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Modeling of transient dust events in fusion edge plasmas with DUSTT-UEDGE code R.D. SMIRNOV, S.I. KRASHENINNIKOV, A.YU. PIGAROV, UCSD, T.D. ROGNLIEN, LLNL — It is well known that dust can be produced in fusion devices due to various processes involving structural damage of plasma exposed materials. Recent computational and experimental studies have demonstrated that dust production and associated with it plasma contamination can present serious challenges in achieving sustained fusion reaction in future fusion devices, such as ITER. To analyze the impact, which dust can have on performance of fusion plasmas, modeling of coupled dust and plasma transport with DUSTT-UEDGE code is used by the authors. In past, only steady-state computational studies, presuming continuous source of dust influx, were performed due to iterative nature of DUSTT-UEDGE code coupling. However, experimental observations demonstrate that intermittent injection of large quantities of dust, often associated with transient plasma events, may severely impact fusion plasma conditions and even lead to discharge termination. In this work we report on progress in coupling of DUSTT-UEDGE codes in time-dependent regime, which allows modeling of transient dust-plasma transport processes. The methodology and details of the time-dependent code coupling, as well as examples of simulations of transient dust-plasma transport phenomena will be presented. These include time-dependent modeling of impact of short out-bursts of different quantities of tungsten dust in ITER divertor on the edge plasma parameters. The plasma response to the out-bursts with various duration, location, and ejected dust sizes will be analyzed.

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