Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Three-Dimensional Lippmann-Schwinger Cross Section Model for Space Radiation Applications CHARLES WERNETH, NASA Langley Research Center, XIAOJING XU, National Institute of Aerospace, RYAN NORMAN, NASA Langley Research Center, KHIN MAUNG, The University of Southern Mississippi
— Space radiation transport codes utilize nuclear cross sections to describe the interaction of particles in the space radiation environment with shielding materials and are needed for estimates of dosimetric quantities of interest and measures of radiation risk. The highly-parameterized (>60 parameters) Tripathi cross section model is often used by many Monte Carlo transport codes for prediction of reaction cross sections and is known to fit well to experimental data. However, predictions of any parameterization are questionable when used for estimates beyond the range of the data to which it is tuned. The present work shows that a three dimensional Lippmann-Schwinger (LS3D) equation model with relativistic kinematics predicts nucleon-nucleus and nucleus-nucleus cross sections as well as the Tripathi cross section. Additional advantages of the LS3D model include the ability to compute accurate elastic differential, total, and total elastic cross sections. The results of this research will show that the LS3D model with relativistic kinematics should be used for space radiation applications in which the kinetic energy of the projectile in the laboratory frame is greater than approximately 220 MeV/n.

Charles Werneth
NASA Langley

Date submitted: 06 Dec 2017 Electronic form version 1.4