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Direct ion heating in overdense plasmas through the Brillouin instability driven by relativistic whistler waves[1] TAKAYOSHI SANO, MASAYASU HATA, NATSUMI IWATA, ILE, Osaka Univ., KUNIOKI MIMA, GPI, YASUHIKO SENTOKU, ILE, Osaka Univ. — Strong magnetic fields over kilo-Tesla have been available in the laboratory by the use of ultra-intense lasers. It would be interesting to apply those strong fields to other laser experiments such as the inertial confinement fusion and laboratory astrophysics. The characteristics of laser-plasma interactions could be modified significantly by the presence of such strong magnetic fields. We investigate electromagnetic wave propagation in overdense plasmas along the magnetic field for a right-hand circularly polarized wave by PIC simulations. Since the whistler mode has no cutoff density, it can penetrate into overdense plasmas and interact directly with charged particles there. When the external field strength is near a critical value defined by that the cyclotron frequency is equal to the laser one, it is reported that electrons are accelerated efficiently by the cyclotron resonance. However, if the field strength is far beyond the critical value, the cyclotron resonance is inefficient, while the ions gain a large amount of energy directly from the laser light owning to the Brillouin scattering. As the result, only ions are heated up selectively. We will discuss about the application of this ion heating in dense plasmas.

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