**Category:** 5) Application of stochastic edges to high performance and reactor plasma scenarios

# ION DRIFT AND PLASMA ROTATION EFFECTS ON INTERACTION OF LOW FREQUENCY FIELDS WITH PLASMAS AT THE RATIONAL SURFACES IN TOKAMAKS

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## Abstract

Low frequency fields ( 1kHz ≤ f ≤ 10kHz, with poloidal/toroidal mode numbers *-M/N= -3/1* ) resonant interaction with plasma at the rational magnetic surface with *q=3* is analyzed under the influence of ion drift Alfven waves that obey the dispersion relation $(\omega / c)^2 \varepsilon_{11} = ( k_{||} )^2$, where $\omega$ is the field angular frequency, $k_{||}$ is the parallel wave vector, $c$ is the light velocity and $\varepsilon_{11}$ is a component of the plasma dielectric tensor that incorporates the effects of the plasma and ion drift velocities.

The low frequency fields driven by the Dynamic Ergodic Divertor in the TEXTOR tokamak and the Ergodic Magnetic Limiter in the TCABR tokamak are usually used to generate a chaotic magnetic layer at the plasma edge to control heat and particle interaction on the tokamak plasma facing components.

The wave effects are asymmetric in the resonant rational magnetic surface depending on the signal of the poloidal/toroidal mode numbers, presenting an Alfven continuum for the *+3/-1* mode and a minimum angular frequency for the mode -3/+1.

In a previous work (Rondan E. R. et al, *Nucl. Fusion* **46** (2006) S154), the effects of plasma rotation on low frequency fields interaction with plasmas at rational magnetic surfaces had been analyzed. Now we extend the analysis adding the ion drift velocity effects to the plasma velocity. Giro-viscosity, plasma and ion drift velocities are incorporated in the plasma dielectric tensor and the multi-component cylindrical code (Elfimov A. G. et al, *Phys Plasmas* **1** (1994) 2637) calculates the electromagnetic fields, power absorption and antenna impedance profiles.