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Modeling of Snowflake Divertor Plasmas in MAST-U Tokamak using UEDGE code[1] ALEXANDER KHRABRY, VSEVOLOD SOUKHANOVSKII, THOMAS ROGNLIEN, MAXIM UMANSKY, LLNL, CA, USA, DAVID MOULTON, JAMES HARRISON, CCFE, Culham, Oxfordshire, UK — In a snowflake (SF) divertor configuration, a second-order poloidal magnetic field null can potentially lead to spreading heat and particle fluxes over additional strike points. SF divertor experiments are planned in the spherical tokamak MAST U. Numerical simulations of the edge and divertor plasmas are performed for standard and SF divertor configurations using the two-dimensional code UEDGE with carbon sputtering, charge-state resolved carbon transport, and a fluid neutrals model. A good agreement is obtained between our UEDGE standard divertor model and the previously developed SOLPS/EIRENE model using transport coefficients for MAST tokamak. The present work is aimed at understanding the heat and particle flux distribution in the SF divertors as a function of MAST-U tokamak operating parameters (edge plasma density, input power) with a focus on transition to plasma detachment regime. In the SF divertor model, transport coefficient profiles in the near-null region are varied with radial distance and with poloidal field strength to simulate the theoretically predicted SF null-region plasma mixing.

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