Modified Budden problem associated with energetic particles in fusion plasmas\textsuperscript{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 \cite{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 \cite{2}.

\textsuperscript{1}This work was supported by US DoE grant No. DE-AC03-76SF00098.

\begin{flushright}
Alain Brizard
Saint Michael’s College
\end{flushright}

Date submitted: 20 Jul 2006

Electronic form version 1.4