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Low-lying spectroscopy of 20O and 19O with ACTAR TPC

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Neutron-rich oxygen isotopes provide a unique probe to test state-of-the-art shell-model interactions such as SFO-tls [1] and YSOX [2]. In particular, 19O and 20O isotopes can be further employed to constrain shell evolution near the drip-lines, a crucial step towards a universal interaction. In this regard, single-nucleon transfer reactions are suitable tools to study the single-particle nature of the populated states, enabling the extraction of valuable model inputs, such as spectroscopic factors and excitation energies. To this end, neutron pick-up reactions 20O(p, d) and 20O(d, t) were performed at a beam energy of 35 AMeV at GANIL. The experimental setup featured the active target ACTAR TPC [3, 4], serving both as a thick gaseous target and as a detection medium for particle tracking, resulting in an overall enhancement of the experimental resolution compared to a conventional thick-target experiment. Additional silicon detectors surrounding the active volume measured the residual energy of the light reaction products, enabling unambiguous particle identification (PID) [5]. This talk will present preliminary results on the low-lying spectroscopy of 19O, along with a comparison to theoretical shell-model calculations and an analysis of the N = 8 shell gap behaviour. Additionally, the inelastic scattering 20O(d, d′) data have been analyzed, and early results on the inelastic excitations will also be discussed.

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