

Nonlinear wave-particle interactions identified in the plasmasphere by the Akebono (EXOS-D) satellite

Suguru Shirai[1], # Takayuki Ono[2], Hiroshi Oya[3]

[1] Earth and Planetary Sci., Tohoku Univ, [2] Department of Astronomy and Geophysics, Tohoku Univ., [3] Space Commu. Fukui Univ.

A nonlinear wave-particle interaction of ESCH waves were identified in the plasmasphere by using the Akebono (EXOS-D) PWS data.

Previously, EP-ESCH waves have been discovered by Okamoto[1993] in the Equatorial Plasmasphere region. The present study identified that new ESCH waves are generated in the plasmasphere, associated with EP-ESCH waves due to the nonlinear wave-particle interaction processes in the plasmasphere.

The frequency characteristics of these ESCH waves indicated the relationship of nonlinear wave-particle interaction between the fq wave and fd wave explained as,

$$f_{Qn+2} - f_{Dn} - (k_{Qn+2} - k_{Dn})V_{th}/2\pi = mfc$$

The discovery of the nonlinear wave-particle interaction in the plasmasphere shows that plasma is more turbulent in the plasmasphere than it has been expected.