



Direct measurement of the energy exchange through wave-particle interactions in planetary magnetospheres: whistler-mode chorus and EMIC waves

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Chorus and EMIC: control factor of the evolution of energetic/relativistic particles in the magnetosphere

Whistler-mode chorus emissions

- generated by keV electrons
- accelerate relativistic electrons

Nonlinear nature of interactions have been clarified

[e.g., Katoh et al., JGR 2011; Katoh and Omura, JGR 2013, 2018]

Electromagnetic ion cyclotron waves (EMIC)

- generated by keV ions
- rapidly scatter relativistic electrons into loss-cone
- contribute ion heating in the polar magnetosphere

[e.g., Katoh et al., PRE8 2017; Kitamura et al., Science 2018]

Direct measurement is planned by JUICE/RPWI-PEP-J-MAG inter-instrument communications (S-WPIA)

New measurement method – WPIA



S-WPIA on JUICE: direct measurement of energy exchange through waveparticle interactions



Chorus in planetary magnetospheres



[[]Katoh et al., JGR 2011]





