Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Modified Budden problem associated with energetic particles in fusion plasmas[1] ALAIN BRIZARD, SMC, ALLAN KAUFMAN, LBNL and UCB, EUGENE TRACY, William and Mary, ANDRE JAUN, RIT — The classic Budden problem is a double-conversion process, whereby a primary incoming wave is converted to a localized secondary wave which then converts to an outgoing (reflected) primary wave. Using ray phase-space methods [1], we investigate the modification of the Budden problem associated with the presence of a localized tertiary wave supported by an energetic-particle population in an inhomogeneous magnetized plasma. The calculation of the reflection coefficient for this modified Budden problem is based on a simple one-dimensional model where the tertiary wave is parameterized by the energetic-particle density and its separation from the localized secondary wave. Note that, since an energetic-particle population can support waves of either positive or negative energy, interference effects are taken into account for each case by using a modular-eikonal approach [2].

[1] E.R. Tracy, A.N. Kaufman, and A.J. Brizard, Phys. Plasmas 10, 2147 (2003).

[2] A.J. Brizard, J.J. Morehead, A.N. Kaufman, and E.R. Tracy, Phys. Plasmas 5, 45 (1998).

[1]This work was supported by US DoE grant No. DE-AC03-76SFOO098.

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Date submitted: 20 Jul 2006 Electronic form version 1.4