

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Investigation of Powder Injection Using Segmented Electrodes

THEOPHILUS HUMAN, UC San Diego, AHMED DIALLO, Princeton Plasma Physics Laboratory — Injection Boron powders were demonstrated to be an effective tool for wall conditioning and recycling reduction in tokamak devices. Presently, boron powder is injected using the Impurity Powder Dropper (IPD) which relies on gravity for delivery in the plasma. This scheme results in velocity limited by gravitational acceleration. It is proposed that by electrically charging boron, transit times can be reduced by at least a factor of ten. Additionally, injection can become directionally independent, removing the requirement for installation above a tokamak and allowing for greater system flexibility. Dust charging via lamp based photoemission processes were studied to set physics constraints for powder dynamics held at vacuum pressure. Various regimes of powder granularity and lamp energy were investigated to guide design of a segmented electrode system for improved injection control and velocity. Control of particle radius and injection velocity also opens avenues for experimental studies of ablation characteristics in the edge of tokamaks.

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Date submitted: 10 Jul 2020

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