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Statistical methods for the new data release of GERDA

The GERDA experiment investigates lepton-number violation and whether neutrinos have a Majorana nature by searching for a rare nuclear transition called neutrinoless double beta decay (0vbb).
The statistical challenges that arise in the search for rare-processes: evaluating the discovery power, the limit setting power on the signal rate and the goodness of fit of the background for models with data sets consisting of a small number of events are discussed.
The topics selected include the systematic variations in the results due to the choice of fit models. This is investigated through Bayesian Hierarchical modelling. Order statistics and the Bayes factor are used as tools to study the background goodness of fit and the signal discovery power.

Mini-abstract

Comparison of Bayesian models for signal discovery and limit setting for the GERDA experiment

Experiment/Collaboration

GERDA

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