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Transfer reactions with ACTAR TPC

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Direct reactions are fundamental tools to investigate the structure of exotic nuclei. Studies of nuclei far away from stability are usually performed with secondary radioactive beams, that suffer from low intensities and need to be compensated with thick targets and high efficient detection systems to increase luminosity. Active targets are invaluable devices that, among other important features, allow to reconstruct the reaction in three dimensions without loss of resolution.

The ACtive TArget and Time Projection Chamber (ACTAR TPC) detector [1-3] has been developed at GANIL to cover a broad physics programme. The device was commissioned in 2018 showing an excellent performance of the detector [4]. Since then, several experiments have been performed at GANIL. In this talk, We will present the recent results from the first transfer campaign. The main goal of the experiment was the study of the spin-orbit splitting between the proton 0p3/2-0p1/2 orbitals. The reaction ^{20}O(d,^{3}He) selectively populates single-particles states in ^{19}N. Excitation energy and angular distributions will be shown. Results were compared to shell model calculations with state-of-the art interactions.

[1] T. Roger et al. Nucl. Instrum. Meth. Phys. Res. A 895, 126 (2018).
[2] J. Pancin et al. Nucl. Instrum. Meth. Phys. Res. A 735, 532 (2014).

[3] P. Konczykowski et al., Nucl. Instrum. Meth. Phys. Res. A 927, 125 (2019).
[4] B. Mauss et al. Nucl. Instrum. Meth. Phys. Res. A 940, 498 (2019).
[5] J. Lois-Fuentes Ph.D. USC (2023)

Collaboration

for the ACTAR TPC collaboration

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