Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Utilizing solid impurity granules for ELM pacing in NSTX-U[1] ROBERT LUNSFORD, L. ROQUEMORE, M.A. JAWORSKI, R. KAITA, R. MAINGI, PPPL, NSTX-U TEAM — Periodic edge localized modes (ELMs) rapidly transport stored energy from the edge plasma to the divertor. These events result in abrupt heating of the plasma facing components (PFCs) which reduces their effective lifetime as well as generating a strong impurity influx. If the frequency of these ELMs can be increased through controlled triggering, also known as pacing, then the inverse relationship between the peak heat flux and the frequency of the ELMs can be utilized to prevent material damage that could result from otherwise unmitigated ELMs. At NSTX, the ability of small (300 – 1000 micron) impurity granules to trigger and pace these ELMs is being explored. In these experiments, ELMs are triggered by seeding a density perturbation within the edge-pedestal region through low speed injection and ablation of impurity granules, thus generating a localized instability. Granules are dropped from a reservoir and transit a vertical flight tube at which point a rotating impeller imparts horizontal momentum into the falling granules. This drives them into the edge of the discharge at speeds ranging from 50-150 m/s and average injection frequencies of up to 200 Hz depending upon the settings of the injector. Results from the initial laboratory injection tests of lithium, boron carbide (B_4C) and vitreous carbon granules and their subsequent implementation in NSTX-U experiments will be discussed.

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

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Date submitted: 23 Jul 2015 Electronic form version 1.4