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Scattering of radio frequency waves by density fluctuations[1] A.K. RAM, PSFC-MIT, K. HIZANIDIS, NTUA, EUROfusion, Greece — The scattering of radio frequency waves by density fluctuations in magnetized fusion plasmas is studied using two different techniques. For coherent fluctuations, such as blobs in the edge region, we use a full-wave model for which the theory is similar to that for Mie scattering of electromagnetic waves by dielectric objects [1]. The blobs are considered to be either spherical or cylindrical with their axes aligned along the magnetic field. For incoherent planar fluctuations, which can be either in the core of the plasma or in the edge region, we use the Kirchhoff approach in tandem with Huygen's principle. The anisotropy induced by the magnetic field is such that the propagation characteristics and the polarization of the wave modes depend on the polar angle with respect to the direction of the magnetic field. An incident plane wave is not only scattered by the coherent and incoherent fluctuations, but also couples power to a different plasma wave. The scattered spectrum is affected by the size of the fluctuations, the frequency, and the direction of propagation of the incident wave. We present the two theoretical models along with numerical results on the spectral characteristics of the scattered waves.

[1] A. K. Ram *et al.*, *Phys. Plasmas* **20**, 056110 (2013).

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