Notre Dame Science
Department of Physics

EFFECTIVE BOSON NUMBER- A FUNCTIONAL APPROACH FOR PREDICTING SEPARATION ENERGIES WITH THE IBM, APPLIED TO ZR, KR, SR ISOTOPES NEAR A=100

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Monday, November 21, 2011
4:00 P.M. NSH 124

This work uses non-integer effective boson numbers in the Interacting Boson Model (IBM1) to predict two neutron separation energies for even-even neutron-rich zirconium, strontium, and krypton isotopes. We determine the functional forms of binding energy and excitation energies as a function of boson number for a given choice of IBM parameters that give a good overall description of the experimental spectra of the isotopic chain. The energy of the first excited 2+ level is then used to extract an effective boson number for a given nucleus, that is in turn used to calculate the separation energies. This method accounts for complex interactions among valence nucleons around magic and semi-magic nuclei and successfully predicts the phase transitional signature in separation energies around A=100 for $^{92\text{-}108}$Zr, $^{90\text{-}104}$Sr, and $^{86\text{-}96}$Kr.

Nuclear Seminar

All interested persons are cordially invited to attend.