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## Is or is not DAMA/LIBRA's a dark matter signal? No PANIC, the COSINUS experiment is coming

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COSINUS (Cryogenic Observatory for the search of SIgnatures seen in Underground Sites) is a new experiment aiming at the detection of galactic dark matter particles scattering off atomic nuclei. It is based on the employment of cryogenic scintillating calorimeters made up of sodium iodide crystals operated at millikelvin temperature. The construction of the impressive COSINUS infrastructure, whose installation will start soon in the National Laboratory of Gran Sasso, has been strongly motivated by a first specific goal: providing a conclusive statement on the nature of the annually modulated signal detected by the DAMA/LIBRA experiment. Such signal, measured using room temperature scintillators, is compatible with the expectations for the detection of galactic dark matter particles, but it has not been confirmed by any other experiments so far. For this reason, COSINUS is cross-checking the results of the DAMA/LIBRA experiment by using the same target material (sodium iodide) but applying a different technology. Indeed, COSINUS reconstructs the energy released in the target material by measuring both the energy converted into lattice vibrations and into scintillation light. Relying on the particle-dependent light yield, an efficient background rejection can be achieved on an event-by-event basis. In this talk, we will provide an update on the status of the COSINUS experiment and on the last results of our detector design optimisation studies, with a particular focus on the COSINUS phenomenology of detection and on the description of the relevant parameters which enter in the comparison among the several NaI-based experimental results.

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