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## A Hybrid Configuration Mixing Model for the Low-lying States of Unstable Nuclei

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We have recently introduced a new approach, which is meant to be a step towards complete low-lying spectroscopy of odd-mass nuclei. In the first applications, we have limited ourselves to a magic core plus an extra neutron or proton. The model does not contain any free adjustable parameter, but is based on a Hartree Fock (HF) description of particle states and Random Phase Approximation (RPA) calculations for core excitations: the coupling between these states is treated self-consistently and the resulting Hamiltonian is solved exactly. The model is an extension of previous Particle-Vibration Coupling (PVC) calculations. However, at variance with these, it also includes the coupling with non-collective core excitations and can also describe states of shell-model type like 2 particle-1 hole.

The underlying spirit is of course related to filling the gap between shell model-like approaches for low-lying spectroscopy, and the traditional HF+RPA approach to high-lying states like giant resonances. At present, we apply this model by using Skyrme functionals.

We shall discuss the results for neutron-rich nuclei in the Ca region and around  $^{132}\text{Sn}$ . In these cases the agreement with existing experimental data is generally good. We shall also demonstrate the usefulness of such a model for low-lying spectroscopy of more neutron-rich, weakly bound systems.

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