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## The LEGEND-200 Liquid Argon Instrumentation: From a simple veto to a full-fledged detector

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LEGEND-200 at LNGS is an experiment designed to search for neutrinoless double beta decay of Ge-76 by operating up to 200 kg of enriched Ge-detectors in liquid argon (LAr). To achieve ultra-low backgrounds, the LAr is instrumented to detect scintillation light emitted upon interactions with ionizing radiation, thus tagging and rejecting backgrounds. The LAr scintillation light is detected with wavelength-shifting fibers coupled to SiPM arrays. We demonstrate the high photoelectron (p.e.) resolution and low noise level of the SiPM signals. We also present the results of special calibration runs performed to determine the p.e. yield and background suppression factors. Maximized geometrical coverage and wavelength conversion efficiency result in a high p.e. yield, which in turn enables effective particle discrimination. We illustrate the suppression performance using K-lines and Ra-226 calibration data. Furthermore, we present the additional LAr DAQ trigger which allows the investigation of time-correlated backgrounds, such as BiPo-214 and muon-induced neutron captures on Ar-40. This, together with the particle discrimination capability, elevates the LAr instrumentation from a simple veto to a full-fledged detector.

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### Submitted on behalf of a Collaboration?

Yes

**Author:** DECKERT, Rosanna (Technical University of Munich)

**Co-authors:** LEONHARDT, Andreas (Technical University of Munich); VOGL, Christoph (Technical University of Munich); ZINATULINA, Daniya (Joint Institute for Nuclear Research); TAGNANI, Diego (Roma Tre University); SHEVCHIK, Egor (Joint Institute for Nuclear Research); ARAUJO, Gabriela (University of Zurich); SALAMANNA, Giuseppe (Roma Tre University); ABRITTA, Igor (Roma Tre University); GUSEV, Konstantin (Joint Institute for Nuclear Research, Technical University of Munich); PAPP, Laszlo (Technical University of Munich); BAUDIS, Laura (University of Zurich); FOMINA, Maria (Joint Institute for Nuclear Research); SCHWARZ, Mario (Technical University of Munich); RUMYANTSEVA, Nadya (Joint Institute for Nuclear Research); BURLAC, Nina (Roma Tre University); KRAUSE, Patrick (Technical University of Munich); SCHÖNERT, Stefan (Technical University of Munich); D'ANDREA, Valerio (Roma Tre University)

**Presenter:** DECKERT, Rosanna (Technical University of Munich)

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