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Faraday-Effect Polarimeter Diagnostic for Internal Magnetic Field Fluctuation Measurements in DIII-D[1] JIE CHEN, W.X. DING, D.L. BROWER, UCLA — A high-resolution Faraday-effect polarimeter-interferometer diagnostic currently under construction at the DIII-D tokamak has three overall measurement goals: (1) determine the current density dynamics at the magnetic axis, J(0,t), for torque-free plasmas (no NBI) and bootstrap current in the pedestal region; (2) resolve both coherent and broadband magnetic fluctuations [at the level δb$\leq$1Gauss with up to 2 MHz bandwidth] associated with MHD perturbations, energetic particle driven modes and broadband turbulence (e.g. microtearing modes), and (3) identify non-axisymmetric structures and plasma response to externally applied RMP (resonant magnetic perturbation) fields being developed for ELM control as well as MHD events. These goals will be achieved using a 650-700 GHz source and heterodyne receiver system to measure the line-integrated Faraday-effect and density along three horizontal chords positioned at the magnetic axis and $\pm$15 cm off-axis. The system will be double-pass and cornercube retroreflectors have already been installed. Simultaneous measurement of density and Faraday effect allows isolation of the fluctuating magnetic field component in the radial direction.

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