Abstract Submitted
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Development of a Technique for Measuring Local Electric Field Turbulence in a Tokamak Plasma[1] D.S. THOMPSON, R.J. FONCK, M.G. BURKE, G.R. MCKEE, B.T. LEWICKI, G.R. WINZ, University of Wisconsin-Madison — Accessible methods for measuring $\tilde{E}(R,t)$ in large-scale magnetic confinement experiments are highly desired for validation studies of plasma turbulence models. A new technique based on neutral beam emission spectroscopy is being developed to address this need. Rapid fluctuations in the separation of spectral components of the motionally induced Stark spectrum can reflect fluctuations in the intrinsic electric field of the plasma. Polarization spectroscopy via high resolution, high-throughput spectrometers that compensate for field-of-view broadening is being developed to isolate and measure these fluctuations. Cross-power correlation analysis between the linewidth fluctuations and plasma density fluctuations will be employed to extract the expected small signals. Electric field fluctuations at mid-minor-radius, normalized to an estimated MSE field, are expected to be on the order of $\tilde{E}/E_{MSE} \approx 1 \times 10^{-3}$ in the PEGASUS Toroidal Experiment and are comparable to those expected in NSTX and in DIII-D.

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M.W. Bongard
University of Wisconsin-Madison

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