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Divertor scenario development for NSTX Upgrade[1] V.A. SOUKHANOVSKII, A.G. MCLEAN, E.T. MEIER, T.D. ROGNLIEN, D.D. RYUTOV, LLNL, R.E. BELL, A. DIALLO, S.P. GERHARDT, R. KAITA, E. KOLEMEN, B.P. LEBLANC, J.E. MENARD, M. PODESTA, F. SCOTTI, PPPL, NSTX-U TEAM — In the NSTX-U tokamak, initial plans for divertor plasma-facing components (PFCs) include lithium and boron coated graphite, with a staged transition to molybdenum. Steady-state peak divertor heat fluxes are projected to reach 20-30 MW/m^2 in 2 MA, 12 MW NBI-heated discharges of up to 5 s duration, thus challenging PFC thermal limits. Based on the recent NSTX divertor experiments and modeling with edge transport code UEDGE, a favorable basis for divertor power handling in NSTX-U is developed. The snowflake divertor geometry and feedback-controlled divertor impurity seeding applied to the lower and upper divertors are presently envisioned. In the NSTX snowflake experiments with lithium-coated graphite PFCs, the peak divertor heat fluxes from Type I ELMs and between ELMs were significantly reduced due to geometry effects, increased volumetric losses and null-point convective redistribution between strike points. H-mode core confinement was maintained at H98(y,2)$\leq$ 1 albeit the radiative detachment. Additional CD_4 seeding demonstrated potential for a further increase of divertor radiation.

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