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Dark matter searches with 229mTh isomer

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The long-lived isomer in 229Th, first studied in the 1970s as an exotic feature in nuclear physics, is the only known candidate for the development of a nuclear clock. The transition energy between the ground and first excited states of 229Th is unusually small and amounts to only several eV, making it the only laser-accessible nuclear transition. An optical clock based on this transition is expected to be a very sensitive probe for variation of fundamental constants, searches for violations of Einstein's equivalence principle, and ultralight dark matter. I will discuss these fundamental physics opportunities with a nuclear clock on the ground and in space.

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