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Overview of 229mTh based nuclear clock

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Nuclear transitions have energy scale a few orders of magnitude larger than atomic ones. This mismatch of energy scales prevented to use laser sources for excitation of nuclear levels. In the 70th it was deduced that 229Th isotope might have an isomeric state at the energy of a few eVs. Recently, with development of the optical frequency combs, this state stimulated a broad interest, in particular regarding a possible nuclear clock application, allowing to enhance the atomic clock precision and test correlations between fundamental forces. In the last decade many experiments on the 229mTh isomer were performed, including TORIO-229 experiment of INFN, confirming the past expectations. In this presentation an overview of the current knowledge on the lowest nuclear isomer 229mTh will be presented as well as its possible future applications.

Primary author: Dr OSIPENKO, Mikhail (GE)

Presenter: Dr OSIPENKO, Mikhail (GE)

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