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## Monte Carlo simulation of background components in low level Germanium spectrometry

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This talk presents the decomposition of the background spectra of the 4 screening detectors GeMPI 1 - 4 at the Gran Sasso Underground Laboratory (LNGS) using Monte Carlo simulations in the Geant4 based framework MaGe. The GeMPI detectors are low background Ge spectrometers located at a depth of 3500 m.w.e. and achieve extremely high sensitivities in material screening at a level of  $\mu\text{Bq/kg}$ . They are used to test material samples on their suitability to use in rare event experiments.

In the simulations muons, neutrons and tiny radioactive contaminations of the detector and shielding materials are investigated as possible sources of background radiation. It was found that the Pb210 contaminations in the detector shield and the neutrons coming from radioactive decays in the surrounding rock have the highest impact on the background spectra.

A detailed understanding of the composition of the background spectra was achieved, allowing for the proposal of two new shield designs for future GeMPI-like detectors. With these new shield designs a reduction of the integrated background count rate to 10 counts/d/kg in the interval [40,2700] keV is possible.

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