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Overview of the background reduction techniques applied in the SoLid experiment

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SoLid is a very short baseline reactor antineutrino experiment, designed to investigate the sterile neutrino hypothesis. The measurement of the reactor antineutrino
flux is based on the detection of an inverse beta decay (IBD) reaction in which the antineutrinos interact with a proton from the detector material. This IBD event results in a positron that creates scintillation light in the SoLid detector's
PVT cubes and a neutron that is captured, after thermalization, by a 6Li doped ZnS layer which results in a second, delayed light signal.

The fact that the SoLid experiment is located in the close proximity of a nuclear reactor brings along some typical types of backgrounds. Examples of these are environmental neutrons and reactor gamma rays, of which the latter generate a high level of accidental background, since their signature can hardly be discriminated from an IBD positron interaction. Secondly, because the experiment is conducted without overburden, an important background component is induced by cosmic muons. These high
energetic particles create spallation neutrons in or close to the detector and consequently contribute to the correlated backgrounds of the experiment. Therefore, a large part of SoLid analyses focusses on techniques to tackle these various types of backgrounds.

This poster will show a comprehensive overview of the background reduction methods, like they were applied on the first data set of the SoLid experiment.

Primary author: DE ROECK, Albert (CERN)

Presenter: MICHIELS, Ianthe

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