Nuclear structure properties through fine structure in proton emission

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The proton emission phenomenon occurring in the atomic nuclei present at the proton drip line paves a better way to understanding the nuclear structure properties in extreme conditions [1, 2, 3, 4]. When a proton unbound nucleus emits a proton, in most cases, it populates the ground state of the daughter nucleus. However, given the favorable energy conditions, branching to the excited states of the daughter nucleus can also occur, leading to the fine structure in proton emission spectrum. This fine structure data is found to be very crucial in assigning the spin and parity to the ground and excited states of such nuclei [5]. However, such assignments are challenging due to the scarcity of data in this exotic region. Therefore, reliable theoretical approaches which minimally depend on the freely adjustable parameters are required. One such approach, namely, the nonadiabatic quasiparticle approach, has successfully interpreted the proton emission data in axial odd-A, odd-odd, and triaxial odd-A nuclei [6]. Recently, this approach has been extended to study the triaxial odd-odd proton emitters [7, 8]. In this talk, a detailed study of fine structure in ^{144}Tm proton emitter utilizing the nonadiabatic quasiparticle approach will be presented.

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