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A Comparison of Fully Relativistic and Non-relativistic Ray-tracing of Electron Bernstein Waves[1] E. NELSON-MELBY, CompX, R.W. HARVEY, A.P. SMIRNOV, CompX, P.O. Box 2672, Del Mar, CA 92014, USA, A.K. RAM, MIT-PSFC, Cambridge, MA 02139, USA — Electron Bernstein waves (EBW) can be important for heating and driving current in high density, high temperature plasmas. Mode- converted EBWs are especially of interest in overdense ($\omega_{pe} > \omega_{ce}$) machines such as spherical tokamaks (ST), because few other types of plasma waves can propagate inside such a plasma. EBWs usually damp near cyclotron resonances, where full relativistic effects are important. This would be especially true in an ST reactor, such as the ARIES-ST study, where $T_{e0} \simeq 16keV$. Recently, a fully-relativistic, high-frequency dispersion relation has been added to the ray-tracing code GENRAY [1]. This portion of the code was written by A.K. Ram and E. Nelson-Melby. Recent work shown at the 16th RF Topical Conference [2] have shown that there can be significant differences between the non- and fully-relativistic EBW dispersion relations. Ray- tracing of EBWs mode-converted through the O-X-B scenario at the edge of the ARIES-ST tokamak will be presented. [1] A.P. Smirnov and R.W. Harvey, Bull. APS 40, Ab. 8p35 (1995). [2] A.K. Ram, J. Decker, and Y. Peysson, J. Plasma Phys., accepted for publication (2005); E. Nelson-Melby et. al., Poster B-08. (2005).

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