

# GERDA Phase II Detectors and Acceptance Tests

Victoria Wagner

for the Acceptance Tests WG  
Max-Planck-Institut für Kernphysik

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GERDA  
Acceptance Test

V. Wagner

GERDA

Phase II

*enr* BEGe

Production

Overview

Status

Acceptance Tests

Motivation

Preparation

HADES

Location

Infrastructure

Measurements

First Results

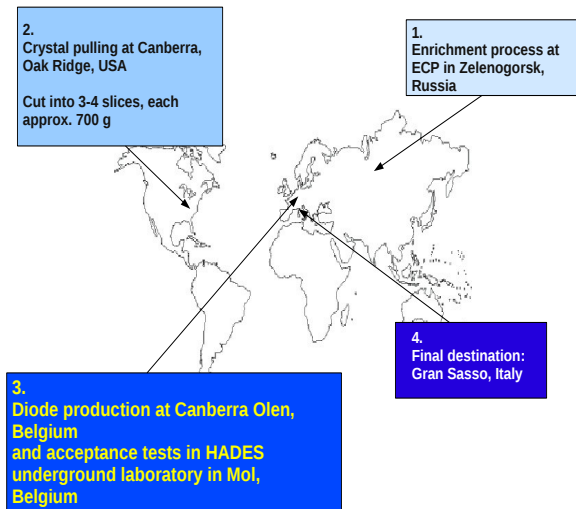
Conclusion and  
Outlook





# *enr* BEGe Detector Production

## Overview



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# Current Status of Diode Production

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Delivery of first 7 enriched BEGes by Canberra  
February 14-17 for acceptance tests in underground  
laboratory HADES



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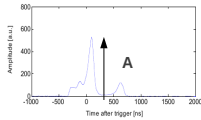
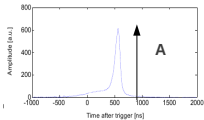
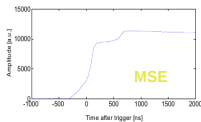
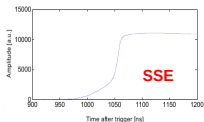
# Acceptance Tests

- ▶ A full characterization of the enriched detectors  
→ Possibility of close study of enriched detectors before deployment into GERDA
- ▶ Do the  $^{enr}$ BEGe detectors have the required characteristics for Phase II?  
→ acceptance or rejection of  $^{enr}$ BEGe detectors
- ▶ in case of rejection: send back diodes to Canberra for refurbishing/ regrowing

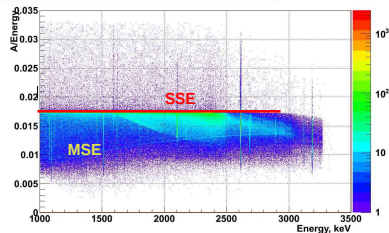


# Preparation of Acceptance Test at MPIK

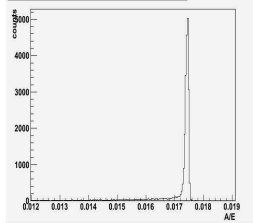
Th228 measurement with depleted BEGe for pulse shape discrimination



Th228 measurement with DD BEGe, 08.12.11 at MPIK Entries 1926697



Th228 measurement with DE BEGe, Heligoland A/E, range 180Vref - 180Vref, 08.12.11 Entries 28817



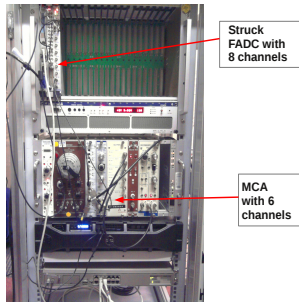




# Infrastructure in HADES

Data acquisition with two parallel systems:

- ▶ FADC: pulses and energy spectrum
- ▶ MCA: only energy spectrum



Standard test protocol for  $^{enr}$ BEGe:

- ▶ HV Scan
- ▶ Energy resolution
- ▶ Leakage current monitoring with USB loggers
- ▶ Active volume measurement with  $^{60}\text{Co}$
- ▶ Dead layer measurement with  $^{133}\text{Ba}$  and  $^{241}\text{Am}$
- ▶ Pulse shape discrimination with  $^{228}\text{Th}$  and  $^{90}\text{Sr}$
- ▶ Short term measurement to test stability
- ▶ Charge collection study with collimated  $^{241}\text{Am}$  source

# First results from acceptance tests in HADES

- ▶ In the last 2 weeks measurements of the first 4 detectors have begun

Energy resolution of ARGO (FWHM):

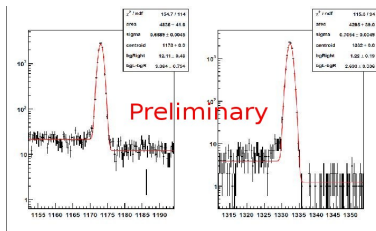
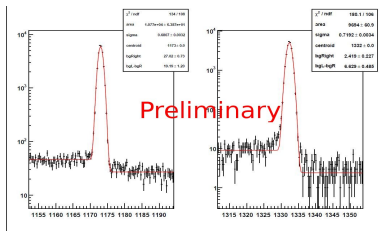
1173.2keV:  $(1.60 \pm 0.01)$ keV

1332.5keV:  $(1.69 \pm 0.01)$ keV

Energy resolution of ANDROMEDA (FWHM):

1173.2keV:  $(1.57 \pm 0.01)$ keV

1332.5keV:  $(1.66 \pm 0.01)$ keV



→ both enriched BEGe detectors have a very good energy resolution!

evaluated by Sabine Hemmer

# Conclusion

- ▶ Preparation of test: successful
- ▶ Start of acceptance test with 7 enriched detectors: successful
- ▶ GERDA requirements:
  - ▶ 2 detectors/week : possible
  - ▶ Installation of several setups: possible, partly implemented

## Outlook:

- ▶ Finish test of first seven detectors
- ▶ *Green light* for production of second batch of detectors
- ▶ Bonding, holder production  
AND finally deployment of detectors in GERDA

Thank you for your attention!