

DAMOP08-2008-020080

Abstract for an Invited Paper
for the DAMOP08 Meeting of
the American Physical Society

Stopping supersonic beams with atomic and molecular coilguns

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We report a method that enables the stopping and trapping of any paramagnetic atom or molecule using a series of pulsed electromagnetic coils. Results of stopping metastable neon and molecular oxygen with a 64 stage coilgun will be presented and applications to fundamental problems in physics and chemistry discussed.