木星極域磁気圏における相対論的電子による波動励起の粒子シミュレーション

木村 智樹 [1]; 篠原 育 [2]
[1] JAXA/ISAS; [2] 宇宙研／宇宙機構

Particle simulation for wave excitation by relativistic electrons in Jovian polar magnetosphere

Tomoki Kimura[1]; Iku Shinohara[2]
[1] JAXA/ISAS; [2] ISAS/JAXA

It is widely known that quasi-periodic (QP) relativistic particle acceleration is observed in Jovian polar magnetosphere, and the QP acceleration is accompanied with periodic auroral emission and low-frequency radio burst (QP radio burst). However, physical process of QP acceleration has not been revealed yet because distribution functions of particles are ambiguous.

Kimura et al. [2008, 2010] investigated source locations and directivity of
QP radio bursts based on combination analysis of in-situ observation data and ray tracing method. They suggested that the QP radio burst is emitted from high-latitude polar region (L>20) with broad beamings.

In this paper, we address generation process of QP radio burst in the specified source region to restrict physical mechanisms of QP accleration by using numerical simulations.
QP burst excitation is modeled by one-dimensional particle-in-cell (PIC) simulation. Comparing with the observed characteristics of the QP radio burst, we will disucss fundamental properties of the QP radio burst emission (e.g. growth rate, directivity, and energy balance) depending on
physical conditions of relativistic electrons. This is expected to restrict distribution functions of electrons and physical mechanisms of QP acceleration.