

Nucleon-nucleon correlations in transfer reactions induced by heavy ions

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Pairing is a key feature of the nucleon-nucleon (NN) interaction that leads to the characteristic $J^\pi = 0^+$ of the nuclear ground state in even-even nuclei and the characteristic odd-even staggering in the binding energies of nuclei.

In this contribution, I will discuss how the two-nucleon transfer reactions allow us to investigate the properties of pair strength. The basic idea is that transfer cross sections are related to the pair strength. However, the detailed mechanisms and the configuration mixing of single-particle states impose serious difficulties. In this scenario, transfers induced by heavy ions offer a unique scenario to treat nn , pp and pn pair transfers on the same theoretical footing. Moreover, its description in terms of semi-classical approach allows interpretation of the experimental data in terms of transfer probabilities. In particular, I will show measurements for 2p- and 1d-transfer in the $^{16}\text{O} + ^{28}\text{Si}$ system. The ^{28}Si nucleus is very suitable in this study because it is a $N = Z$ nucleus with protons filling the $1d_{5/2}$ shell. Excitation energy spectra and transfer cross sections give some hints on the role of pairing in the reaction mechanisms.

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