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Ion acceleration driven by a relativistic electron beam under a strong magnetic field[1] TOSHIHIRO TAGUCHI, Setsunan University, THOMAS ANTONSEN, University of Maryland, KUNIOKI MIMA, Graduate School for the Creation of New Photonics Industries — We have been investigating about an electron beam propagation under a strong magnetic field and found a very interesting phenomena. It is a generation of a large amplitude whistler wave, which is amplified by a nonlinear coupling of obliquely propagating circularly polarized waves [1]. Since the previous work did not include ion motions, such a giant whistler wave mainly affects on beam electrons and they stagnate due to a large ponderomotive force of the electromagnetic wave. In order to investigate the influence of the strong wave on background ions, we have developed a new PIC code which has an open (upstream and downstream) boundaries. By using the new code, we have been studying the kinetic behavior of ions in a circumstance generating a large whistler wave. As a result, it is found that the electrostatic field induced by the stagnated beam electrons not only creates a density dip in the background electrons but also accelerates background ions. We will discuss the relation between the ion acceleration and a formation of a collisionless shock wave. [1] T. Taguchi et al., J. Plasma Phys. 83, 2, 905830204 (2017).

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