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Gamow shell model calculations of resonance states of drip line nuclei

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The lightest nuclei, encapsulating some of the most fascinating systems in the nuclear landscape, have sparked considerable interest in the nuclear physics community. Their structures are characteristically intricate and complex, particularly evident in the ^{4,5}He nuclei. These structures can be meticulously expounded with the implementation of realistic interactions in a no-core framework, illuminating the nuclei's internal dynamics. Light nuclei, accessible up to and even beyond drip-lines, provide perfect experimental and theoretical laboratories to probe the nucleon-nucleon interaction, contributing vital insights into the nature of nuclear forces and structures.

Recent years have witnessed significant strides in the Gamow shell model calculations of nuclear structures. These advancements provide the foundation for the dissection of complex nuclear phenomena, fostering a deeper understanding of the physical world at the nuclear level. This presentation focuses on the application of the Gamow shell model in studying the properties of weakly-bound and unbound nuclei. The Gamow shell model, endowed with resonance and continuum degrees of freedom, offers a potent tool for exploring the realm of weakly-bound systems and beyond.

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