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Transfer reactions: challenges for the future¹

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Transfer reactions offer a unique tool to study spectroscopic of nuclei. It is extremely important to devise a method to extract structure information from transfer cross sections, reliable even when moving toward the driplines. The transfer amplitude is typically surface peaked and sensitive to the overlap function of the nucleus of interest in the surface region. As there is a non negligible contribution to the cross section from the interior of the nucleus under study, spectroscopic factors can usually be extracted. For low energies, the transfer cross sections may only be sensitive to the tail of the overlap function, and then only an Asymptotic Normalization Coefficients (ANC) should be extracted. The standard theory to analyze transfer reactions is still the same for decades, namely the Distorted Wave Born Approximation. Several recent studies, revisiting the topic, have unveiled problems but also indicate possible solutions. For example higher order effects often need to be considered, either from breakup, from inelastic excitations or from couplings to other reaction channels. In this talk I will review the present status and underline the importance of performing, in parallel to a transfer measurement, an experiment to determine the ANC independently.

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