Abstract Submitted
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Dynamics, transport and impact of dust in fusion plasmas[1] R.D. SMIRNOV, S.I. KRASHENINNIKOV, A.YU. PIGAROV, D.A. MENDIS, UCSD, T.D. ROGNLIEN, LLNL — It has been well established now that dust is commonly present in magnetic fusion devices. It is expected that dust formation will increase significantly due to increased power and prolonged plasma operation in ITER and future fusion reactors. In this work we investigate dynamics, transport and effects of dust in tokamak plasmas. Recent advancements in development of theoretical models and simulations with the DUSTT/UEDGE code of dust-plasma interactions in tokamaks are reported. These include studies of dynamics of non-spherical dust, effects of dust ablation cloud, and possible impact of dust and dust originated impurities on fusion plasmas. It is shown that naturally formed or deliberately injected dust can be a significant source of impurities in the plasmas that can have drastic impact on plasma profiles, instabilities, and radiation power losses. Using DUSTT/UEDGE code we assess dust effects on the plasmas, simulating controlled dust injection with different sizes and injection speeds in modern tokamaks and ITER. Possible applications of dust injection for power dissipation in SOL/divertor and during plasma quench are discussed.

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