

Abstract Submitted  
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**Effect of halo neutrals on neutral particle measurements**<sup>1</sup> D. LIU, W.W. HEIDBRINK, UC Irvine, S.S. MEDLEY, A.L. ROQUEMORE, PPPL, R.J. AKERS, UKAEA — The Neutral Particle Analyzer (NPA) diagnostics including the E||B type NPA and solid state NPA (ssNPA) array on the National Spherical Torus Experiment (NSTX) measure neutral production in charge exchange reactions between energetic ions and beam primary and halo neutrals. A Monte Carlo simulation code is developed to analyze the effect of primary neutrals and halo neutrals to the NPA flux temporal evolution and energy spectrum. The code is validated by comparing with the TRANSP-simulated NPA signals and an analytical halo diffusion model. The simulation results show that the density of halo neutrals around the beam footprint is comparable to that of primary neutrals. Charge exchange with halo neutrals contribute significantly to the neutral flux measured by NPA diagnostics for typical NSTX conditions. Effect of halo neutrals in quiet plasmas and discharges with beam modulation and vertical NPA scans will be presented.

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