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Review of Mode Conversion in Phase Space, and Applications to Ray Tracing Codes A. RICHARDSON, E. TRACY, Y. XAIO, Physics Department, College of William and Mary, J. FINN, Los Alamos National Laboratory, A. KAUFMAN, LBNL, UC Berkeley — We review the problem of two coupled harmonic oscillators with slowly varying frequencies as a simple model for mode conversion. For an interval of time when the two frequencies are nearly equal, energy can be transfered from one to the other in a process called "resonance crossing". This is a simple example of a very general phenomenon in physics: the breakdown of adiabaticity by resonant interactions, and it is called different names in different contexts: "Landau-Zener crossings", "avoided crossings", "mode conversion", etc. In this poster, we provide a brief pedagogic review of how to solve this simple time dependent problem using matched asymptotic expansions. We then describe in some detail how the same problem can be solved using phase space techniques, for example by computing the Wigner matrix of the two interacting oscillators. The advantage of phase space methods is that they can be extended to problems in higher dimensions and more complex geometries [1]. We then show some numerical results for mode conversion in a cold plasma model.
1] See related poster by A. Jaun, E. R. Tracy, and A. N. Kaufman, this meeting.

Andrew Richardson
College of William and Mary

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