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Radiative divertor optimization for NSTX Upgrade based on open geometry standard divertor experiments in NSTX[1] V. A. SOUKHANOVSKII, O. IZACARD, F. SCOTTI, LLNL, R. MAINGI, R. E. BELL, R. KAITA, S. M. KAYE, B. P. LEBLANC, J. E. MENARD, D. MUELLER, PPPL — Recent analyses of NSTX divertor experiments suggest a way to optimize the standard open geometry divertor configuration for partial detachment with deuterium puffing and intrinsic carbon radiation. Results from the NSTX experiments and the divertor transport and radiation model obtained with the multi-fluid code UEDGE are used to show that detachment onset and properties are sensitive to 1) placing the neutral gas source in the vicinity of the strike point, 2) directing the recycling neutrals toward the separatrix by adjusting the poloidal separatrix angle, and 3) entrapping neutrals by plasma plugging via the high poloidal magnetic flux expansion configuration. These findings will be tested in NSTX Upgrade, where H-mode scenarios with 2 MA, 1 T, 10 MW NBI-heated discharges and 5 s flattop are predicted to produce unmitigated peak divertor heat fluxes above 10 MW/m^2, necessitating the scrape-off layer power sharing between upper and lower divertors and inducing dissipative losses.

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