Abstract Submitted
for the 4CF11 Meeting of
The American Physical Society

Finding the Time Evolution of Driven Quantum Systems with Lie Algebras RYAN SAYER, JEAN-FRANCOIS VAN HUELE, TIM WENDLER, Brigham Young University — In quantum dynamics, the time evolution operator U determines how a system responds to an external force. When the dynamics, as characterized by the Hamiltonian operator, is contained within a Lie algebra, we can factorize U in exponentials of basis elements of the algebra and reduce the time dependence to a set of coupled differential equations for the coefficients of these basis elements. Using this method, we solve free-particle and simple-harmonic systems with spatially-uniform forces of arbitrary time dependence. We discuss the possibility of extending the method and applying them to molecules in external dipole fields.

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Date submitted: 14 Sep 2011 Electronic form version 1.4