

Abstract Submitted
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Time Dependent Nuclear Scattering Calculations DAVID WEEKS, BRIAN DAVIS, Air Force Institute of Technology — A new time dependent method for calculating scattering matrix elements of two and three body nuclear collisions below 50 Mev is being developed. The procedure closely follows the channel packet method (CPM) used to compute scattering matrix elements for non-adiabatic molecular reactions.¹ Currently, one degree of freedom calculations using a simple square well have been completed and a two body scattering calculation using the Yukawa potential is anticipated. To perform nuclear scattering calculations with the CPM that will incorporate the nucleon-nucleon tensor force, we plan to position initial reactant and product channel packets in the asymptotic limit on single coupled potential energy surfaces labeled by the spin, isospin, and total angular momentum of the reactant nucleons. The wave packets will be propagated numerically using the split operator method augmented by a coordinate dependent unitary transformation used to diagonalize the potential. Scattering matrix elements will be determined by the Fourier transform of the correlation function between the evolving reactant and product wave packets. A brief outline of the Argonne v_{18} nucleon-nucleon potential² and the proposed wave packet calculations will be presented.

¹T.A.Niday and D.E.Weeks, Chem. Phys. Letters **308** (1999) 106

²R.B.Wiringa, V.G.J.Stoks, and R.Schiavilla, Physical Review C **51**(1995) 38

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