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Optical Simulation Methods for Studying Gaussian Beam Propagation in the Microwave Imaging Reflectometry in KSTAR[1] M. KIM, I. HONG, J.B. KIM, G.S. YUN, H.K. PARK, POSTECH — The microwave imaging reflectometry (MIR) is a new innovative plasma diagnostic system that can form images of the density fluctuations at the cut-off layer in the plasma. To design the optical system for the KSTAR MIR system, it is essential to understand the diffraction pattern of the probing waves at the cut- off layer. Two commonly used methods are compared in this poster; the FDTD simulation solving the Maxwell's equations exactly on a rectangular grid and analytical solution from the phase screen model, with the cut-off layer modeled as a reflecting surface of infinite conductivity. In both cases, the target surface is bent circularly to match the curvature of an incoming probe beam with embedded corrugation simulating the density fluctuation. Differences between two methods are apparent for shorter target wavelength and larger corrugation amplitude. A systematic comparative study will cover a wide range of the corrugation parameters such as wave number and corrugation amplitude in this poster.

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