Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

**Simulation of Edge Plasma Transport with Transient Impurity Sources due to Dust Influx**[1] ROMAN SMIRNOV, SERGEI KRASHENINNIKOV, UCSD — Accidental dust injection into edge plasmas of magnetic fusion devices can occur due to damage of plasma facing components by high transient heat loads or due to mobilization of previously accumulated dust from plasma exposed surfaces. Such events can produce large transient impurity sources in fusion edge plasmas caused by ablation of the dust grains. As the dust itself is mobile due to various forces acting on the grains in the plasma, impact of the dust-produced impurities on edge plasma depends on the dust transport. To simulate the dust, impurity, and plasma transport in tokamak edge self-consistently we use coupled UEDGE-DUSTT code in time-dependent mode. In this work we investigate magnitudes of perturbations induced by tungsten dust injection in ITER-like H-mode edge plasma and the following plasma recovery dynamics for various amounts of dust injected. The impurity fluxes to the plasma core and associated reduction of the pedestal temperatures are simulated, as well as characteristic times of the pedestal recovery following dust injection. We also investigate impact of transient dust influx on divertor operation. The simulations demonstrate that injection of dust in divertor plasma can trigger asymmetric detachment/re-attachment of inner-outer divertor plasmas, which may not spontaneously recover after the dust injection event.

[1]This material is based upon the work supported by the U.S. Department of Energy, Office of Science, Office of Fusion Energy Sciences under Award No. DE-FG02-06ER54852.

Roman Smirnov
University of California, San Diego

Date submitted: 02 Jul 2019 Electronic form version 1.4