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Transfer reactions: opportunities and challenges for the modern era

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Much of what has been learned about the structure of atomic nuclei over the past several decades has been determined from studies of transfer reactions. Typically, these are reactions where one or two nucleons are exchanged between a beam and a target. The data can provide information such as the excitation energies and quantum numbers for nuclear states, as well as other more subtle properties such as spectroscopic factors which are sensitive to many aspects of the nuclear wave function. Data from transfer reactions can be used to guide theoretical calculations of nuclear structure, and are important for understanding the properties of exotic nuclei produced in modern laboratories. The latest experiments utilize radioactive beams which make studies of transfer reactions technically more difficult than those performed with stable nuclei in the past. Many new methods have been developed recently to contend with the technical challenges, and active-target experiments in particular will play an important role in future research in this area. This talk will present some background of the physics that can be studied with transfer reactions, review the technical challenges, and describe how new experimental approaches can best utilize the exotic beams produced by today's modern facilities.

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