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Design of a collective scattering system for electron gyroscale turbulence study in KSTAR[1] WOOCHANG LEE, HYEON PARK, DONGJAE LEE, Ulsan National Institute of Science and Technology, Ulsan 689-798, Korea, JUNEEOK LEEM, Pohang University of Science and Technology, Pohang 790-784, Korea, YONGUN NAM, National Fusion Research Institute, Daejeon 305-333, Korea — The design characteristics of a multi-channel collective (or coherent) scattering system for electron scale turbulence study in KSTAR, which is planned to be installed in 2016, are investigated. A few critical issues are discussed in depth such as effect of the Faraday rotation of the electric field polarization of probing and scattered, the probing wave frequency which is related to the optics for measurement of electron gyro scale turbulence, the wave polarization to minimize absorption of the probing power by electron cyclotron resonant layers, and the probing power. A proper and feasible optics with 300 GHz probing wave, which is based on these issues, provides a simultaneous measurement of electron density fluctuations at four discrete poloidal wave numbers up to 21 cm^{-1}. The upper limit corresponds to the normalized wave number $k_\perp \rho_e$ of 0.2 in KSTAR plasmas. To detect scattered wave power and extract phase information, a quadrature detection system consisting of four-channel antenna/detector array and electronics will be employed.

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