
SIMPLE FUNCTIONAL FORMS FOR TOTAL AND TOTAL REACTION CROSS SECTIONS FROM NUCLEON-NUCLEUS COLLISIONS.Pradip K. Deb¹, Ken A. Amos²¹ *The Ohio-State University, Ohio, U.S.A.*² *The University of Melbourne, Australia*

Total reaction cross sections have been predicted for nucleons scattering from nuclei ranging in mass from 6 to 238 and for projectile energies from just above noticeable giant resonance excitation to 300 MeV. So also have been the mass variations of those cross sections at selected energies when they have been calculated using coordinate space optical potentials formed by full folding effective two-nucleon (NN) interactions with one body density matrix elements (OBDME) of the nuclear ground states. Good comparisons with data result when effective NN interactions defined by medium modification of free NN t matrices are used. Such has been also the case for angular as well as integral data for scattering of ${}^6\text{He}$ from hydrogen when analyzed using inverse kinematics.

However there is a simple three parameter functional form that reproduces the partial wave total reaction cross section values determined from those optical potential calculations; a functional form that also maps the total scattering cross section partial wave elements. Adjusting the theoretical defined parameter values has enabled us to fit the actual measured data values from the scattering involving (15) nuclei spanning the mass range from ${}^9\text{Be}$ to ${}^{238}\text{U}$ and for proton energies 10 to 300 MeV. Likewise total cross sections for neutron scattering from various nuclei can be equally well reproduced. Of import is that the three parameter values vary smoothly with mass and energy.