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Development of reconstruction and analysis tools & sensitivity study of the SuperNEMO demonstrator

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The **SuperNEMO demonstrator**'s unique design, combining both tracking and calorimetry techniques, provides essential **topological informations**. Indeed, fully reconstructing the event kinematics not only allows a powerful background discrimination but also gives access to a variety of event topologies which can be used to measure the different background contributions.

The SuperNEMO software relies on a range of algorithms to ensure a faithful event reconstruction. The improved detector performance for γ detection coupled to new **γ -reconstruction algorithms**, based on geometrical and Time-of-Flight criteria, will not only improve the measurements of the γ -emitter backgrounds (^{208}Tl , ^{214}Bi ...) but also increase the sensitivity for the search of $\beta\beta$ -decays to the excited states.

The poster will also present how the use of topological informations in **multivariate analysis** could improve the SuperNEMO demonstrator sensitivity, both for the search of the **neutrinoless double beta decay** and for the background control.

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