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Gyrokinetic particle simulation of global Alfven modes in toroidal geometry IGOR HOLOD, ZHIHONG LIN, YASUTARO NISHIMURA, University of California, Irvine — Global Alfven modes are important for energy confinement studies, since thay can resonantly interact with fusion alfa- particles. The electromagnetic version of GTC PIC code has been devoloped in order to be capable to describe these modes. In the code ions are treated kinetically, while electrons are adiabatic in the zeroth order of an expansion based on the smallness of electron-to-ion mass ratio. Toroidal coupling of different shear Alfven modes leads to the apperance of gaps in the continuum frequency spectrum. Inside these gaps Toroidal Alfven Eigenmodes (TAE) can exist. Keeping electromagnetic effects by taking into account magnetic field perturbations in the simulations, gives us a possibility to observe various Alfven modes, in particular TAE. Starting with random perturbations of vector potential, the shear Alfven modes die out due to the continuum damping and the dstinctive peaks inside TAE frequency gaps are observed. Linear dispersion relation of the observed modes is compared with analytical theory to benchmark the simulations.

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