

**R008-27**

**Zoom meeting D : 11/4 PM2 (15:45-18:15)**

**16:30~16:45**

## **相対論的衝撃波上流におけるピックアップ過程による粒子加速**

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## **Particle Acceleration by Pickup Process Upstream of Relativistic Shocks**

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Relativistic shocks are ubiquitous in the Universe as a consequence of interaction between relativistic plasma outflow and interstellar medium and believed to be an efficient particle accelerators. Although particle acceleration at relativistic shocks is often invoked for the generation mechanism of the ultra-high-energy cosmic rays, which is a long-standing in astrophysics, the detailed acceleration mechanism remains unsolved yet.

It is well-known that relativistic shocks emit coherent electromagnetic waves (e.g., Gallant et al. 1992; Hoshino et al. 1992; Iwamoto et al. 2017; 2018), which are assumed to originate from the synchrotron maser instability (Hoshino & Arons 1991). 1D particle-in-cell (PIC) simulations of relativistic shocks demonstrated that longitudinal electrostatic waves, which are called wakefields, are induced in the wake of the large-amplitude electromagnetic waves via the stimulated Raman scattering and that nonthermal particles are generated in the upstream (Lyubarsky 2006; Hoshino 2008). Recently, our high-resolution 2D PIC simulation (Iwamoto et al. 2019) confirmed that the particle acceleration associated with the wakefield works even in realistic multidimensional shocks. In this talk, we will discuss the acceleration mechanism in more detail and show that the particles are mainly accelerated by the motional electric field via the pickup process.