Imitations of Reduction Methods for Fusion and Total Reaction Cross Sections.

Very recently we have investigated the most frequently used methods to reduce fusion and total reaction excitation functions. These methods are widely used in the literature, especially to compare the cross sections of weakly and tightly bound systems, and then to find out the effects of the breakup of the weakly bound nuclei on these reaction processes. In the case of fusion excitation functions, we confirmed that the fusion function method is the only one that works very well, for any system at any energy regime. Regarding total reaction excitation functions, none of the methods was satisfactory. Their reduced reaction cross sections kept a strong dependence on the atomic and mass numbers of the collision partners. In the present work we make a revision of conclusions of almost twenty published papers on total reaction cross sections, when we find that several of them are not correct, since some of the effects described as owing to the breakup process are, in fact, consequences of the limitations of the reduction methods used. Then, possible general conclusions are also presented.

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