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Studying the microscopic structure of the low-energy electric dipole response of ^{120}Sn

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The microscopic structure of the low-energy electric dipole response, commonly denoted as the Pygmy Dipole Resonance (PDR), was studied for ^{120}Sn in a ^{119}Sn$(d, p\gamma)^{120}$Sn experiment, using the SONIC@HORUS setup at the University of Cologne. Unprecedented access to the single-particle structure of excited 1^- states below and around the neutron-separation threshold was obtained by comparing experimental data to predictions from a novel theoretical approach. The approach combines detailed nuclear structure input from energy-density functional (EDF) plus quasiparticle-phonon model (QPM) theory with reaction theory to obtain a consistent description of both the structure and reaction aspects of the process. Similar to the recently investigated case of ^{208}Pb [1], the combined results show that the EDF+QPM approach correctly predicts the energies of the relevant neutron single-particle levels in ^{120}Sn and the fragmentation of the observed spectroscopic strength, and that the understanding of one-particle-one-hole structures of the 1^- states in the PDR region is crucial to reliably predict properties of the PDR. Furthermore, the EDF+QPM approach predicts the increasing contribution of complex configurations to the PDR states at higher excitation energies, which has been recently suggested as a cause for the discrepancy between (γ, γ') and (p, p') experiments [2,3]. This contribution will present the joint experimental and theoretical effort and discuss further applications, allowing a detailed study of the microscopic structure of the PDR along the isotopic chart.

[1] M. Spieker *et al.*, Phys. Rev. Lett. **125**, 102503 (2020)
[2] S. Bassauer *et al.*, Phys. Rev. C **102**, 034327 (2020)
[3] M. Müscher *et al.*, Phys. Rev. C **102**, 014317 (2020)

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