

# Status-Phase II Detectors

- Goal of the TG is to produce Phase II detectors for GERDA
- Achieved:
  - Procurement and transport of 37.5 kg of  $^{enr}\text{Ge}$  with isotopic content ca 87%
  - Set up of test facilities at MPI
  - Procurement and successful test of a prototype 18-fold segmented  $^{nat}\text{Ge}$  detector
  - 2.5 kg of zone refined  $^{enr}\text{Ge}$  from IGEX scraps received
- To be achieved:
  - operation of segmented detector in LAr
  - purification
  - crystal pulling
  - detector manufacture

## Purification News:

50 kg of  $^{76}\text{GeO}_2$  has been ordered from ECP. Expected delivery end March

Contract with PPM to perform reduction and zone refinement on 10 kg of  $^{76}\text{GeO}_2$  to check yield and isotopic dilution. They will need 1 week to set up & 1 week for procedures once material in hand.

Make many measurements of the zone refined material to check purity & isotopic composition. Will map as function of position along ingot.

If have high yield and no isotopic dilution, set up monozone refining and attempt to reach 8-9N to have good starting material for crystal pulling.

## Crystal production news:

Finalizing contract with IKZ to

- a) Grow crystals starting from 6N natural Germanium. These crystals should satisfy specified dimensions, have dislocation density within Canberra specified range, and show no degradation of purity
- b) Once the crystals satisfy these specs, then attempt to grow detector grade crystals starting with 8-9N material (presumably produced by PPM). Specs include resistivity at LN temperature  $> 10 \text{ k}\Omega\text{-cm}$ , n-type, concentration of free charge carriers  $10^{10}/\text{cm}^3$ , variation within limits across crystal.
- c) Make working detector from these crystals
- d) Once detector grade  $^{\text{nat}}\text{Ge}$  crystals produced, can start with  $^{\text{enr}}\text{Ge}$ . IKZ anticipate 2 year time period.

Umicore:

Latest news (November 06) is that they may have capacity (probably only one pass) in summer 07. Currently offer 2 crystals, maybe this can be brought up to 3.

- PPM would presumably do the purification to 6N
- Umicore would likely do their own monozone refinement
- More information expected this year - Canberra is our middle-person

This scenario would allow us to get started with phase II detectors on the Phase I time scale. Background levels could be checked to the  $N \times 10^{-3}/(\text{kg yr keV})$  level within about 3 years of data taking.

In parallel, pursue PPM+IKZ option. Look into TU crystal lab possibilities. These options will take time ...