ABSTRACT

Pellet injection is planned to be the main fueling method on ITER. The high temperature of the plasma during a fusion burn will limit the penetration of the pellet to the outer third of the minor radius. This limited penetration is expected to be compensated by a polarization drift, which will deposit the particles deeper in the plasma for the pellets injected from the high field side. In order to evaluate the expected depth of the fueling on ITER, a good understanding of this drift effect is important. Experimental data acquired on the DIII-D (USA) and Tore Supra (France) tokamaks show that the polarization drift is influenced by the low order rational q surfaces. These surfaces appear to attenuate the polarization mechanism as the drifting particles cross them. In this paper, a correlation between the maximum of the pellet mass deposition profile and the positions of the $q = 2$ and $q = 3$ surfaces on DIII-D and Tore Supra is shown for high field side and low field side injection. A model is proposed to explain this effect and compared to the experimental results. To conclude, the possible consequences of this phenomenon on the fueling in ITER are described.

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