Contribution ID: **213** Type: **Contributed talk**

Discovery probability of next-generation neutrinoless double-beta decay experiments

Monday 24 July 2017 16:45 (15 minutes)

The Bayesian discovery probability of future experiments searching for neutrinoless double-β decay is evaluated under the popular assumption that neutrinos are their own antiparticles. A Bayesian global fit is performed to construct a probability distribution for the effective Majorana mass, the observable of interest for these experiments. This probability distribution is then combined with the sensitivity of each experiment derived from a heuristic counting analysis. The discovery probability strongly depends on whether the neutrino mass ordering is normal or inverted, and is found to be higher then previously considered for both mass orderings. For the inverted ordering, next-generation experiments are likely to observe a signal already during their first operational stages. Even for the normal ordering, the probability of discovering neutrinoless double-β decay reaches $\sim$50% in the most promising experiments.

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Session Classification: Neutrino Parallel

Track Classification: Neutrinos