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Impact of transient dust injection on power load in impurity seeded divertor.[1] ROMAN SMIRNOV, SERGEI KRASHENINNIKOV, University of California, San Diego — Dust can present significant challenges for operation of long pulse discharges in future fusion reactors. It is expected that large quantities of sputtered wall material can be deposited at the bottom of a reactor vessel. Formation of dust from such deposits and its subsequent mobilization by transient plasma events can present substantial intermittent source of plasma impurities. On the other hand, seeding of gaseous impurities is expected to be necessary for divertor power load mitigation. In the present work we investigate effects that transient dust sources can have on plasma and heat transport in a divertor with other seeded impurities. We conducted self-consistent time-dependent simulations of coupled dust and plasma dynamics following tungsten dust outburst in ITER-like divertor with seeded neon impurities using coupled DUSTT and UEDGE codes. The evolution of the edge, SOL, and divertor plasma conditions, following the injection of tungsten dust of various quantities and sizes at the outer strike point, was investigated. The estimates of the core plasma impurity fraction and the core impurity screening factor associated with the dust injection were also obtained. The simulations showed that injection of even modest amounts of tungsten dust into the divertor plasma can result in large transient increase of the divertor power load and intolerable levels of the core plasma contamination with tungsten impurities.

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