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Gyrokinetic particle simulation of the beta-induced Alfven eigen mode HUASEN ZHANG, Fusion Simulation Center, Peking University, Beijing 100871, China, ZHIHONG LIN, Department of Physics and Astronomy, University of California, Irvine, CA92697, USA, IHOR HOLOD, XIN WANG, YONG XIAO, WENLU ZHANG — The beta-induced Alfven eigen mode (BAE) is studied using the global gyrokinetic particle code GTC. In our simulation, BAE is successfully excited by antenna and energetic particle density gradient. Through the antenna frequency scan, we can measure the BAE frequency and damping rate by numerical fitting the saturation amplitude. BAE excitation by energetic particles shows that the BAE propagates in the ion diamagnetic direction and the frequency has a little downshift, which is due to modification of the energetic particles. The frequency and growth rate in gyrokinetic simulation is a little different from drift kinetic simulation, which is expected due to the finite larmor radius effect. We also find that the BAE frequency is related to the wavelength and the plasma beta while the growth rate is sensitive to the energetic particle properties. Benchmarks between GTC and HMGC are also done through initial perturbation, antenna excitation and energetic particle excitation. The simulation results agree with each other very well.

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