Abstract Submitted
for the DNP17 Meeting of
The American Physical Society

Deuteron Coulomb Excitation in Peripheral Collisions with a Heavy Ion[1] WEIJIE DU, Department of Physics & Astronomy, Iowa State University, PENG YIN, Institute of Modern Physics, Chinese Academy of Sciences, YANG LI, GUANGYAO CHEN, Department of Physics & Astronomy, Iowa State University, WEI ZUO, XINGBO ZHAO, Institute of Modern Physics, Chinese Academy of Sciences, JAMES P. VARY, Department of Physics & Astronomy, Iowa State University — We develop an *ab initio* time-dependent Basis Function (tBF) method to solve non-perturbative and time-dependent problems in non-relativistic quantum mechanics. As a test problem, we apply this method to the Coulomb excitation of a deuteron by an impinging heavy ion. We employ wave functions for the bound and excited states of the deuterium system based on a realistic nucleon-nucleon interaction and study the evolution of the transition probability, the r.m.s. radius and the r.m.s. momentum of the system during the scattering process. The dependencies of these quantities on the external field strength and the bombarding energy are also analyzed and compared to corresponding results obtained from first-order perturbation theory. The time evolution of both the charge and the momentum distributions is shown.

[1]This work was supported in part by the U. S. Department of Energy (DOE) under grants No. DESC0008485 (SciDAC/NUCLEI) and DE-FG02-87ER40371. W. Zuo and P. Yin are supported by the National Natural Science Foundation of China (11435014).

Weijie Du
Iowa State Univ

Date submitted: 29 Jun 2017 Electronic form version 1.4