

Optical spectroscopy of triply charged thorium

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Atomic nuclei usually possess excitation energies in the keV to MeV range. A notable exception is the ^{229}Th nucleus where the energy splitting of the ground state doublet is less than 10 eV. This fortuitous coincidence offers prospects for a next-generation clock and for a test of temporal variation of fundamental constants at an unprecedented level of precision. The monovalent character of the Th^{3+} ion is favorable for the isomer level search based on the electron bridge process. Optical spectroscopy of laser cooled and crystallized triply charged ^{229}Th in a linear Paul trap will be presented. The nuclear excitation from the ground-electronic level of a single trapped, cold $^{229}\text{Th}^{3+}$ ion is expected to be an ideal system for metrological applications.