R006-34
Zoom meeting B ：11/2 PM1 (13:45-15:30)
13:45〜14:00

Repetitive EMIC rising tone emissions by anomalous trapping of low pitch angle protons

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Electromagnetic ion cyclotron (EMIC) rising tone emissions which are similar to the whistler mode chorus emissions are generated through the nonlinear interactions with anisotropic protons in the inner magnetosphere. Theoretical studies suggest that whistler waves cause the anomalous trapping of low pitch angle electrons. By test particle simulations, we find that EMIC rising tone emissions also scatter the significant number of low pitch angle protons to the higher pitch angle. Hybrid simulations on the EMIC rising tone emissions, however, have been performed with subtracted Maxwell distribution function for the energetic protons which exclude low pitch angle protons. We perform a self-consistent hybrid simulation with bi-Maxwellian protons to investigate the effect of the anomalous trapping on the generation of the rising tone emissions. We find several EMIC rising tone emissions are generated while only one pair of forward and backward propagating rising tone emissions is generated in the subtracted Maxwellian case. The low pitch angle protons are also scattered to the higher pitch angle obtaining kinetic energy from the EMIC wave in the simulation. The higher pitch angle proton flux formed by the anomalous trapping becomes a part of the energy source of another EMIC emission. The new EMIC wave repeats the process, and then the multiple rising tone emission occurs.