Scattering of Radio Frequency Waves by Density Fluctuations in Tokamak Plasmas

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A. K. Ram, Z. Ioannidis, K. Hizanidis, I. Tigelis

- Understanding the propagation of radio frequency (RF) waves through the scrape-off layer is important
  - plasma turbulence affects the propagation characteristics
  - in ITER small changes in the edge become magnified in the core (compared to present-day “smaller” plasmas)

- Full wave theoretical model for scattering of RF waves by fluctuations shows
  - reflection and refraction of waves;
  - diffraction, shadowing, and focusing of waves;
  - spatial fragmentation of power flow into the plasma;
  - changes in the propagation vector of the waves;
  - side-scattering of the waves;
  - coupling of incident wave to other plasma waves.

- Full wave simulations verify theoretical modeling results.