PLASMA ROTATION EFFECT ON INTERACTION OF LOW FREQUENCY FIELDS WITH PLASMAS AT THE RATIONAL SURFACES IN TOKAMAKS

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Modifications of low frequency (LF) field penetration, dissipation and ponderomotive forces produced by plasma rotation effect in TEXTOR and Tokamak Chauffage Alfvén Brésilien (TCABR) are discussed. The LF fields are driven by Dynamic Ergodic Divertor (DED) in TEXTOR and and Ergodic Magnetic Limiter (EML) in TCABR. DED (or EML) coils are represented as a sheet current expanded in Fourier series with poloidal/toroidal wave numbers *M/N* depending on coil shape and feeding. Alfvén wave mode conversion effect in the LF range is responsible for low frequency field dissipation at the rational magnetic surfaces $q_r=-M/N=3$. Analytical and numerical calculations show maximums of LF field dissipation in local Alfvén wave resonance $|\omega-k_zU| = |k_{||}|c_A$ (where ω, $k_{||}$ is frequency and parallel component of wave vector c_A is Alfvén velocity) near the rational magnetic surface $q=3$ in TEXTOR and at the resonant magnetic surface $q_r=2,3$ typical for EML coil design in TCABR. The toroidal rotation velocity *U*, taken into account in the dielectric tensor, can strongly modify the LF field and dissipated power profiles. Even stationary EML fields can dissipate at the local Alfvén wave resonance ($k_zU= k_{||}c_A$) in rotating plasmas. The positions of the local AW resonances begin to be non-symmetric in the relation to the resonance surface. The ponderomotive forces are enhanced in co-rotating (in the direction of phase velocity) plasmas at the first local AW resonance and diminished at the second resonance. The effect is inversed in counter-rotating plasmas.