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Transfer to the continuum calculations of quasifree (p,pn) and (p,2p) reactions

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Nucleon removal (p,pn) and (p,2p) reactions at intermediate energies have gained renewed attention in recent years as a tool to extract information from exotic nuclei, thanks to the availability of exotic beams with which to perform these reactions in inverse kinematics. The information obtained from these experiments is complementary to that obtained from nucleon removal experiments with heavier targets (knockout), but is expected to be sensitive to deeper portions of the wave function of the removed nucleon.

In this contribution, we present calculations for (p,2p) and (p,pn) reactions performed within the transfer to the continuum method [Phys. Rev. C **92**, 044605]. This is a fully quantum-mechanical formalism, based on the application of the prior form transition amplitude, in which the 3-body final states are expanded in a discretized basis of p-N continuum states. This method is expected to be suitable for the analysis of observables of inclusive nature which are currently under study in the experiments performed at GSI and RIKEN. Results for different nuclei are presented, employing Reid Soft-Core nucleon-nucleon interaction for the interaction between the incoming proton and the extracted nucleon and either JLM potentials or microscopic nucleus-nucleon potentials calculated by folding the effective Paris-Hamburg g-matrix NN interaction with Hartree-Fock densities for the entrance and exit channels, depending on the range of energies studied.

In the case of (p,pn) reactions, special interest is devoted to the (p,d) channel, which can be treated on equal footing to quasi-free scattering channels within the transfer to the continuum formalism and may compete with them, specially at energies below 100 MeV per nucleon.

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