Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Carbon microgranule injection into NSTX-U discharges for edge diagnostic research[1] ROBERT LUNSFORD, A. LANE ROQUEMORE, Princeton Plasma Physics Laboratory, FILIPPO SCOTTI, Lawrence Livermore National Laboratory, DENNIS MANSFIELD, ALESSANDRO BORTOLON, ROBERT KAITA, RAJESH MAINGI, Princeton Plasma Physics Laboratory — Microgranule injection is a versatile means for investigating edge plasmas in fusion devices. Employing a dual bladed rotary turbine, carbon microgranules ranging in diameter from 300 - 700 microns are radially injected into NSTX-U discharges at approximately 50 m/sec. Utilizing multiple high speed camera views, a 3D reconstruction of the injection geometry is created which characterizes the ablation rate and granule trajectory. By coupling this with a neutral gas shielding (NGS) ablation model, the granule mass deposition profile can be determined. Simulation projects a depositional barycenter near the pedestal shoulder for H-mode discharges, and ˜20 cm inboard of the LCFS for L-mode discharges. Spectroscopic measurements of this localized particle source can be used to characterize impurity transport within the discharge, and potentially allows for direct measurement of the safety factor profile (q). In addition, the transient pressure peaking resultant from injection into H-mode plasmas can also result in the prompt triggering of an edge localized mode (ELM).

[1]Work supported by DOE Contract No. DE-AC02-09CH11466

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Date submitted: 19 Jul 2016 Electronic form version 1.4