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High energy density laboratory astrophysics experiments with supersonic magnetized plasmas on the MAGPIE pulsed-power facility[1]

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— The use of plasma flows generated by pulsed-power facilities provides a natural platform for designing magnetized HEDLA experiments. The plasma in this case is created and accelerated by the JxB force of the driving, ˜Mega-Ampere level currents, forming plasma flows with embedded, frozen-in magnetic fields. Here we present several recent experiments performed on the MAGPIE pulsed-power facility focusing on studies of the structure of magnetized bow shocks, the dynamics of counter-streaming plasma jets, the formation of shocks in inverse liners, and magnetic reconnection in colliding plasmas. The relatively large spatial and temporal scales characterizing these experimental platforms, together with excellent diagnostic access, allow detailed characterization of the key plasma parameters and quantitative comparison of the experimental results with numerical simulations.

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