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Coherent and turbulent density fluctuation measurement with a microwave imaging reflectometry on KSTAR[1] W. LEE, J. LEEM, J.A. LEE, Y.B. NAM, G.S. YUN, H.K. PARK, Pohang University of Science and Technology, H. PARK, K.W. KIM, Kyungpook National University, C.W. DOMIER, N.C. LUHMANN, JR., University of California, Davis, J.H. JEONG, M. JEONG, Y.S. BAE, W.H. KO, S.G. LEE, National Fusion Research Institute, KSTAR TEAM —
Both coherent and turbulent electron density fluctuations in KSTAR plasmas were measured by a semi two-dimensional microwave imaging reflectometry (MIR) system, which utilizes a detector array with 16 poloidal channels and two frequency X-mode probe beams (two radial positions). With a refractive imaging optics, the system measures density fluctuations with the poloidal wavenumber up to 2.5 cm^{-1}. The MIR system was tested with a known coherent density fluctuation during the pre-cursor phase of the sawtooth oscillation. The simultaneously measured phase oscillations from two cutoff layers were consistent with those of the electron temperatures at same radial locations. Furthermore, poloidal rotation velocities (V_{pol}) of the electon density turbulence were obtained by correlation analysis in an on-axis ECH heated ohmic plasma ($V_{pol} \sim$ -2 km/s in the electron diamagnetic direction) and a neutral beam heated L-mode plasma ($V_{pol} \sim$ 9 km/s in the ion diamagnetic direction), and implications are under study

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