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Searches for ultralight dark matter: from the lab to space

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UltraLight Dark Matter (ULDM) is a class of bosonic Dark Matter candidates whose mass is below the electronVolt. Such Dark matter candidates have become very popular in the last decade, in particular because of the lack of direct detection of WIMPs with particles accelerators. The most studied ULDM candidates are the axion (pseudo-scalar particle), the dilaton (a scalar particle) and the hidden photon (a spin 1 particle). The phenomenology of ULDM is very rich and in particular, it can be searched for using atomic sensors like atomic clocks, cavities, atom interferometry, etc... In this talk, we will review the basic properties of such dark matter candidates and discuss some of their theoretical properties. We will then focus on experimental results and also present some new proposals of experiments specifically designed to search for such new fields.

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