RECENT RESULTS ON THE PYGMY DIPOLE RESONANCE STUDIED VIA HADRONIC PROBES AT INTERMEDIATE ENERGY

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Detailed knowledge of the low-lying electric dipole (E1) response of atomic nuclei including specific features like the decay behavior, isospin properties, and collectivity leads to a deeper understanding of the excitation modes that contribute to the overall E1 strength. This knowledge might also help to answer fundamental questions concerning, e.g., the equation-of-state of nuclear matter and reaction rates relevant for nucleosynthesis reaction networks.

One main component of the low-lying E1 strength is the so-called Pygmy Dipole Resonance (PDR) which is addressed with the experiments presented in this contribution. It has been studied using various experimental methods [1], including systematic (α,α'γ) and (γ,γ') experiments on A = 48−140 mass nuclei [1-6] as well as (^{17}O,^{17}O'γ) experiments [7,8]. Recently, protons at 80 MeV/u were used as a complementary hadronic probe in a (p,p'γ) coincidence experiment on the semi-magic nucleus ^{140}Ce. This experiment was performed at KVI in Groningen, The Netherlands. Due to a higher energy per nucleon compared to the previously used α particles of 34 MeV/u, the proton-induced reaction is sensitive to more inner parts of the dipole transition density. Results of this experiment including DWBA calculations will be presented and discussed in the context of previous results of experiments using hadronic and electromagnetic probes.

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