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Background model of the ANAIS-112 dark matter experiment

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The ANAIS-112 experiment is intended to test the observation of an annual modulation signal by the DAMA/LIBRA experiment using 112.5 kg of NaI(Tl) detectors operated in the Canfranc Underground Laboratory (Spain). Data taking is going on since August, 2017 and annual modulation results from the analysis of three years of data have been presented, being compatible with the absence of modulation.

A complete study of the ANAIS-112 detector background was carried out before unblinding data for the first modulation analysis using the first year of data. A background model was developed for each detector from the direct measurement of primordial and cosmogenic activity in crystals and other components and Monte Carlo simulation. The knowledge of some cosmogenic isotopes activities considered in this model has been improved by profiting from the large accumulated three-year exposure, and using only events outside the Region of Interest, has led to a better explanation of the detector background time evolution. These background studies have been relevant to understand the different background components and to predict sensitivity as well as to model the time evolution considered in the annual modulation analysis.

Here, the ANAIS-112 background model will be firstly described; then, considering different analysis conditions and energy ranges, the comparison of model and measurements for energy spectra and counting rate time evolution for three years of data will be discussed.

Reference to paper (DOI or arXiv)

Your gender (free text)

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