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Design and status of the NSTX BES diagnostic for fluctuation measurements on the ion gyro-scale D.R. SMITH, R.J. FONCK, G.R. MCKEE, I. UZUN-KAYMAK, G. WINZ, Univ of Wisconsin-Madison, H. FEDER, R. FEDER, G. LABIK, B.C. STRATTON, Princeton Plasma Phys Lab — A beam emission spectroscopy (BES) diagnostic has been installed on NSTX to investigate density fluctuations on the ion gyro-scale. The BES diagnostic measures the Doppler-shifted D_α emission at 660 nm from neutral deuterium beams. The measurements provide radial and poloidal correlation functions, wavenumber spectra, decorrelation rates, and turbulent flows for investigating core and edge turbulence and energetic particle modes on NSTX. The initial deployment includes 16 detection channels, and the viewing optics are aligned to the local magnetic field to optimize spatial resolution. Spot sizes on the neutral beam are in the range 2–3 cm. Radial arrays can measure fluctuations from $r/a \approx 0.1$ to beyond the last-closed flux surface, and poloidal arrays are positioned at $r/a \approx 0.4, 0.6, 0.85,$ and 1.1 . PIN photodiodes and low noise preamplifiers measure fluctuations with high sensitivity, and filtered data is obtained at 2 MS/s. The BES diagnostic will collect initial data during the 2010 run campaign. *Supported by the U.S. Department of Energy under Contract No. DE-AC02-09CH11466.

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