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Search for neutrinoless double-beta decays in Ge-76 in the LEGEND experiment

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The observation of neutrinoless double-beta ($0\nu\beta\beta$) decay would establish both the violation of lepton number conservation and the Majorana nature of the neutrino. It would also constrain the neutrino mass scale in the picture of light-neutrino exchange.
The best limit on the $0\nu\beta\beta$ half-life of ^{76}Ge, one of the most promising isotopes to search for it, is $1.8 \cdot 10^{26}$ at 90% C.L..
LEGEND follows the GERDA and MAJORANA DEMONSTRATOR collaborations, which have achieved the lowest background and best energy resolution in the signal region of any experiment searching for $0\nu\beta\beta$.
Building on their success, the LEGEND collaboration pursues a tonne-scale ^{76}Ge experiment in a staged approach, properly using existing resources to expedite physics results.
The first stage, LEGEND-200, is currently being installed at the Laboratori Nazionali del Gran Sasso (Italy) in the existing GERDA infrastructure.
The half-life discovery potential of the proposed tonne-scale stage, LEGEND-1000, lies beyond 10^{28} years and will allow exploring the parameter space of the inverted neutrino mass ordering.

Primary author: BIANCACCI, Valentina

Presenter: BIANCACCI, Valentina

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