Single-particle and collective motions from nuclear many-body correlation (PCM2025)



Contribution ID: 77

Type: not specified

Weak-binding and continuum-coupling effects on the structure of neutron-rich nuclei

The structure of nuclei far from the stability line is a central theme of research in Nuclear Physics. Key to this program has been the worldwide development of advanced radioactive beam facilities and novel detector systems, which provide the tools needed to produce and study these exotic nuclei.

One of the intellectual drivers guiding current experimental and theoretical research concerns the effects of weak binding and coupling to the continuum on the evolution of collective motion towards the neutron dripline.

We have studied the coupling of weakly bound (halo) valence neutrons to a deformed core using a Weak-Coupling phenomenological approach and the Particle-Rotor model. Despite its simplicity, our phenomenological model captures the main physical ingredients and provides a framework that allows us to examine possible coupling schemes involving a core and halo.

I will illustrate our results using the known properties of 38,40 Mg to discuss the impact of weak binding on the low-lying excitation spectrum, one proton removal reaction cross sections and transition probabilities.

I will also discuss some ideas for future experiments that will shed further light on this interesting topic.

*This material is based upon work supported by the U.S. DOE, Office of Science, Office of Nuclear Physics, under Contract No. DE-AC05-00OR22725

Type of contribution

poster

Are you a student or postdoc?

no

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Session Classification: session #12