MAR12-2011-000792

Abstract for an Invited Paper
for the MAR12 Meeting of
the American Physical Society

Benchmark Calculations of Atomic Collision Processes[1]

KLAUS BARTSCHAT, Drake University

The rapid development of computational resources has resulted in enormous improvements in the accuracy of numerical calculations of atomic collision processes. This talk will concentrate on recent advances in the computational treatment of charged-particle and intense short-pulse laser interactions with atoms, ions, and small molecules. Examples include electron collisions with heavy complex targets that are of significant importance in many modelling applications in plasma and astrophysics, fundamental studies of highly correlated 4-body Coulomb processes such as simultaneous ionization with excitation, and the accurate solution of the time-dependent Schrödinger equation in the presence of intense femto/attosecond laser fields, which paves the way for quantum dynamic imaging and coherent control.

[1]Work supported by the NSF under PHY-0903818 and PHY-1068140, and the TeraGrid/XSEDE allocation TG-PHY090031.