Importance of Coriolis interaction and pseudo–spin doublets in deformed proton emitters

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Proton emitters lie beyond the proton drip–line, and are a unique possibility of observing Nilsson resonances. In fact, the experimental data on proton radioactivity in regions where theoretical models predict a certain deformation for the nucleus, could be interpreted assuming that the proton was in a single particle resonance state, in the field of the daughter nucleus. The escape energy is so low, that no mixing with states higher up in the continuum is expected.

Having this in mind, we have developed a model to describe decay from odd-even and odd–odd nuclei, based on the exact calculation of Nilsson resonance states and their corresponding half–lives. An important aspect of the calculation is the inclusion of the nuclear structure properties of the core. Taking into account the rotational spectrum of the daughter nucleus, leads to the treatment of the Coriolis coupling term in the nuclear Hamiltonian. We have found, that the correct approach to this problem cannot be dissociated from the exact treatment of the pairing residual interaction. The application of the model to pseudo–spin doublets will be discussed.