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First Production of C_{60} Nanoparticle Plasma Jet for Study of Disruption Mitigation for ITER[1] I.N. BOGATU, J.R. THOMPSON, S.A. GALKIN, J.S. KIM, FAR-TECH, Inc., S. BROCKINGTON, A. CASE, S.J. MESSER, F.D. WITHERSPOON, HyperV Technologies Corp. — Unique fast response and large mass-velocity delivery of nanoparticle plasma jets (NPPJs) provide a novel application for ITER disruption mitigation, runaway electrons diagnostics and deep fueling. NPPJs carry a much larger mass than usual gases. An electromagnetic plasma gun provides a very high injection velocity (many km/s). NPPJ has much higher ram pressure than any standard gas injection method and penetrates the tokamak confining magnetic field. Assimilation is enhanced due to the NP large surface-to-volume ratio. Radially expanding NPPJs help achieving toroidal uniformity of radiation power. FAR-TECH's NPPJ system was successfully tested: a coaxial plasma gun prototype ($\sim$35 cm length, 96 kJ energy) using a solid state TiH_2/C_{60} pulsed power cartridge injector produced a hyper-velocity (>4 km/s), high-density ($>10^{23}$ m^{-3}), C_{60} plasma jet in $\sim$0.5 ms, with $\sim$1$-$2 ms overall response-delivery time. We present the TiH_2/C_{60} cartridge injector output characterization ($\sim$180 mg of sublimated C_{60} gas) and first production results of a high momentum C_{60} plasma jet ($\sim$0.6 g·km/s).

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