Abstract Submitted
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Development of an Internal, Localized Magnetic Field Fluctuation Diagnostic on the DIII-D Tokamak[1] T.L. RHODES, W.A. PEEBLES, X. NGUYEN, C. WANNBERG, UCLA — UCLA is developing a new generation internal magnetic field fluctuation diagnostic utilizing cross-polarization scattering [1,2], a process where magnetic fluctuations scatter EM radiation into the perpendicular polarization. The unique scattering geometry offered by Doppler backscattering probe beams are utilized to improve the spatial localization and wavenumber range. When fully developed the system will measure magnetic fluctuations in the core and edge of high-performance tokamak plasmas with cm spatial and microsecond time resolution, and wavenumber range $k\rho_s \sim 0.25$-9. The diagnostic is being developed on DIII-D but is potentially applicable to spherical tokamaks (NSTX) and future burning plasmas such as ITER. System goals, constraints, and design, including quasi-optical elements are presented. Laboratory measurements of the system performance and comparison to design targets as well as initial plasma tests will be shown.

[1] T. Lehner, et al., Europhys. Lett. **8**, 759 (1989).
[2] Linda Vahala, et al., Phys. Fluids B **4**, 619 (1992).

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