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Electromagnetic particle simulation of the effect of toroidicity on linear mode conversion and absorption of lower hybrid waves JIAN BAO, ZHIHONG LIN, ANIMESH KULEY, ZHIXUAN WANG, University of California, Irvine — Effects of toroidicity on linear mode conversion and absorption of lower hybrid (LH) waves in tokamak have been studied by electromagnetic particle simulation using GTC[1,2]. The simulation confirms that the toroidicity induces an upshift of parallel refractive index when LH waves propagate from the tokamak edge toward the core, which affects the radial position for the mode conversion between slow and fast LH waves. Furthermore, moving LH antenna launch position from low field side toward high field side leads to a larger upshift of the parallel refractive index, which helps the slow LH wave penetration into the tokamak core. The broadening of the poloidal spectrum of the wave-packet due to wave diffraction is also verified in the simulation. Both the upshift and broadening effects of the parallel spectrum of the wave-packet modify the parallel phase velocity and thus the linear absorption of LH waves by electron Landau resonance. In the nonlinear electromagnetic simulation, nonlinear wave trapping of electrons is verified and a plasma current is nonlinearly driven. Preliminary results of the nonlinear parametric decay of LH waves will be presented. [1]J. Bao, Z. Lin, A. Kuley, Z. X. Wang, Phys. Plasmas 23, 062501 (2016). [2]J. Bao, Z. Lin, A. Kuley, Z. X. Wang, Nuclear Fusion 56, 066007 (2016).

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