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A Crossed-Beam Correlation Interferometer for Spatially Resolved Density Fluctuation Measurements in HSX[1] WAYNE GOODMAN, DAVID ANDERSON, KONSTANTIN LIKIN, JASON SMONIEWSKI, HSX Plasma Lab, University of Wisconsin, CHUANBAO DENG, DAVID BROWER, Dept. of Physics and Astronomy, UCLA — Turbulent transport has been shown to be important in HSX. At present, a primary physics goal is to study how spectral content and density scale lengths can affect turbulence. Recent gyrokinetic (GENE) simulations also show TEM associated fluctuation intensity varies as a function of poloidal angle on a given flux surface. Previous line-integrated measurements using interferometry indicated a flux surface asymmetry in the density fluctuation amplitude. Spatially resolved density fluctuation measurements are needed for comparing the measurements with GENE results. The existing multichannel interferometer in HSX is being modified to include a single probe beam perpendicular to the existing beams and apply crossed-beam correlation techniques (Fisher, 1967) to these measurements. This modification enables measurements of density fluctuation as a function of poloidal angle along the flux surface where the density gradient peaks. Measured fluctuation intensity and spectral data can then be compared to GENE simulations for the quasihelically symmetric configuration (QHS) and configurations where quasisymmetry is degraded. Results from GENE simulations and crossed-beam interferometry correlation bench testing are presented.

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