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High-intense laser propagation into strongly magnetized dense plasma¹ MASAYASU HATA, TAKAYOSHI SANO, Osaka University, HITOSHI SAKAGAMI, National Institute for Fusion Science, YASUHIKO SENTOKU, HIDEO NAGATOMO, Osaka University — Recent progress of method for kilo-tesla class magnetic field generation allows us to perform experiments of high-intense laser plasma interactions (LPI) under strong external magnetic field. Such strong magnetic field affects not only fluid dynamics but also fast electrons and laser propagation. We study high-intense laser propagation into dense plasma under strong magnetic field using Particle-In-Cell (PIC) simulations. According to the linear theory of cold plasma in strong magnetic field, where the cyclotron frequency is greater than the laser frequency, right-handed circularly polarized (RCP) component of electromagnetic wave propagates into dense plasma without cut-off density. Simulation results show that initially the RCP component of injected laser can propagate into dense plasma, but after a while following laser cannot propagate. It is found that apparent ion acoustic wave generates at the area where the laser cannot propagate and it inhibits the propagation of the RCP component. This means that the RCP component of the laser can propagate until ion acoustic wave sufficiently grows.

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