Microscopic description of triaxially deformed odd-odd proton emitters

P. Arumugam[1], P. Siwach[2], E. Maglione[3] and L.S. Ferreira[3]

[1] *Department of Physics, Indian Institute of Technology Roorkee, Roorkee 247667, India*
[2] *Department of Physics, University of Wisconsin, Madison, Wisconsin 53706, USA*
[3] *Centro de Física e Engenharia de Materiais Avançados CeFEMA, and Instituto Superior Técnico, Universidade de Lisboa, Avenida Rovisco Pais, P1049-001 Lisbon, Portugal*

Contact e-mail: arumugam@ph.iitr.ac.in

The nonadiabatic quasiparticle approach [1] to study the triaxially deformed odd-odd proton emitters is a powerful tool to unveil the structure of exotic nuclei near the proton drip line. The proton decay properties of nuclei in this region influence the path of the astrophysical *rp*-process [2, 3] significantly. We study these nuclei with the newly developed modified particle rotor model (MPRM) with two quasiparticles and a triaxial rotor. One of the major advantages of this approach is that the matrix elements of the coupled system explicitly carry the rotor's matrix element in the laboratory frame [4]. This provides the opportunity to utilize the rotor's experimental data, which in turn reduces the dependence on several adjustable parameters. The residual neutron-proton interaction is also considered within an appropriate formalism. The half-life of the proton emitter is calculated in a microscopic manner by coupling the parent and daughter wave functions. The information about the odd neutron is gathered from MPRM [4] which has been very successful in explaining the features of triaxially deformed odd-A proton emitters [5–6]. The configuration assignment of triaxially deformed odd-odd nuclei is done by looking into the rotational energies and the proton decay half-lives of the corresponding states, simultaneously. Important results in bringing out the necessity of a nonadiabatic approach while explaining the measured structure and decay data of 108I, including the fine structure in 140Ho and 144Tm, will be discussed.

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