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**On dust grain interactions with fusion plasmas** SERGEI KRASHENINNIKOV, ROMAN SMIRNOV, UCSD — Recently different aspects of dust physics in fusion devices brought additional attention from both theoreticians and experimentalists, which, in part, was motivated by the work on the ITER project. To predict the role of dust in core plasma contamination and material migration we need to use some models describing the processes of the interactions of dust grains with fusion plasmas (including charging, forces and energy deposition). So far the models based on the interactions of collisionless plasma with the grain immersed in the self-consistent ambipolar electric field, which were developed for the study of so-called “dusty plasmas” are utilized. However, rather hot and dense edge plasma environment in fusion devices results in a strong heating of dust grain and subsequent grain sublimation and evaporation. When the vapor density and/or the amount of ionized impurity atoms become large enough they can alter the grain-plasma interactions. Somewhat similar processes occur during pellet injection in fusion plasma and the interactions of comets with sun radiation and Earth atmosphere. In this presentation we discuss: i) dust and plasma parameter range where the role of dust grain evaporation/sublimation and the processes associated with it do not have a significant impact on grain-plasma interactions, and ii) statistical issues of the description of dust-plasma interactions. This work was supported the US DoE under Grant DEFG02-04ER54852.

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