Abstract Submitted
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Modeling of high-Z materials erosion and its suppression in DIII-D[1] RUI DING, H.Y. GUO, V.S. CHAN, P.B. SNYDER, GA, D.L. RUDAKOV, UCSD, P.C. STANGEBY, J.D. ELDER, UTIAS, D. TSKHAKAYA, UWIEN, W.R. WAMPLER, SNL, A. KIRSCHNER, FZJ, A.G. MCLEAN, LLNL — Erosion of plasma facing components is a key issue for high-power, long pulse operation. The 3D Monte Carlo code ERO has been used to simulate the erosion/redeposition of Mo and W samples exposed to DIII-D divertor plasma using the DiMES. The net erosion rate is significantly reduced due to the high local re-deposition ratio of eroded materials, which is mainly controlled by the electric field and plasma density within the Chodura sheath as indicated by ERO modeling. Similar re-deposition ratios were obtained from the modeling using three sheath models for small inclined magnetic field angle, all being close to the measured value. ERO modeling shows that local CH_4 injection can create a carbon coating on the Mo sample to mitigate Mo erosion; the local decrease of electron temperature due to gas injection also suppresses net erosion, consistent with experimental observation.

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