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Collision Experiment of an Arched Plasma-Filled Flux Rope and a Target Cloud of Initially Neutral Gas PAKORN WONGWAITAYAKORNKUL, PAUL BELLAN, California Institution of Technology, HUI LI, SHENGTAI LI, Los Alamos National Laboratory — Shocks occur in the co-rotating interaction regions just beyond the solar corona, in the corona during CME events, and when the solar wind impacts Earth's magnetosphere. The Caltech solar loop experiment investigates shock physics by creating an arched plasma-filled flux rope that expands to collide with a pre-injected, initially-neutral gas. We focus the investigation on the situation of a heavy-gas plasma (Argon) impacting a much lighter neutral gas cloud (Hydrogen). The neutral gas target cloud ionizes immediately upon being impacted and plasma-induced shock waves propagate in the target cloud away from the impact region. Analysis of data from magnetic probes, Langmuir probes, a fast camera, and spectroscopic measurements will be presented. The measurements suggest that a thin, compressed, ionized layer of hydrogen is formed just downstream of the Argon plasma loop and that thin, supersonic shocks form further downstream and propagate obliquely away from the plasma loop. Numerical simulation of an ideal MHD plasma is underway to enable comparison of the measurements with the predictions of MHD theory.

Pakorn Wongwaitayakornkul
California Institution of Technology

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