Abstract Submitted
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Characterization of Multi-Ion-Species Shock Structures in Railgun-Driven Plasma Jet Experiments[1] AMEER I. MOHAMMED, MAXIMILIAN K. SCHNEIDER[2], COLIN S. ADAMS, Virginia Polytechnic Institute and State University — Shocks are induced and characterized by colliding high-Mach-number plasma jets with stagnated plasma. A linear railgun serves as the plasma source, where injected argon gas mixes with impurities ablated from the internal components of the gun to form multi-ion-species plasma jets. These jets exist in a collisional regime, with density $\approx 10^{16}$ cm^{-3} and temperature ≈ 2 eV. The collision event produces a stagnation layer which is characterized using multi-chord interferometry, fast photography, and spatially-resolved spectroscopy. Plasma parameters measured and inferred from these diagnostics suggest that this stagnation layer is consistent with the formation of a collisional shock. Present efforts focus on spatially resolving the distribution of ion species in the pre- and post-shock plasma. The resulting data will have the potential to validate physics models relevant to astrophysical and high-energy-density plasmas.

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[2]Presently a postdoctoral fellow at Johns Hopkins University.

Ameer I. Mohammed
Virginia Polytechnic Institute and State University

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