Abstract Submitted
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Modeling NSTX Snowflake Divertor Experiments[1] E.T. MEIER, V.A. SOUKHANOVSKII, A.G. MCLEAN, T.D. ROGNLIEN, D.D. RYUTOV, LLNL, R.E. BELL, A. DIALLO, R. KAITA, B.P. LEBLANC, M. PODESTA, F. SCOTTI, PPPL, NSTX TEAM — Experiments on the National Spherical Torus Experiment (NSTX) have demonstrated the potential of the snowflake divertor to alleviate the tokamak power exhaust challenge. The NSTX snowflake configuration induced partial detachment and reduced heat flux approximately fivefold. To explore snowflake physics, the multi-fluid edge transport code, UEDGE, has been used to compare standard and snowflake configurations. Radial profiles of anomalous perpendicular transport coefficients (assumed to be poloidally uniform) are constrained by requiring solutions to match ion and electron temperature and density data at the outer midplane. Divertor recycling and separatrix location are constrained by matching D_α emission and heat flux at the outer target. Good agreement with heat flux data is achieved, and partial detachment is captured in the snowflake case. Increased snowflake divertor volume and connection length result in higher radiation which, in tandem with direct flux-expansion profile broadening, leads to heat flux reduction.

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