Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Scattering of radio frequency waves by edge density blobs in tokamaks[1] A.K. RAM, PSFC, MIT, K. HIZANIDIS, Y. KOMINIS, NTUA, Athens, Greece — The density blobs and fluctuations present in the edge region of magnetic fusion devices can scatter radio frequency (RF) waves through refraction and diffraction. A previous study has considered refractive scattering using the geometric optics approximation [1]. It is found that the scattering can diffuse rays in configuration space and in wave-vector space. The diffusion in space can make the rays miss their intended target region, while the diffusion in wave-vector space can broaden the wave spectrum and modify the wave damping profile. The geometric optics approximation is of limited validity. We have developed a full-wave, cold plasma, model for wave scattering in which the size and density of the blobs are arbitrary. The model allows for diffractive scattering of waves as well as coupling of the incident wave to other plasma waves. Diffractive scattering can lead to "shadowing" while the coupling to other plasma waves can broaden the spectrum of the incident wave, and reduce the power propagating into the interior of the plasma. The full-wave model and the consequences of diffractive scattering of RF waves by blobs will be discussed.

[1] K. Hizanidis, A.K. Ram, Y. Kominis, and C. Tsironis, *Phys. Plasmas* **17**, 022505 (2010).

[1]Supported by DoE, EFDA, and Assoc. EURATOM-Helenic Republic.

A. K. Ram
PSFC - MIT

Date submitted: 09 Jan 2012 Electronic form version 1.4