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Plasma radiation transport effects in MAST-U advanced divertors[1] V. A. SOUKHANOVSKII, A. I. KHRABRY, H. A. SCOTT, T. D. ROGNLIEN, LLNL, D. MOULTON, J. HARRISON, CCFE — Modest effects of deuterium line radiation trapping in MAST Upgrade tokamak Super-X and snowflake (SF) divertor plasmas are found using SOLPS-EIRENE and UEDGE code divertor plasma modelling, and the CRETIN code radiation transport and collisional-radiative modelling. Lyman series line radiation trapping in the divertor increases deuterium ionization rate, and reduces volumetric rates for recombination and radiation. This may potentially increase divertor detachment density threshold and diminish the advanced divertor geometry benefits. The CRETIN and UEDGE modeling of the detached Super-X and SF divertors shows that 1) divertor plasma properties are modified insignificantly ($\leq$ 10 %) when Lyman opacity effects are included; 2) the deuterium Lyman radiation trapping is non-negligible hence challenging its experimental detection; 3) Carbon C II, C III, and C IV resonance line radiation transport in the vacuum ultraviolet region under most divertor scenarios can be neglected.

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