THE γ-DECAY BEHAVIOUR OF THE PDR IN ^{92,94}MO

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The Pygmy Dipole Resonance (PDR) has attracted a lot of interest both in experimental and theoretical nuclear physics [1]. However, some key observables crucial to understanding its nature are still not easily accessible. The γ-decay branching of the PDR to excited states, which is a sensitive measure of the wave function, is such an observable.

The new setup SONIC@HORUS at the Institute for Nuclear Physics in Cologne was developed to investigate this decay branching using the particle-γ-coincidence technique. The detector array is equipped with silicon and HPGe detectors to measure the energy of ejectiles and γ-rays with high resolution. Since the particle detectors are capable of distinguishing light ejectiles by using the ΔE-E-technique, inelastic scattering experiments and transfer reactions with p, d, and α-particles can be performed at the 10 MV FN Tandem accelerator.

Detailed results of a ^{92}Mo(p,p'γ) experiment at E_p=10.4 MeV will be shown, focussing on the state-by-state γ-decay behaviour of dipole states in the PDR region as well as a comparison to theoretical calculations.

Recently, an additional (p,p'γ) experiment has been performed on the neighbouring isotope ^{94}Mo at E_p=13.5 MeV, and preliminary γ-decay branching ratios for several states will be shown. Individual branching ratios for two states, derived from an (α,α'γ) experiment at E_α=136 MeV [2], and mean branching ratios deduced from a (γ,γ') experiment at the HIγS facility [3], will serve as a benchmark for our presented results.

We also performed a ^{119}Sn(d,pγ)^{120}Sn one-neutron transfer experiment to explore this additional reaction mechanism for PDR states, as these types of experiments should be very sensitive to neutron single-particle excitations. A clear excitation of PDR states could already be deduced in the online spectra, and results of further investigations will be shown.

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REFERENCES

[1] D. Savran, T. Aumann, and A. Zilges, PPNP **70** (2013) 210
[2] V. Derya *et al.*, NPA **906** (2013) 94
[3] C. Romig *et al.*, PRC **88** (2013) 044331