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Near threshold resonances and exotic decay of ^{11}Be

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The ^{11}Be neutron halo nucleus decays into ^{10}Be with a rate that exceeds expectations. Neutron disappearance into dark matter, beta decay of a halo neutron, or beta delayed proton decay have been offered as explanations. The discovery of an exotic near-threshold resonance supports the latter. The observations, however, also highlight a remarkable and not fully understood manifestation of quantum many-body physics near decay thresholds that includes restructuring of states due to decay, quantum features of sequential decay, and interplay between different channels including alpha and neutron decays. In this presentation along with the specific case of ^{11}Be we discuss the theory of weakly bound and unbound quantum many-body systems.

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