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Coherent Pitch-Angle Interaction between Whistler Waves and a Distribution of Energetic Particles (PhD Oral-24)[1] YOUNG DAE YOON, Pohang Accelerator Laboratory, PAUL M. BELLAN, California Institute of Technology — How coherent whistler waves interact with energetic particles is a crucial question in magnetospheric plasma physics, as well as in the context of runaway electrons in fusion devices. A recent study [2] showed that an exact rearrangement of the relativistic particle equation of motion under a circularly-polarized wave leads to an equation describing the motion of the frequency mismatch parameter ξ under a pseudo-potential ψ. When the shape of the pseudo-potential is two-valleyed and the particle has enough pseudo-energy to undergo two-valley motion, ξ and the pitch-angle changes greatly. In the present study, the analysis is extended to a distribution of particles. A general condition for two-valley motion is first derived. It is then shown via single-particle simulations that particles which satisfy the two-valley condition indeed undergo large pitch-angle changes. Then, the fraction of two-valley particles are calculated assuming that the particle distribution is Maxwell-Jüttner, which is the relativistic generalization of the Maxwell-Boltzmann distribution. For magnetospheric parameters, at least 1-5% of the particles undergo two-valley motion, and this fraction is verified by single-particle simulations

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[2]P. M. Bellan, Phys. Plasmas, 20, 042117

Young Dae Yoon
Pohang Accelerator Laboratory

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