ULF wave modulation of the whistler-mode chorus generation in the inner magnetosphere

Yuto Katoh[1]; Lunjin Chen[2]
[1] Dept. Geophys., Grad. Sch. Sci., Tohoku Univ.; [2] U Texas, Dallas

We carry out electron hybrid code simulations for the study the modulation of the generation process of whistler-mode chorus emissions under the presence of ULF waves in the inner magnetosphere. Previous studies revealed properties of chorus generation depending on the number density of energetic electrons [Katoh et al., JGR 2011], temperature anisotropy of velocity distribution function [Katoh et al., JGR 2018], and spatial gradient of the background magnetic field [Katoh and Omura, JGR 2013]. The properties of both energetic electrons and the background magnetic field are also varied by the presence of ULF waves in the inner magnetosphere [e.g., Xia et al., 2016]. The range of parameters controlling chorus generation should be examined by a self-consistent simulation reproducing the generation process of chorus emissions. By referring the variation of the background magnetic field for toroidal and poloidal mode ULF waves, we carry out a series of electron hybrid code simulations for the condition of chorus generation. Simulation results clarify that the variation of the spatial gradient of the background magnetic field controls whether or not distinct chorus emissions are generated from the magnetic equator. The results of the present study serve useful information in understanding in-situ observation of both chorus and ULF waves and related wave-particle interactions occurring in the inner magnetosphere.