ID contributo: **449** Tipo: **Poster**

Performance of the Active Background Suppression of LEGEND-200 and Background Index

martedì 18 giugno 2024 17:30 (2 ore)

The discovery of neutrinoless double beta decay ($0\nu\beta\beta$) would definitively prove both that lepton number is not a fundamental symmetry in nature and that neutrinos are their own antiparticles. Furthermore, being a purely matter-creating process, it would be pivotal for our best theories of the matter-antimatter asymmetry in our universe. LEGEND (Large Enriched Germanium Experiment for Neutrinoless double beta Decay) is a multiphase program to search for ($0\nu\beta\beta$) in ^{76}Ge, the first phase of which, LEGEND-200, is currently running at LNGS in Italy with an eventual discovery sensitivity at a half-life of 10^{27} years. To reach this sensitivity LEGEND has several layers of active background mitigation to ensure backgrounds are as low as possible namely: a multiplicity cut for events in multiple detectors, the Liquid Argon coincidence cut and Pulse Shape Discrimination in the individual detectors. Legend has been in stable data taking now for more than 1 year with over 100 kg of Ge detectors and here the overall performance of the active background suppression in terms of the background index will be presented alongside the unblinding strategy and methodology.

This work is supported by the U.S. DOE and the NSF, the LANL, ORNL and LBNL LDRD programs; the European ERC and Horizon programs; the German DFG, BMBF, and MPG; the Italian INFN; the Polish NCN and MNiSW; the Czech MEYS; the Slovak SRDA; the Swiss SNF; the UK STFC; the Russian RFBR; the Canadian NSERC and CFI; the LNGS, SNOLAB, and SURF facilities.

Poster prize

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Classifica Sessioni: Poster session and reception 1

Classificazione della track: Neutrinoless Double Beta Decay