

Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Circularly polarized electromagnetic wave-particle interaction and whistler magnetic polarization¹ PAUL BELLAN, Caltech — Two recent results on waves are reported: (i) The interaction between a circularly polarized electromagnetic wave and an energetic gyrating particle is described using a relativistic pseudo-potential that is a function of the instantaneous frequency mismatch [1]. The pseudo-potential parametrically depends on the initial mismatch, the normalized wave amplitude, and the initial angle between the wave magnetic field and the particle perpendicular velocity. For zero initial mismatch, the pseudo-potential consists of a single valley, but for finite initial mismatch it can be two valleys separated by a hill. (ii) The circular propagation of the magnetic field of oblique whistler waves previously shown in Ref. [2] is derived using a simple oblique basis set [3]. Whistler propagation is shown to consist mainly of magnetic energy sloshing back and forth between two orthogonal components of wave magnetic field in quadrature; wave electric field energy is small compared to the wave magnetic field energy.

[1] P. M. Bellan, *Phys. Plasmas* 20, 042117 (2013).

[2] O. P. Verkhoglyadova, B. T. Tsurutani, and G. S. Lakhina, JGR-Space 115, A00F19 (2010).

[3] P. M. Bellan (submitted).

¹Supported by USDOE, NSF, and AFOSR.

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Date submitted: 10 Jul 2013

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