

Probing nuclear sizes of unstable nuclei with total reaction cross sections (Invited)

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Measuring nuclear sizes has a long history. The nuclear charge distribution (radius) is traditionally determined by electron scattering measurement. However, thus far probing neutron distribution is difficult, and the measurement is limited to stable nuclei. Total reaction or interaction cross section is known as a quantity that reflects nuclear sizes. Using recent rare isotope beam facilities, the cross section can be measured for almost all nuclei as long as they are produced in sufficient number.

In this talk, we present our recent studies on nuclear size properties of unstable nuclei using total reaction cross sections, especially focusing on nuclear deformation and neutron-skin thickness. Incident energy and target dependence of the cross section is discussed in order to select appropriate reactions for the size determination. If time allows, feasibility of determining the proton radius of unstable nuclei using charge-changing cross section, which can be measured in the same setup of the total reaction cross section.

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