

Abstract Submitted  
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**Calculating the Non-Adiabatic Pathways in STIRAP**<sup>1</sup> YUAN SUN, HAROLD METCALF, Physics, Stony Brook University, Stony Brook NY 11794-3800 — The various origins of the non-adiabaticity of the Stimulated Raman Adiabatic Passage (STIRAP) process is a long-standing, well-studied, and interesting topic.<sup>2</sup> We have analyzed the details of STIRAP's non-adiabatic passage with a perturbative method that shares some of its characteristics with Feynman's path integral approach. The key contribution to the atomic evolution is from the pulse envelopes, timing, and shapes, a time dependence that remains after the rotating frame transformation that is usually employed to produce a time-independent Hamiltonian. Our resulting propagator describes the time evolution of the quantum system, and the different perturbation orders allow for a better and more intuitive view of STIRAP's non-adiabatic behavior. The method can be extended to other problems where the higher orders of the actual paths matter during the time evolution.

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<sup>2</sup>K. Bergmann et al., Rev. Mod. Phys. **70** 1003 (1998)

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