EFTC 2017
17th European Fusion Theory Conference
9 - 12 October 2017, Athens - Greece

Scattering of radio frequency waves by cylindrical blobs in the plasma edge in tokamaks

S. I. Valvis[1], P. Papagiannis[1], A. Papadopoulos[1], K. Hizanidis[1], E. Glytsis[1], A. Zisis[2], I. G. Tigelis[2], and A. K. Ram[3]

[1]*National Technical University of Athens, Athens, Greece*
[2]*National and Kapodistrian University of Athens, Athens, Greece*
[3]*Plasma Science and Fusion Center, MIT, Cambridge MA, USA*

In tokamaks, radio frequency waves are used to control the temperature and the current in the plasma core. Before the waves reach their target in the core, they are being scattered by density fluctuations that exist in the plasma edge, known as blobs. The propagation and scattering processes of RF beams with transverse Gaussian intensity distribution by blobs are studied analytically and numerically (COMSOL). For that purpose, the blobs are considered to have cylindrical shape and in general, the cylinder axis is not aligned with the externally applied magnetic field. The results are compared to the ones from the study of the aligned case [1,2]. The frequency range of the RF waves studied is the electron cyclotron (EC) frequency range for ITER-like and Medium Size Tokamak applications (such as TCV, ASDEX-U, DIII-D, etc). The study covers for a variety of density contrasts between the blobs and the ambient plasma and a wide range of blob radii.

This work was supported in part by the Hellenic National Programme on Controlled Thermonuclear Fusion associated with the EUROfusion Consortium.

References

[1] A. K. Ram and K. Hizanidis, PoP 23, 022504 (2016)
[2] Z. C. Ioannidis, A. K Ram, K. Hizanidis, I. G. Tigelis, "Computational studies on scattering of radio frequency waves by density filaments in fusion plasmas", to be published in PoP