

Density fluctuation measurements from the NSTX Beam Emission Spectroscopy diagnostic system*

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A newly commissioned beam emission spectroscopy (BES) diagnostic system on NSTX has obtained density fluctuation measurements on the ion gyroscale. The system presently employs 32 detection channels with sightlines arranged in radial and poloidal arrays. The sightlines provide coverage from $r/a \approx 0.1$ to beyond the last closed flux surface and resolve fluctuations with $k_{\perp}\rho_i < 1.5$. Measurements show fluctuations decrease sharply at LH transitions in certain regimes, but other regimes do not exhibit sharp reductions. Also, core channels ($r/a \approx 0.6$) can show reduced fluctuations at the LH transition in certain regimes. Preliminary analysis indicates radial and poloidal correlation lengths can be on the order of 10 cm in H-mode plasmas. Finally, coherent harmonic modes localized near the top of the pedestal have been observed between ELM events. Collectively, the observations provide an initial survey of low-k fluctuations in spherical torus plasmas. *Supported by the U.S. Department of Energy under Contract Nos. DE-FG02-89ER53296, DE-AC02-09CH11466 and DE-SC0001288.