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Impact of melt-layer ejection from metallic first wall on tokamak plasmas[1] R.D. SMIRNOV, S.I. KRASHENINNIKOV, A.YU. PIGAROV, UCSD, T.D. ROGNLIEN, LLNL — At present, all-metallic tokamak first wall is preferred over carbon composite materials for next generation fusion devices, such as ITER, due to favorable thermo-physical and chemical properties of metals in fusion plasma environment. However, recent experiments demonstrate that surface of metallic components, including tungsten ones, under high transient heat load pertinent to next step tokamaks can melt and eject molten material into fusion plasma in form of droplets or fine spray [1]. The ejected material can be a source of impurity contamination of fusion plasmas and even in some cases cause discharge termination, as was observed recently on LHD. In this work, we investigate impact of ejection of beryllium droplets of various sizes on ITER-like plasmas using coupled dust-plasma edge transport code DUSTT/UEDGE [2]. Different ejection scenarios are modeled, including intermittent and prolonged ejection of molten material at the top, midplane and divertor poloidal locations in ITER. Using the modeling we assess modifications of the plasma profiles, radiation power losses, and impurity particle fluxes to the plasma core produced by various quantities of the ejectile. Critical amounts of the different materials ejected, which can lead to discharge termination, are evaluated.

[1] J.W. Coenen, et al., Nucl. Fusion **51** (2011) 113020;
[2] R.D. Smirnov, et al., J. Nucl. Mater. **415** (2011) S1067.

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