

Abstract Submitted  
for the DPP09 Meeting of  
The American Physical Society

**Models and Simulations of C60-Fullerene Plasma Jets for Disruption Mitigation and Magneto-Inertial Fusion**<sup>1</sup> IOAN-NICULAE BOGATU, SERGEI A. GALKIN, JIN-SOO KIM, FAR-TECH, Inc. — We present the models and simulation results of C60-fullerene plasma jets proposed to be used for the disruption mitigation on ITER and for magneto-inertial fusion (MIF). The model describing the fast production of a large mass of C60 molecular gas in the pulsed power source by explosive sublimation of C60 micro-grains is detailed. Several aspects of the magnetic “piston” model and the 2D interchange (magnetic Rayleigh-Taylor) instability in the rail gun arc dynamics are described. A plasma jet adiabatic expansion model is used to investigate the in-flight three-body recombination during jet transport to the plasma boundary. Our LSP PIC code 3D simulations show that heavy C60 plasmoid penetrates deeply through a transverse magnetic barrier demonstrating self-polarization and magnetic field expulsion effects. The LSP code 3D simulation of two plasma jets head-on injection along a magnetic field lines for MIF are also discussed.

<sup>1</sup>Work supported by the US DOE DE-FG02-08ER85196 and DE-FG02-05ER84185 SBIR grants.

Ioan-Niculae Bogatu  
FAR-TECH, Inc.

Date submitted: 29 Jun 2009

Electronic form version 1.4