

Frontiers in Gamma Ray Spectroscopy

FIG18

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Calculation of resonances in weakly bound exotic nuclei

Content :

Study of the structure of nuclei having very small binding energy emerged has been emerging as one of the most interesting branches of physics. The exotic halo nuclei are very weakly bound, having extended low density tail and significantly large rms matter radii, are being studied extensively with the advent of RIB facilities. We apply a novel technique to study resonances in nuclei having at least one bound state as well as those without having bound ground state. For the purpose SSQM formalism will be invoked to the HHE method for few-body nuclear system in the mass region $A=6-24$. Using hyperspherical coordinates we first solve for the ground state of the few-body system having a stable core plus one or two loosely bound (binding energy typically $< 1\text{MeV}$) valence nucleon choosing phenomenological nucleon-nucleon and nucleon-nucleus potential to get the ground state energy and wave function. This wave function will then be used to construct a one parameter family of Iso-spectral potential. The parameter will be adjusted to develop a deep well followed by a positive barrier, having enhanced capability of trapping particles with energy $E>0$. Computed resonance energies and widths are compared with the available experimental results with excellent agreement.

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