Abstract Submitted
for the DNP15 Meeting of
The American Physical Society

Nuclear Cross Sections for Space Radiation Applications CHARLES WERNETH, NASA Langley Research Center, KHIN MAUNG, WILLIAM FORD, The University of Southern Mississippi, JOHN NORBURY, NASA Langley Research Center, MICHAEL VERA, The University of Southern Mississippi — The eikonal, partial wave (PW) Lippmann-Schwinger, and three-dimensional Lippmann-Schwinger (LS3D) methods are compared for nuclear reactions that are relevant for space radiation applications. Numerical convergence of the eikonal method is readily achieved when exact formulas of the optical potential are used for light nuclei ($A \leq 16$) and the momentum-space optical potential is used for heavier nuclei. The PW solution method is known to be numerically unstable for systems that require a large number of partial waves, and, as a result, the LS3D method is employed. The effect of relativistic kinematics is studied with the PW and LS3D methods and is compared to eikonal results. It is recommended that the LS3D method be used for high energy nucleon-nucleus reactions and nucleus-nucleus reactions at all energies because of its rapid numerical convergence and stability for both non-relativistic and relativistic kinematics.

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Date submitted: 25 Jun 2015 Electronic form version 1.4