Direct Dark Matter Search with XENON Project

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Understanding the properties of dark matter particles is a fundamental problem in particle physics and cosmology. Its Direct Detection (the search of dark matter particle scattering off nuclei target using ultra-low background detector) is one of the most promising technologies to decipher the nature of dark matter. Dual-phase Liquid Xenon TPCs, in particular with the XENON1T detector, have done much to push the sensitivity bounds for detection of a broad range of WIMP masses, from O(100) MeV up to the TeV scale, by combining different analysis techniques. Its upgrade, XENONnT, that will start commissioning in Spring 2020, will increase this sensitivity by an order of magnitude.

One of those techniques is the search for a possible annual modulation of the background, which requires high stability over time of the detector. I'm currently working on the study of all parameters that can be relevant to reach the maximum stability possible.

The poster provides an introduction to the dark matter problem, it presents the XENONnT experiment and its rich physics case, finally, it shows the topics I'm contributing so far, in particular, the development of a data quality monitoring system and the study of some physical quantities that are crucial to determining the performances of the detector and its ability to detect dark matter.