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Statistical Inference in Double-Beta Decay Searches

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The neutrinoless double-beta decay is a hypothetical nuclear transition predicted by most of the theories that explain the origin of neutrino masses or the dominance of matter over antimatter in our Universe. The primary experimental signature for this transition is an excess of monoenergetic events. While the statistical problem can be traced back to the simple search for a peak over some background, new challenges arise because of the extremely low counting rates expected in the next-generation experiments, in which a single signal count could lead to a discovery. The methods used in the field to evaluate the sensitivity of an experiment, handle the systematic uncertainties and derive constraints on the signal strength will be discussed.

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