

無衝突衝撃波の高強度レーザー実験

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High power laser experiment on collisionless shock

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Laboratory experiment on collisionless shocks by using high power laser is performed in collaboration with the Institute of Laser Engineering (ILE) at Osaka university. An aluminum foil target surrounded by nitrogen gas is irradiated by Gekko XII hyper laser. The target foil is ablated to produce expanding aluminum plasma. This target plasma sweeps a surrounding nitrogen gas plasma which is produced as a result of photo ionization due to strong radiation through laser-target interaction. Then, a shock is formed in the gas plasma. The above shock formation process is observed using a number of diagnostics such as the optical imaging based on self-emission, shadowgraphy, and collective Thomson scattering. We will discuss characteristics of the shocks by analyzing the observed data. In particular, upstream of the shock at early time stage is paid attention to focus on local plasma heating due to a microinstability.