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Investigation of the character of the PDR in 96Mo via single-nucleon transfer reactions

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The pygmy dipole resonance (PDR), known as the low-lying E1 strength, is characterized by a concentration of 1− states below and around the neutron threshold. This phenomenon has been observed in neutron-rich nuclei and its investigation holds potential implications for the nuclear equation of state and nucleosynthesis. Since its initial discovery, a significant amount of research has been dedicated to comprehending the nature of the PDR, both theoretically and experimentally. An important aspect under scrutiny is the extent to which the dipole states exhibit collective behavior. This study aims to examine the nature of the PDR, specifically focusing on determining whether the 1− states are single-particle or collective in character. To achieve this, one-step transfer reactions, which possess the ability to selectively excite single-particle states, are employed as the preferred probing method. The nucleus of interest is populated using the 97Mo(p, d)96Mo reaction and its conjugate reaction, 95Mo(d, p)96Mo. The experimental investigation is carried out at the INFN-LNS facility in Catania, Italy. The resulting ejectiles are subjected to momentum analysis using the MAGNEX spectrometer and subsequently detected by its focal-plane detector. From a simplistic shell model, single-particle configurations that populate 1- and 2+ states were identified. The contribution of each configuration was determined via the use of the MDA. In this talk the results from the (p,d) will be presented together with theoretical interpretation within the QPM framework.

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