

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

FAR-TECH's Nanoparticle Plasma Jet System and its Application to Disruptions, Deep Fueling, and Diagnostics¹ J.R. THOMPSON, I.N. BOGATU, S.A. GALKIN, J.S. KIM, FAR-TECH, Inc. — Hypervelocity plasma jets have potential applications in tokamaks for disruption mitigation, deep fueling and diagnostics. Pulsed power based solid-state sources and plasma accelerators offer advantages of rapid response and mass delivery at high velocities. Fast response is critical for some disruption mitigation scenario needs, while high velocity is especially important for penetration into tokamak plasma and its confining magnetic field, as in the case of deep fueling. FAR-TECH is developing the capability of producing large-mass hyper-velocity plasma jets. The prototype solid-state source has produced: 1) >8.4 mg of H₂ gas only, and 2) >25 mg of H₂ and >180 mg of C₆₀ in a H₂/C₆₀ gas mixture. Using a coaxial plasma gun coupled to the source, we have successfully demonstrated the acceleration of composite H/C₆₀ plasma jets, with momentum as high as 0.6 g·km/s, and containing an estimated C₆₀ mass of ~75 mg. We present the status of FAR-TECH's nanoparticle plasma jet system and discuss its application to disruptions, deep fueling, and diagnostics. A new TiH₂/C₆₀ solid-state source capable of generating significantly higher quantities of H₂ and C₆₀ in <0.5 ms will be discussed.

¹Work supported by US DOE grants DE-FG02-08ER85196 and DE-SC0006220

John Thompson
FAR-TECH, Inc.

Date submitted: 12 Jul 2012

Electronic form version 1.4