Abstract Submitted
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**Core Density Fluctuation Measurements by Interferometry in the HSX Stellarator**[1] C. DENG, D.L. BROWER, UCLA, D.T. ANDERSON, F.S.B. ANDERSON, A. BRIESEMEISTER, K. LIKIN, J.C. SCHMITT, J.N. TALMADGE, R. WILCOX, K. ZHAI, University of Wisconsin-Madison — The multichannel interferometer system on the HSX stellarator is optimized to measure electron density fluctuations by utilizing both phase and amplitude techniques Information on core and edge fluctuations can be realized by comparing chords at different locations or by use of the differential interferometry approach. Both coherent modes and broadband density fluctuations with frequency up to 250 kHz are measured. For quasi-helically symmetric plasmas with $B_T$=1.0 T, significant changes (both amplitude and frequency) in the turbulent density fluctuation spectrum are observed when heating location changes from on-axis to high field side. Density fluctuation amplitude and frequency decrease with increasing of ECRH power ($\sim T_e$). Changes in fluctuations will be compared with measurements of plasma flow (by CHERS) as well as electron density and temperature profile modifications. When HSX is operated without quasi-helical symmetry at $B_T$=1T and $n_e$ $\sim 4 \times 10^{12}$ cm$^{-3}$, a coherent electrostatic mode at $\sim$28 kHz is observed. Fluctuation sensitivity to changes of heating location and ECRH power were not observed for these plasmas.

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