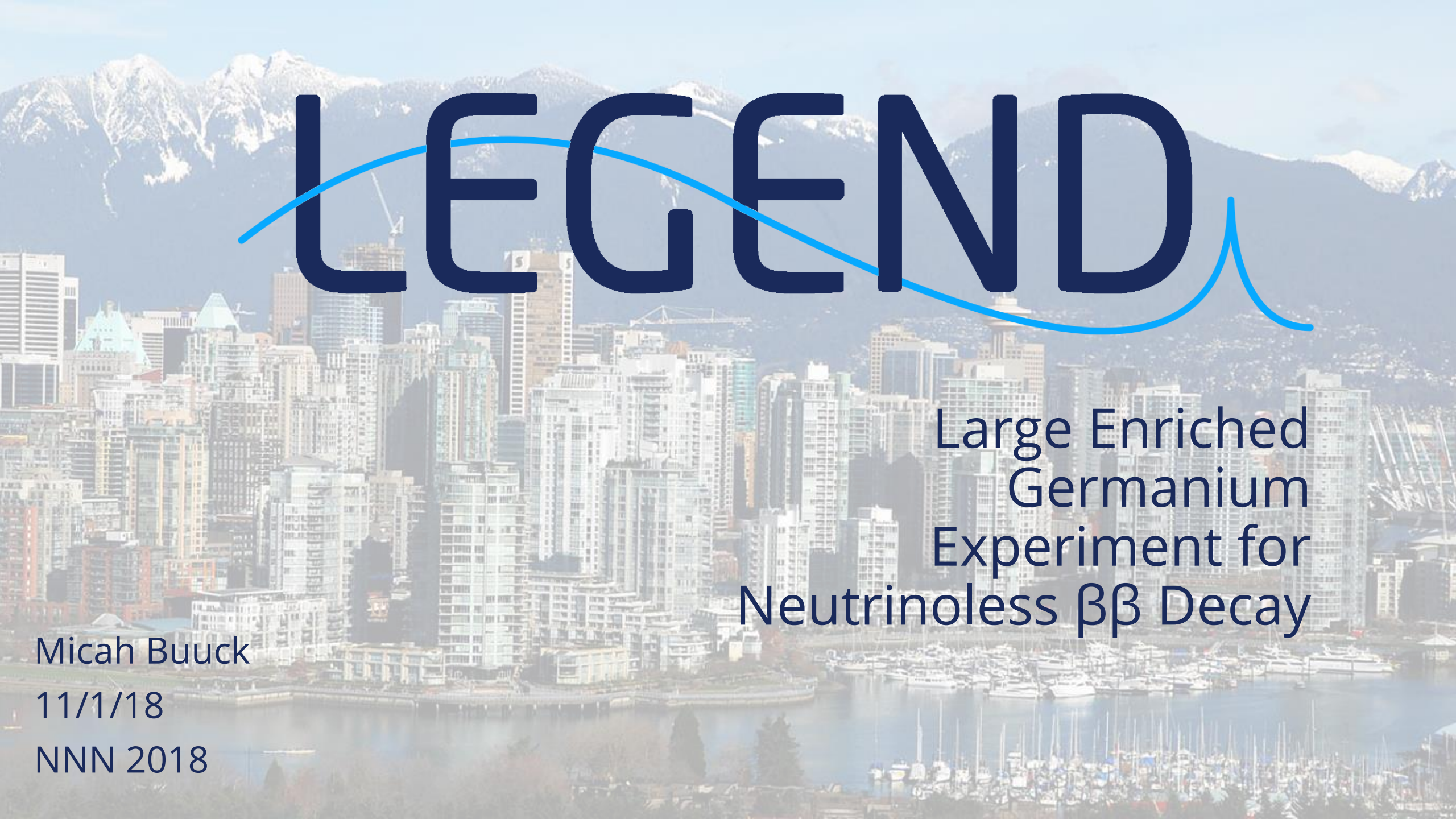

Large Enriched Germanium Experiment for Neutrinoless ββ Decay

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11/1/18

NNN 2018

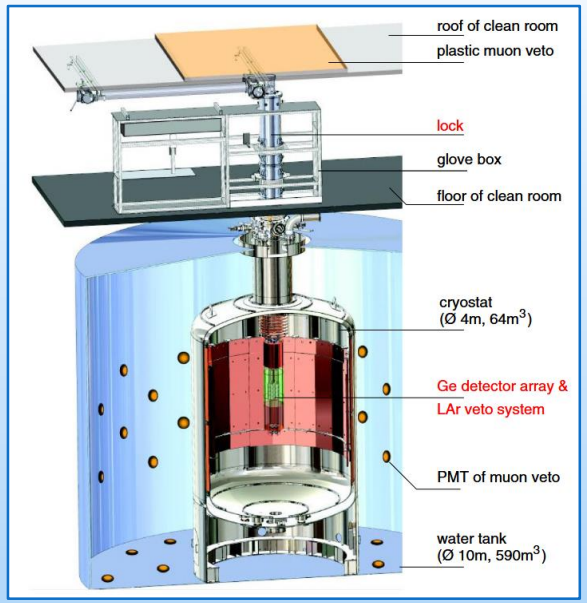
Mission Statement

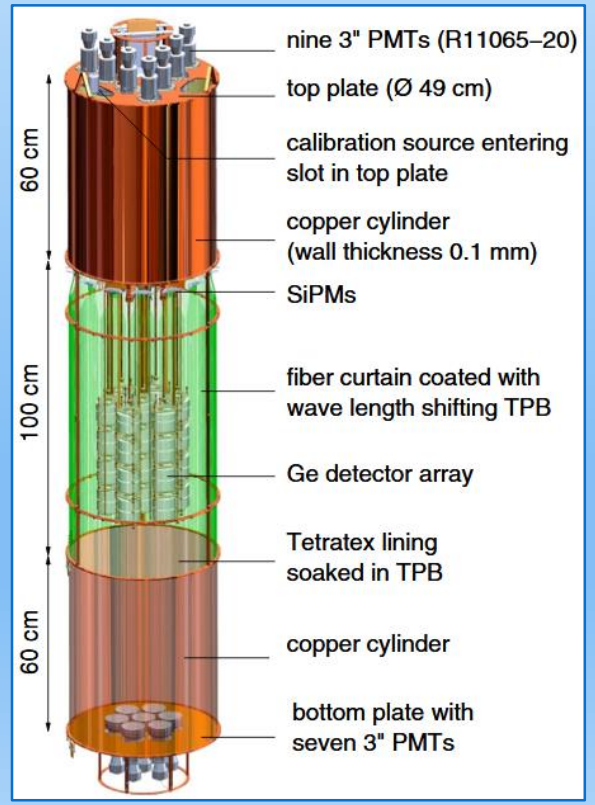
The Large Enriched Germanium Experiment for Neutrinoless Double-Beta Decay (LEGEND) aims to develop a phased, ^{76}Ge-based double-beta decay experimental program with discovery potential at a half-life significantly longer than 10^{27} years, using existing resources as appropriate to expedite physics results.

GERDA and MAJORANA have merged and expanded to create the LEGEND collaboration

GERDA

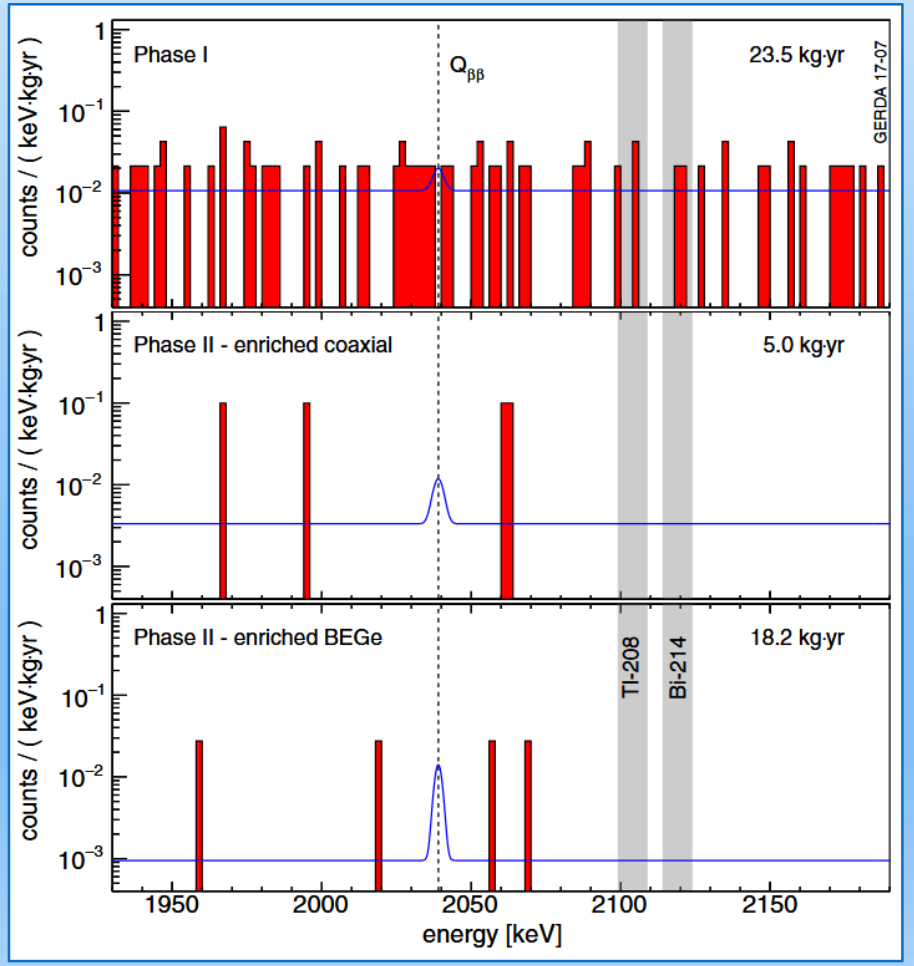
- 20 kg of ^{enr}Ge
- Detectors directly immersed in active LAr scintillating veto
- Detectors mix of coaxial and P-type Point Contact design





Results (7/2018)

Best bkg: 1.7 c/(t-y-FWHM)
Exposure: 82.4 kg-y
E res (FWHM): 2.9 keV (0.14%)
Limit on 0νββ HL: 9×10^{25} y

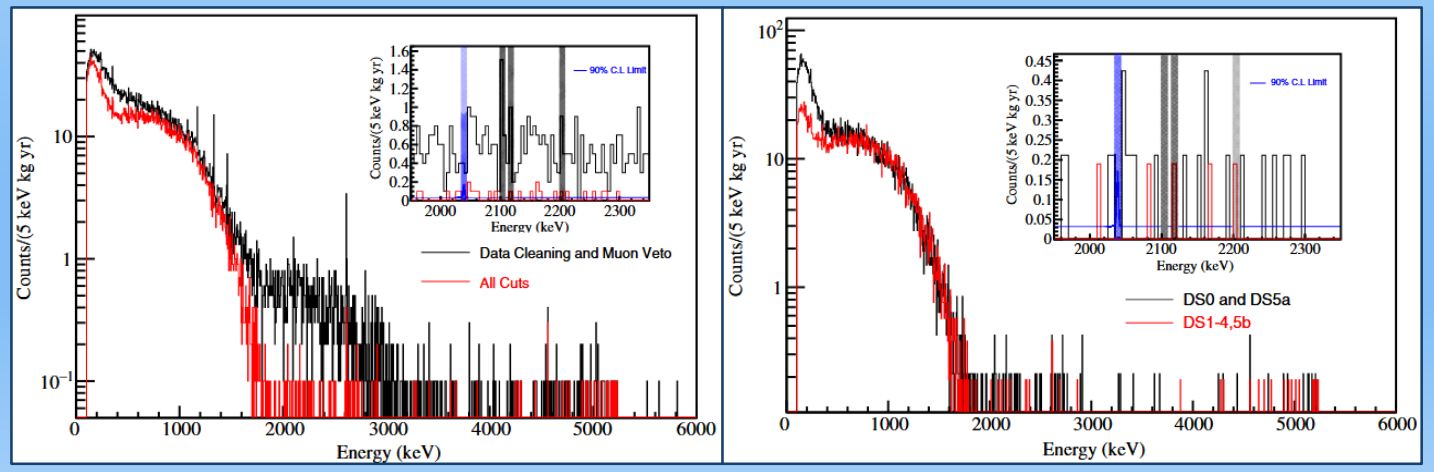


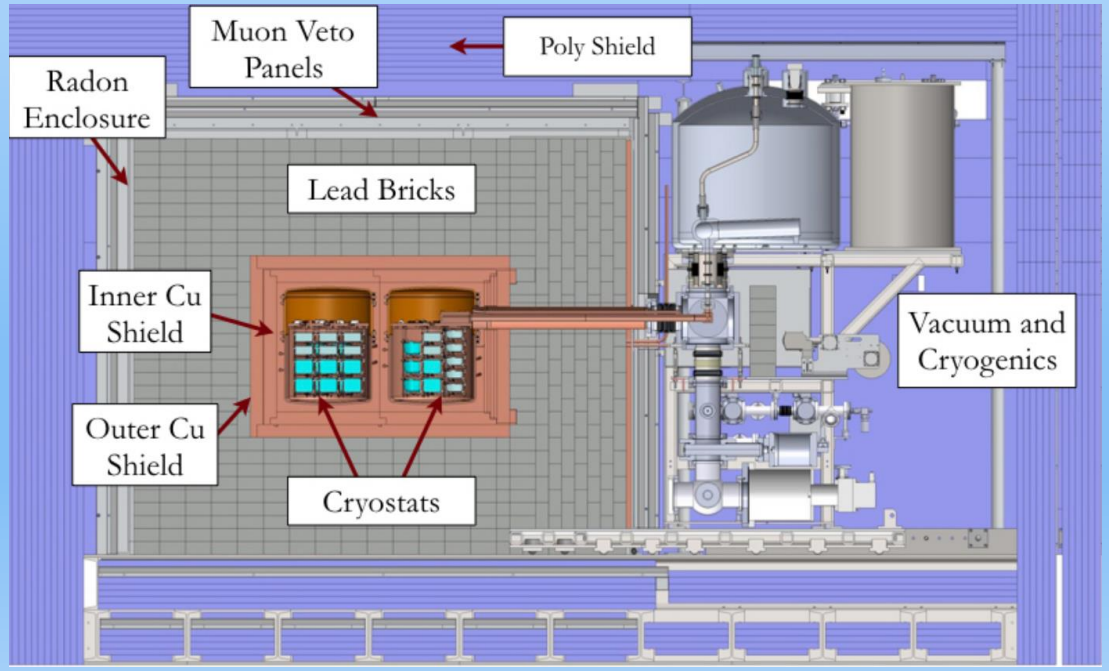
The Majorana Demonstrator

- 30 kg of ^{enr}Ge
- Detectors shielded by compact n-arresting plastic, lead, and underground electroformed copper
- All detectors P-type Point Contact
- Located at the Sanford Underground Research Facility in Lead, SD, USA

Results (7/2018)

Best background: 11.9 c/(t-y-FWHM)
Exposure: 26 kg-y
Energy res (FWHM): 2.5 keV (0.12%)
Limit on 0νββ HL: 2.7×10^{25} y





The Goal

- LEGEND 1T aims to achieve a sensitivity to 0νββ decay with a half-life longer than 10^{27} years
- This goal can be achieved by increasing sensitive exposure by ~20x, and reducing the background rate by ~20x over GERDA/MAJORANA

- How will we do this? Visit my poster to find out more!