**R008-16**
**Zoom meeting D ：11/4 AM2 (10:45-12:30)**
**11:45〜12:00**

# 爆発的に成長する非線形無衝突磁気リコネクション

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# Nonlinear Explosive Magnetic Reconnection in a Collisionless Plasma

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The debate surrounding onset of the fast magnetic energy dissipation by magnetic reconnection has remained a fundamental topic in the plasma universe, not only in the Earth's magnetosphere but in astrophysical objects such as pulsar magnetospheres and solar flares, for more than half a century. Recently, nonthermal particle acceleration and plasma heating during reconnection have been extensively studied in collisionless plasmas, and it has been argued that rapid energy dissipation can occur for a "thin" current sheet, the thickness of which is of the order of the particle gyro-radius. However, it is an intriguing enigma as to how the fast energy dissipation can occur for a "thick" current sheet with thickness larger than the particle gyro-radius. Here we demonstrate, using a high-resolution particle-in-cell simulation, that an explosive reconnection can emerge with the enhancement of two effects: one is the inertia resistivity due to the magnetization of the meandering particles by the reconnecting magnetic field, and the other is the shrinkage of the current sheet during the early time evolution/linear stage of the plasma sheet. Together with the theoretical approach of the energy principle, we show that, regardless of the initial thickness of the current sheet, the time scale of the nonlinear explosive reconnection is tens of the Alfven transit time.