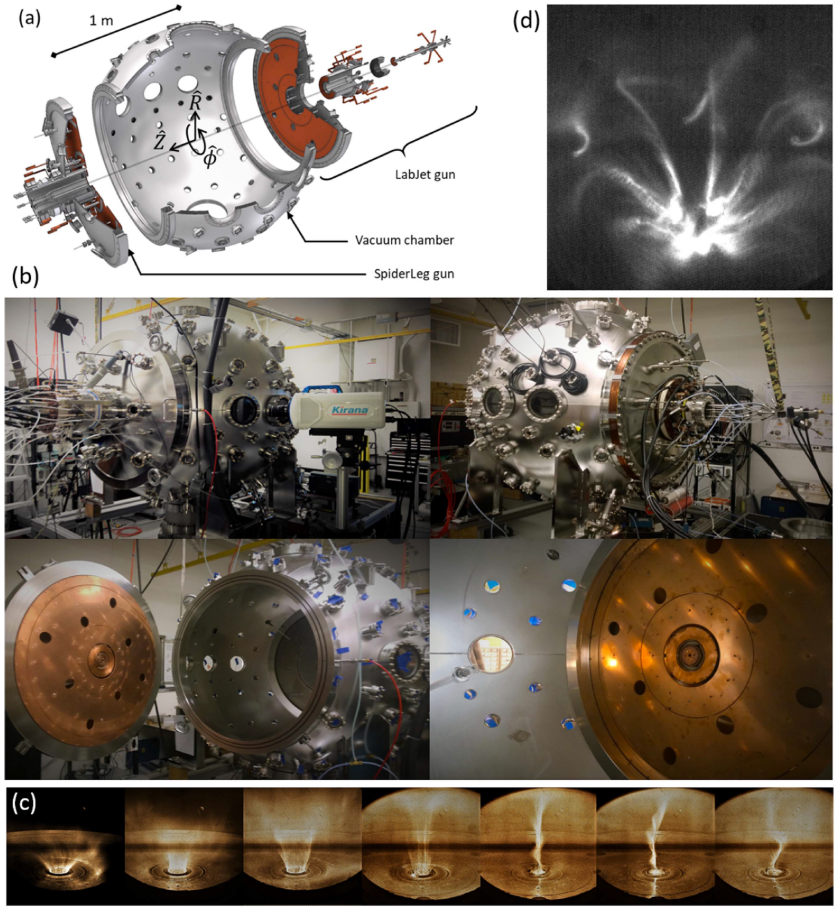
3D MHD Simulation for Jet Experiments: DOE INFUSE

Shengtai Li & Hui Li

Experiment Setup by Dr. Setthivoine You of HelicitySpace Inc.

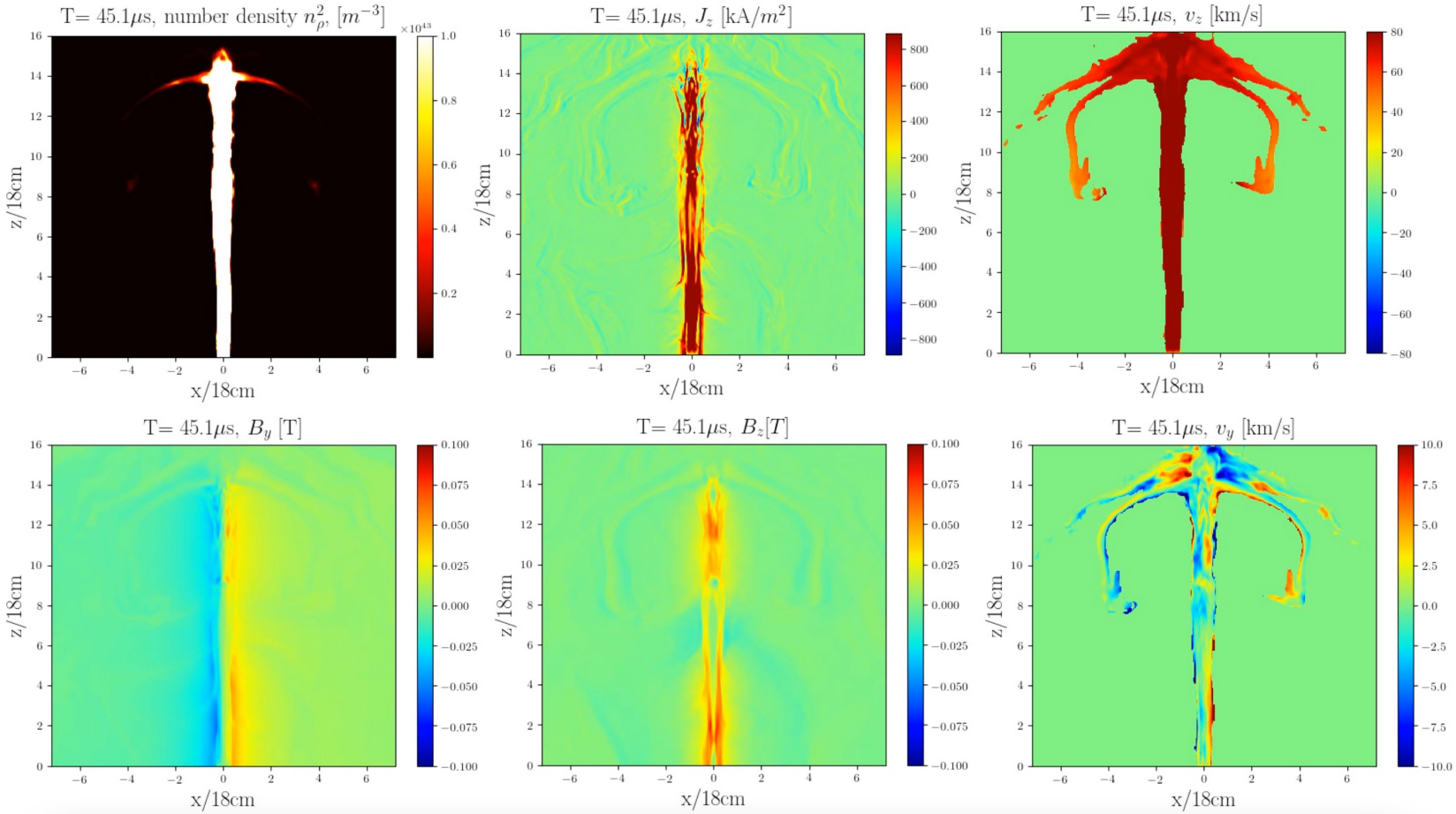


Mochi facility. (a) Schematic showing the mounting of the LabJet gun opposite the SpiderLeg gun on the spherical vacuum chamber. The numerous viewports generally point radially to the center of the sphere, except for several diagnostic ports that point to the Z-axis of the chamber within an azimuthal plane. The cutouts in the LabJet gun provide access to the viewports behind the gun; there are none behind the SpiderLeg gun. (b) Photographs of the apparatus showing the LabJet gun (top left), the SpiderLeg gun (top right), the hinged door with the LabJet gun and the tungsten-coated SpiderLeg gun in the background (bottom left), and the typical high-speed camera view of the LabJet gun (bottom right). (c) Typical plasma jets formed from the LabJet gun during the first operational campaign showing azimuthally symmetric tubes forming, lengthening, collimating, and undergoing instabilities. (d) Early plasma discharge in the SpiderLeg gun showing discrete, kinked, current-carrying magnetic flux tubes linking the gas holes.

3D MHD Simulation Results

Long-stable Jet (top row): Number density, Current density, Jet velocity (v_z)

(bottom row) Magnetic fields (By, Bz) Jet expansion Velocity (Vy)



Simulation of Merging of Two Jets