[JJ] Evening Poster | P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM17]Space Plasma Physics: Theory and Simulation

convener:Takayuki Umeda(Institute for Space-Earth Environmental Research, Nagoya University), Yohei Miyake(Education Center on Computational Science and Engineering, Kobe University), Yasuhiro Nariyuki(富山大学人間発達科学部, 共同), Tadas Nakamura(Fukui Prefectural University)
Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
This session focuses on studies of space plasma physics via theoretical and numerical approaches. Papers on a wide variety of topics from natural phenomena to artificial plasma environment as well as theoretical and computational methodologies are welcome.

[PEM17-P07]Dynamics of energetic protons interacting with electromagnetic ion cyclotron waves

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We perform simulations of non-relativistic protons interacting with EMIC waves in the Earth’s magnetic field. We find that the non-relativistic protons are trapped and accelerated by waves. We also perform simulations of the motion of relativistic protons in the Juvian magnetic field. We find highly efficient acceleration of the protons by the EMIC waves. The efficiency is greater than that at the Earth.
In this acceleration process, the direction of proton velocity along the magnetic field is reversed. We observe that this acceleration process is quite similar to the acceleration process of relativistic electrons by whistler-mode chorus waves, called Relativistic Turning Acceleration(RTA). We modify the nonlinear trapping theory for the relativistic proton case. We confirm that our results satisfy the theoretical conditions for RTA.