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Interference effects on quasilinear diffusion of lower hybrid waves¹ JOHN WRIGHT, PAUL BONOLI, MIT Plasma Science and Fusion Center, Cambridge USA — In cases of weak damping resulting in multi-pass behavior, lower hybrid (LH) ray tracing has been shown to predict a stronger LH wave-electron interaction than observed in experiment [1]. We have previously presented [2] a comparison with full wave simulations in which the full wave results demonstrated much closer agreement in magnitude of hard x-ray emissions than ray tracing. For an explanation of the different model predictions we look to interference effects manifested in the quasi-linear (QL) diffusion tensor $E_1 f_1$. Ray tracing treats the contribution of each LH wave to QL diffusion independently whereas in full wave each partial wave constructively or destructively interferes with the distribution function perturbed by the entire spectrum. We remove the phase effects in the full wave QL calculation and compare to previous results. We conclude with a discussion on the causes of the prediction discrepancies from experiment in multi-pass regimes.

[1] A. Schmidt et al, Phys. Plasmas, 17 (2011).

[2] J. Wright et al, 19th RF Topical Conference (2011).

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