Abstract Submitted
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Divertor spectroscopy for radiative divertor feedback control and snowflake divertor experiments in NSTX Upgrade[1] V.A. SOUKHANOVSKII, F. SCOTTI, M.E. WELLER, LLNL, S.P. GERHARDT, R. KAITA, B. STRATTON, PPPL, NSTX-U TEAM — In the NSTX-U tokamak, steady-state peak divertor heat fluxes are projected to reach 10-30 MW/m^2 thus challenging plasma facing component thermal limits. The snowflake divertor magnetic configuration and radiative divertor with feedback-controlled D_2 or impurity seeding are presently envisioned for divertor power handling, based on NSTX experiments and modeling with edge transport code UEDGE. In addition to the existing NSTX divertor diagnostics, new spectroscopic diagnostics are installed to improve understanding of snowflake divertor transport and to measure divertor radiation and plasma temperature for impurity radiation feedback control. A radially viewing divertor Phantom camera will be used to elucidate on the null-region churning mode. An upgraded vacuum ultraviolet spectrometer SPRED and a multichannel ultraviolet spectrometer would provide estimates of divertor impurity radiated power and divertor $T_e \sim 0.5 - 10$ eV via the $\Delta n = 0; 1; 2$ of C and N line intensity ratios, and deuterium Balmer B7-B11 line ratios, respectively. The measurements are calibrated using atomic physics models and the collisional-radiative code CRETIN. Using the upgraded divertor gas injectors, the characteristic radiative divertor control time is expected to be under 50 ms.

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