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Plasma guiding and deflection of high speed projectiles. ANDREY STARIKOVSKIY, RICHARD MILES, Princeton University, PU TEAM — The deposition of energy in the air in front of a high-speed projectile can lead to both the reduction of drag and the production of steering moments. Modeling has shown that the major contributor to the drag reduction and the steering moment is the high temperature, low density region that is produced by the energy addition. If the energy addition is off axis, it leads to a non symmetric pressure distribution on the projectile as it passes through this region, producing steering control authority that increases nonlinearly with Mach number. Experiments with a tethered projectile and subsequently with a rotating projectile using pulsed laser energy addition were reported. More recent experiments with a 30-mm diameter projectile in M=3.5 flow have been undertaken using a nozzle driven by a pulsed shock tunnel 9.5 m in length and 100 mm internal diameter. Energy was deposited by Nd-YAG laser with pulse energy of about 3 Joules at 1064nm. The laser pulse duration was 5-6 ns. Preliminary results indicate that the laser spark – flow interaction changes the angular momentum of the model for with a laser pulse energy of 2.85 J, the angle between laser spark axis and the flow 30ˆ0 and a flow speed 1100 m/s.

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