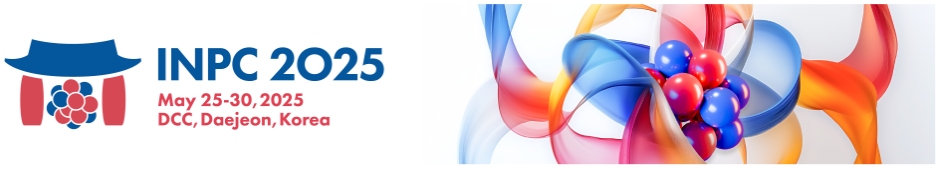

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Pygmy Dipole Resonances within a semiclassical coupled channel model

Friday, 30 May 2025 11:00 (25 minutes)

Nuclei with neutron excess, along and far from the stability valley, shows up a hump, in the excitation region close to the neutron emission threshold, in the isovector dipole strength distribution. This is well separated from the Isovector Giant Dipole Resonance (IVGDR) and with a very small percentage of Energy Weighted Sum Rule (EWSR). This new excitation modes, the so-called Pygmy Dipole Resonance (PDR) has been extensively investigated both experimental and theoretical point of view. Extensive and detailed studies of this mode have been the subject of many experimental and theoretical reviews [1-5].
One of the main characteristic of the mode is its strong isospin mixing which allow the excitation of these states via both isoscalar and isovector probes. Together with the standard electromagnetic (γ, γ') process, these dipole states have been studied also with isoscalar probes like alpha-particle, ^{17}O, ^{12}C and (p, p') reactions. The use of these different ways of investigation, often on the same nucleus, has brought new informations on the nature and excitation of these low-lying dipole mode.
Therefore, the calculation of the inelastic cross section is of paramount importance for the description the low-lying dipole excitation with isoscalar probes. The use of a semiclassical coupled channel models, based on realistic radial form factors, calculate with a double folding procedure, has revealed a good method to describe the excitation of the PDR. A description of the method and its applications to several nuclear systems will be the content of this contribution.

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