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3D PIC Simulations of Laser Produced Plasma Expansion with Large Ion Larmor Radius[1] MASANORI NUNAMI, AKIRA TAKATA, KATSUNOBU NISHIHARA, Institute of Laser Engineering, Osaka University, CSN TEAM — We have investigated expansion of laser produced cluster plasma in a strong magnetic field using 3D PIC simulation. Since initial electron pressure of laser heated cluster is much higher than magnetic pressure, electrons first expand and ions are accelerated outward due to electric field generated by expanding electrons. In the expansion of cluster plasma in magnetic field, ion Larmor radius is much larger than the initial cluster size, while electron Larmor radius is much smaller than the cluster size, namely, Re << Ro << Ri, where Re(i) is Larmor radius of electron (ion) and Ro is the initial cluster size. Accelerated ions expand up to about their Larmor diameter. Therefore magnetized electron surface separates from ion surface. The surface of magnetized electrons is unstable for the flute type instability mainly due to the inward-directed electric field created by streaming ions with large Larmor radius [1]. However we found that ion surface is relatively stable, which is different from previous works.
[1] B. H. Ripin et al, Phys. Fluids B5, 3491 (1993).

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Masanori Nunami
Institute of Laser Engineering, Osaka University

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