

Abstract Submitted
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Dust in the divertor sheath: a problem or a possible solution to a problem? GIAN LUCA DELZANNO, XIANZHU TANG, LANL — In this work, we will present results on dust transport in the magnetized sheath near the divertor plate for micron-sized dust. We consider conditions relevant to present short-pulse tokamak machines as well as conditions for long-pulse ITER/DEMO reactors. We solve the dust charging equation, the dust equation of motion and the equations for dust heating and mass loss in the magnetized sheath. We present parametric studies changing the divertor plasma conditions and the angle of the equilibrium magnetic field relative to the wall. Our main result is that, for conditions relevant to DEMO, the stronger heat flux to the wall severely limits the dust survivability and mobility. We discuss the implications of this result for the divertor plates of long-pulse fusion reactors. We will also discuss two fusion technology solutions to DEMO PFC, the dust patch and the dust shield, based on externally introduced solid particulates to patch areas of net erosion and to provide the primary heat exhaust for the divertor.

Gian Luca Delzanno
LANL

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