

Study of multi-nucleon transfer reactions with light nuclei

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Multi-nucleon transfer (MNT) and deep-inelastic (DIC) reactions are useful tools to populate exotic nuclei, particularly the neutron-rich ones. Although these reaction mechanisms have already been extensively exploited in the past years, only recently the availability of efficient spectrometers opens up a variety of new possibilities to study the reaction mechanism itself and to investigate the spectroscopy of medium neutron-rich nuclei.

In this view, two different experiments were performed employing a stable (²²Ne) and a radioactive (²⁴Ne) beam. The first reaction has been performed using the CLARA-PRISMA-DANTE set-up [1, 2, 3] at Legnaro National Laboratories (Legnaro-Italy), where an intense beam (3-4 pA) of ²²Ne at 151 MeV impinged on an enriched 700 $\mu\text{g}/\text{cm}^2$ ²⁰⁸Pb target [4].

The second reaction, performed at Ganil (Caen-France) employed a SPIRAL radioactive beam of ²⁴Ne (at 190 MeV with an intensity of 1.5×10^5 pps) also impinging on a thick ²⁰⁸Pb target [5]. Recoils and coincident γ rays were detected with the VAMOS-EXO GAM set-up [6].

The data show that MNT reactions can selectively populate states of different nature and, therefore, are a good tool to study nuclear structure further away from stability.

Recent results and a comparison of the two experiments will be discussed.

References

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