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A compilation of experimental total reaction cross sections

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The nucleon-nucleus and nucleus-nucleus total reaction cross sections are of importance in many different fields, both for a better theoretical understanding as well as for a number of applications. The total reaction cross section determines the mean free path when particles traverse nuclear matter, and the production cross sections for secondary particles are directly proportional to it. Many complex Monte Carlo codes use the total reaction cross sections for these purposes, and these observables become important in a number of different applications, including Accelerator Driven Systems, space radiation dosimetry. ion beam cancer treatment, and Single Event Effects (SEE) in digital electronics.

We have performed a comprehensive literature study in order to find all available experimental data on total reaction cross sections, interaction cross sections, and total charge changing cross sections for neutrons, protons, and all stable and exotic heavy ions. The data base extends earlier compilations with new data and data that has not been found in earlier searches. Excluded from the data base are measurements where the cross sections have been derived through model-dependent calculations from other kinds of measurements. The objective of the study is to identify where more measurements are needed in view of different applications, and to make the data easily available for model developers and experimentalists, as well as for the nuclear data bases such as EXFOR. We will present some examples from the study, which is in the stage of quality control of all the gathered data.

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