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Observation of "Anomalous" Energetic Ion Spectra by the E||B Neutral Particle Analyzer on NSTX[1] S.S. MEDLEY, R.E. BELL, D.S. DARROW, E.D. FREDRICKSON, N.N. GORELENKOV, B.P. LEBLANC, A.L. ROQUEMORE, PPPL, Princeton, NJ, M. PODESTA, UC Irvine, CA, AND THE NSTX TEAM — An "anomalous" increase in E||B NPA charge exchange neutral flux (∼4x) localized at the neutral beam (NB) injection full energy, E_b = 90 keV, is observed in NSTX. This so-called "High-Energy Feature (HEF)" appears in discharges only when kink-type modes (f < 10 kHz) are absent, TAE activity (f ∼ 10-150 kHz) is weak (δB_{rms} < 75 mGauss) and CAE activity (f ∼ 400 – 1200 kHz) is robust. The HEF exhibits a growth time of ∼ 20-80 ms and develops a slowing down distribution that evolves over 100-400 ms, a time scale long compared with the ∼ 50 ms equilibration time of the NB injected particles. Increases of ∼ 10-30% in the measured neutron yield and total stored energy are observed to coincide with the HEF along with broadening of the CHERS T_i(r) profile. The HEF is observed only in H-mode (not L-mode) discharges with injected NB power above 4 MW and is suppressed by vessel conditioning using lithium deposition at rates ∼ 100 mg/shot sufficient to suppress ELM activity. Though a definitive mechanism has yet to be develop, the HEF appears to be driven by a form of CAE resonance.

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S. S. Medley
PPPL, Princeton, NJ

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