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Updated results on annual modulation with three years of data from ANAIS-112, present status and prospects

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DAMA/LIBRA observation of an annual modulation in the low energy detection rate compatible with that expected for dark matter has accumulated evidence for more than twenty years. It is the only hint about a positive identification of the dark matter, but it is in strong tension with the negative results of other experiments. However, this comparison depends on the models assumed for the dark matter particle and its velocity distribution in the galactic halo. ANAIS-112, using the same target material than DAMA/LIBRA, NaI(Tl), can perform a model independent test. ANAIS-112 is taking data smoothly with excellent performance since August 2017, and is leading the efforts within the international dark matter community with this goal, according to the last released results. We will present the results of a reanalysis of the first 3 years data using new filtering protocols based on machine-learning techniques, which are compatible with the absence of modulation and incompatible with DAMA/LIBRA for a sensitivity of almost 3σ C.L., with the potential to reach a 5σ level by the end of 2025. The main systematics in the comparison between DAMA/LIBRA result and other experiments using NaI(Tl) is the scintillation quenching factor. The impact of different scintillation quenching factors in the comparison between ANAIS-112 and DAMA/LIBRA will also be addressed in the talk. Finally, the present status and prospects of the experiment will be discussed.

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