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Sensitivity to Radon induced background in SuperNEMO

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Based on the well-known NEMO-3 technique, the SuperNEMO detector combines tracking and calorimetric measurements to search for the hypothetical $0\nu\beta\beta$ process. These unique features allow a full reconstruction of the kinematic of events and discrimination among different mechanisms behind $0\nu\beta\beta$. The knowledge of the complete topology of the events also allows to have independant analysis channels to measure the different background contributions.
The SuperNEMO Demonstrator Module is installed at Laboratoire Souterrain de Modane (LSM), under 4800 m.w.e. The ^{238}U contained in the rocks surrunding the detector emanate ^{222}Rn that can enter and bind onto the different parts of the detector. The γ and e^- released in the ^{222}Rn decay chain, can mimic the $2e^-$ signal via Compton or Möller scatterings. To reduce the level of ^{222}Rn, an hermetic tent surrounding the detector will be intalled and flushed with ^{222}Rn-free air. The collaboration has also performed a measurement compaign to evaluate and minimise the level of intrinsic ^{222}Rn emanation from the components of the detector.
The decay chain of ^{222}Rn includes so-called Bi-Po events, where the decays $^{214}\text{Bi}\rightarrow {}^{214}\text{Po} + e^-$ and $^{214}\text{Po}\rightarrow {}^{210}\text{Pb} + \alpha$ occur with a typical time separation of 164 μs. This time correlation among the prompt e^- and the delayed α provides a very clean and sensitive measurement of ^{222}Rn level in the detector. This poster describes the reconstruction of the e-α coïncidence and the development of an analysis to measure the amount of ^{222}Rn in the SuperNEMO Demonstrator Module.

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