

# TG01 Report: Test and modification of existing detectors

Stefan Schoenert

GERDA general meeting @ LNGS

Feb. 3-5, 2005

# Tasks/people

- Testing, modification and re-testing of existing detectors
- Installation of LArGe-TB (quality control)
- TG1 (mailing list) members: (nearly all institutions involved!)

Andrey Vasenko  
Bernhard Schwingenheuer  
Carla Cattadori  
M.V. Chirchenko  
Claudia Tomei  
Ernesto Farnea  
Gerd Heusser  
K. Gusev  
P. Grabmayr  
Hardy Simgen  
Igor Kirpichnikov  
Jan Yurkowski

Josef Jochum  
S. Katulina  
Valentin Lebedev  
Matthias Junker  
Matthias Laubenstein  
Oleg Chkvorets  
Peter Peiffer  
V. Sandukovsky  
Anatoly Smolnikov  
Stefan Schoenert  
Sergei Vasiliev  
Sergei Zhukov

# Kurchatov detectors hand over

- 1) Detectors was taken from the upper-very warm electronics room of HdMo. Experiment.
- 2) Detector 'ANG1' was not filled with LN2 since June, 2004 and was warm.
- 4) After week of cool down all detectors checked on leakage current and resolution.
- 5) Detector ANG1 could not keep HV, and was was wet because of low vacuum

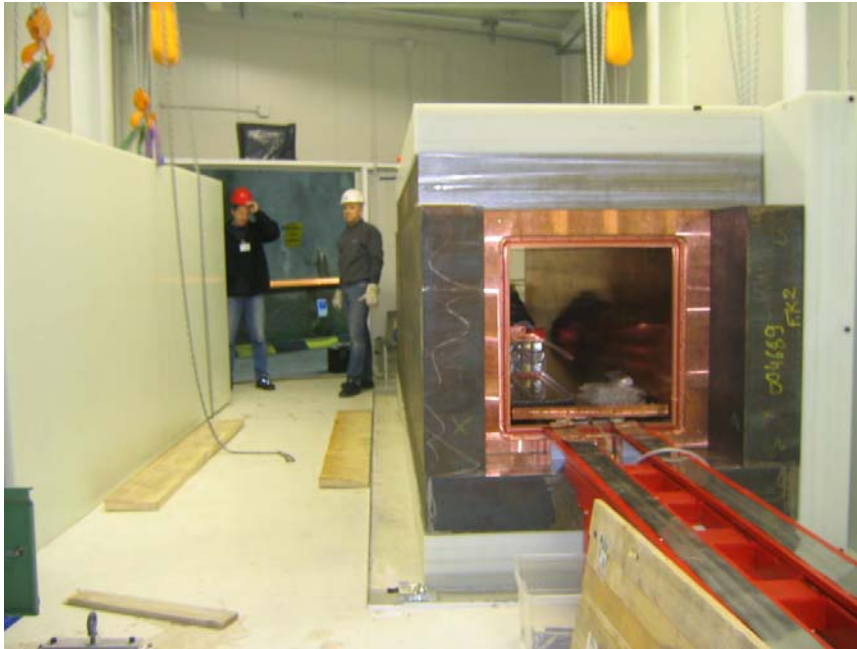
**September, 29 2004, LUNA1 room**



O. Chkvorets' talk

# Critical: underground workspace

- Nov. 04: dismounting of LENS LBF





# Nov. 22: KI (HdM) detectors moved into former LENS barrack



# KI-Detectors Energy Resolution, keV $E = 2614$ keV

	ANG1	ANG2	ANG3	ANG4	ANG5
HdMo Setup	3.0	3.4	3.0	3.5	3.4
GERDA Lab, Jan.05	<u>3.9</u>	2.7	3.0	<u>2.8</u>	3.1
Notes	Warm Up	PA gain 'jumps'			

ANG1(2?): pump and heat cycle?

O. Chkvorets' talk

# Status of IGEX detectors

- Still at Can Franc (Spain)
- Expect that Spanish/US issues resolved within next weeks
- Transfer to GS to be organized
- Only limited information on crystal exposure above-ground available (need to further investigate):

IGEX detectors

name	Total mass	Delivery of the raw material to USA	Start of operations	Further operations
RG1	2149 g	March 1992	Sept. 1993, HST	CF since 1995
RG2	2194 g	-“-“-	May 1994, HST	CF since 1995
RG3	2121 g	-“-“-	May 1995, CF	CF since 1995
R1	1006 g	1991	1992, BAKSAN	BAKSAN
R2	1018 g	-“-“-	1992, CF	BAKSAN since 1995
R3	896 g	-“-“-		BAKSAN since 1995
	10 182 g			

I. Kirpichnikov's talk

All the RG detectors had nominal resolutions about 2.5 keV (1332 keV).

HST – Homestake, CF – Canfranc

•Co-60 background ?  $10^{-2}$  /(keV kg y) ?

# Plans for Feb/March

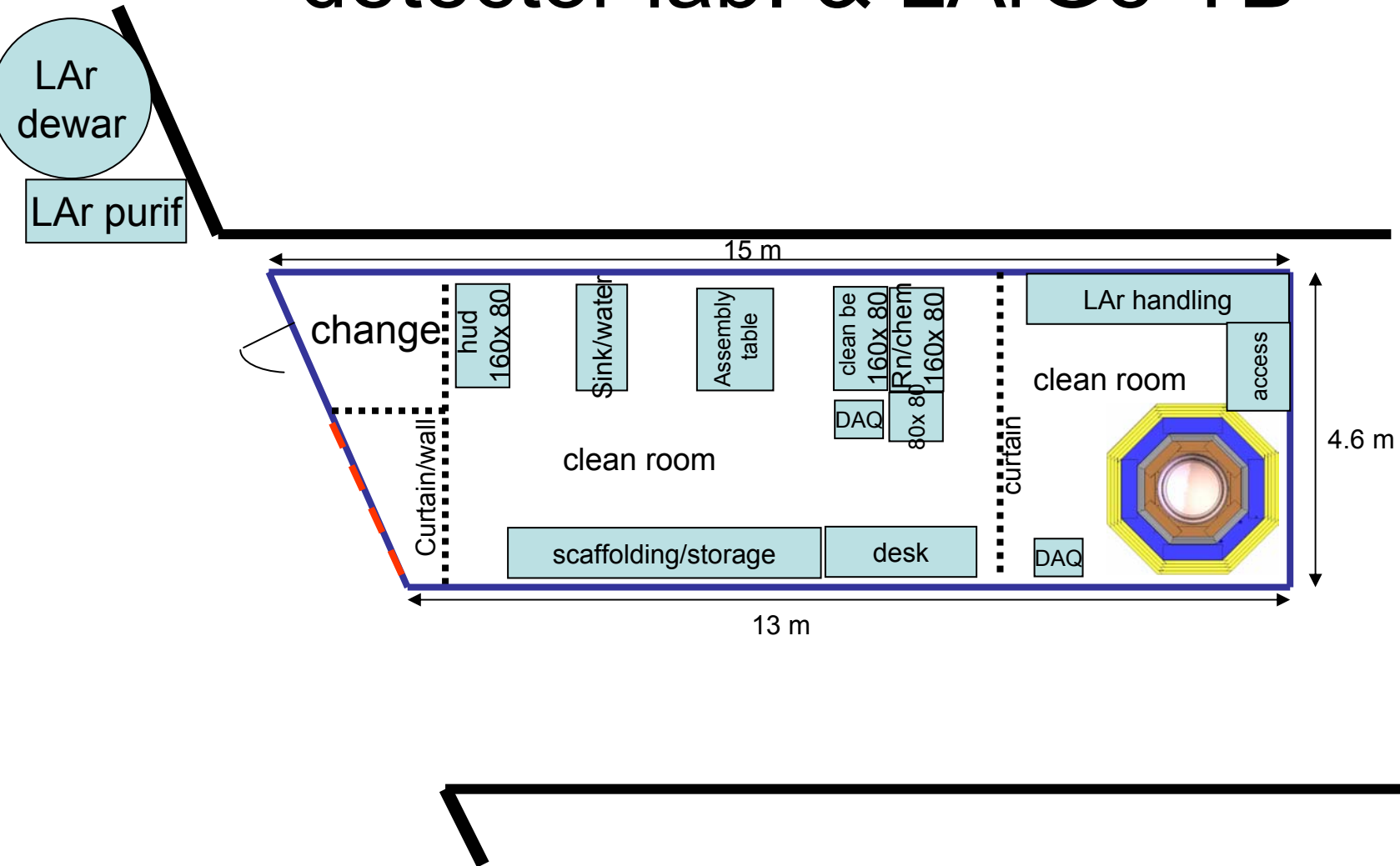
- Feb/March:
  - Characterization of KI detectors (O.Chkvorets, S. Zhukov)
    - 1) Co-60 source - absolute efficiency.
    - 2) Ba-133 source - dead layer thickness estimation.
    - 3) Ra-226 source - summing effect in the 2000 keV area and detailed efficiency calibration.
    - 4) ....depending
  - Preparation of LENS barrack refurbishment to be used as detector laboratory
  - Procurement of hoods, clean bench, etc.
- April/May:
  - Refurbishment of barrack; mounting of LArGe-TB shielding
- June/July:
  - Start-up of clean lab. / detector lab.



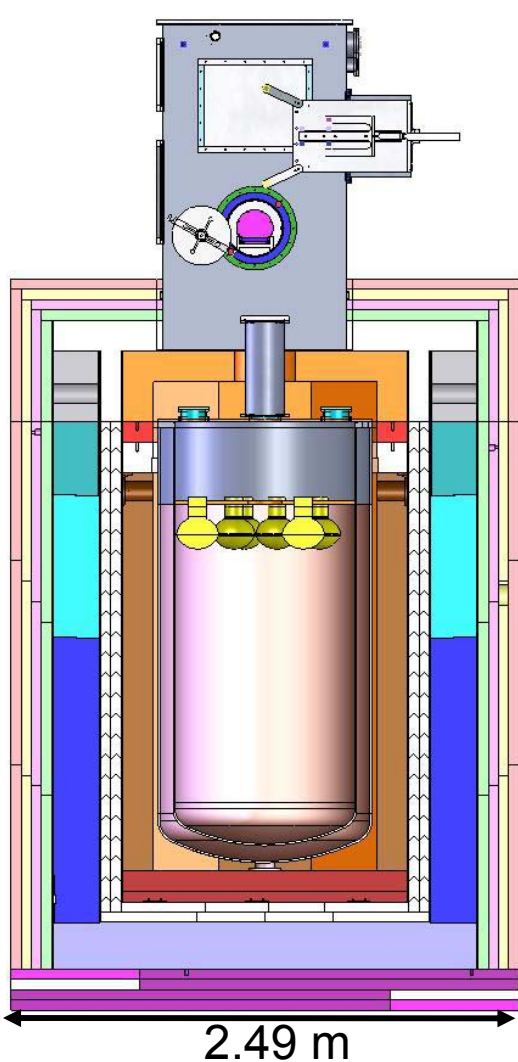
# Infrastructure needed for detector tests, modifications and LArGe-TB

- Structural modifications: separation wall, increasing height at back end; new floor
- Refurbishment of air conditioning/humidity control system
- Installations
  - chemistry hood
  - clean bench
  - Rn-free clean bench
  - water purification system
  - Mounting table
  - N<sub>2</sub> dewar for testing
  - Storage shelves
  - ....
- LArGe-TB
  - Shield
  - Rn box & insertion system
  - LAr supply & handling

# Floor plan for refurbished barrack: detector lab. & LArGe-TB



# Status LArGe-TB

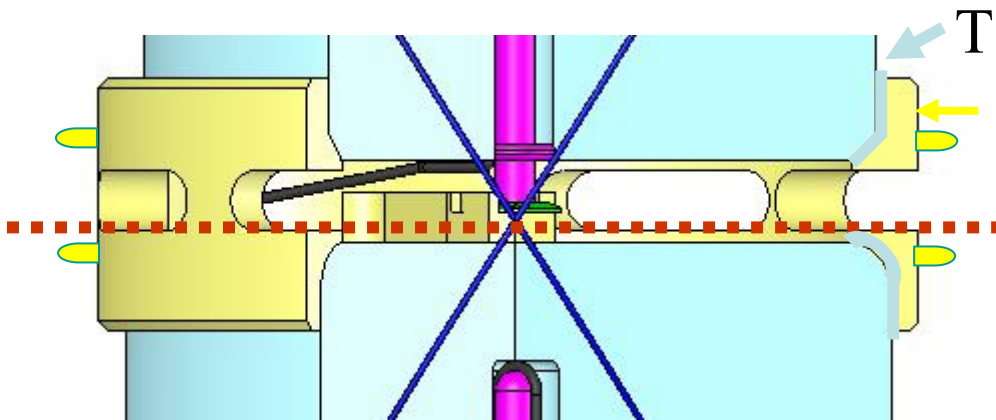


4.85 m

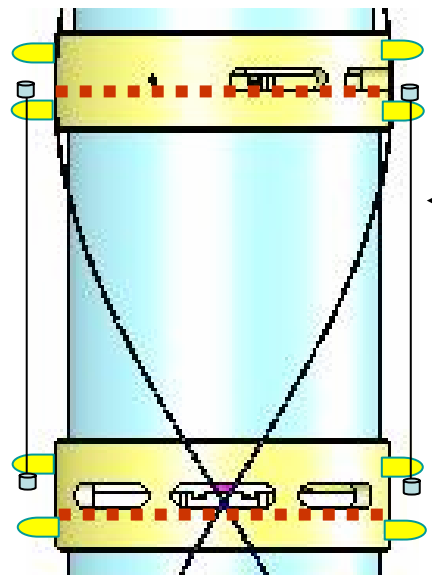
- shield: (nearly) completed
- dewar: delay (further iteration with company needed)
- Rn box and insertion system: construction completed

•Plan: mounting shield after refurbishment of barrack

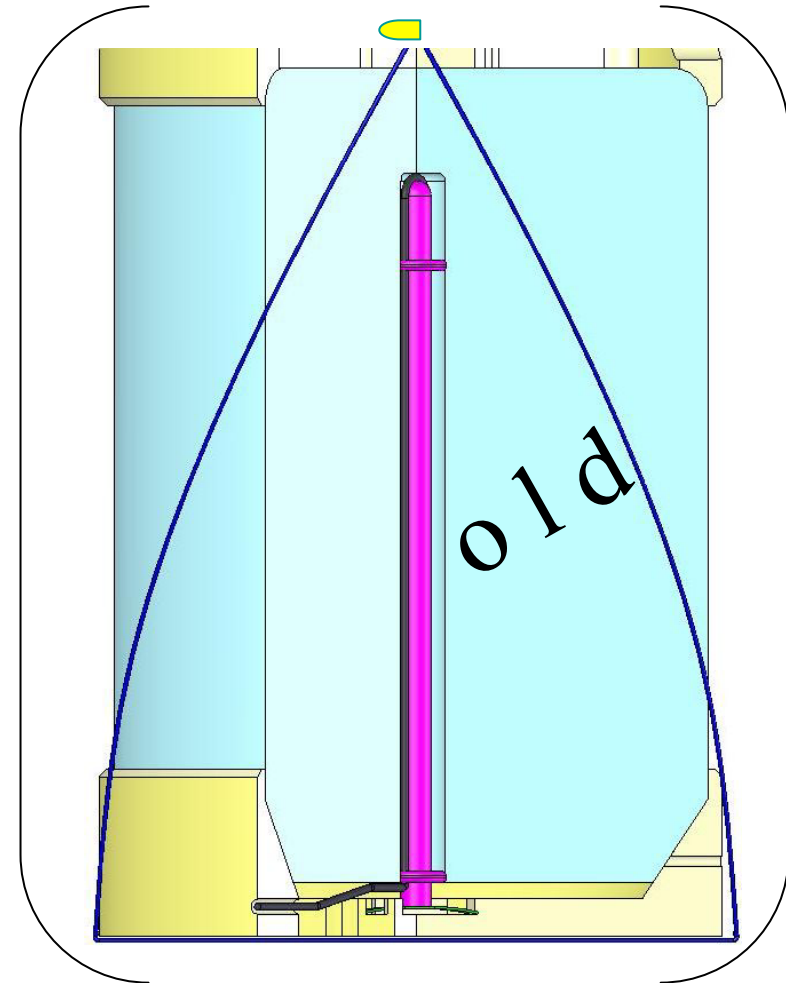
# Challenge: contacting Ortec type detectors – different to Canberra type!



Teflon or Nylon pad  
Cu or Ge or Si



metal wire  
crimbed ends with Cu



# Schedule

Year	'04	'05				'06				
Quarter	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Ge-76 diode refurbishment</b>										
Underground lab room allocated	10									
Underground lab room installed		11								
All diodes at LNGS		11								
Performance in cryostats documented			2							
Contact materials screened			3							
Refurbishment designed & tested			3							
Refurbishment procedures documented				4						
Diodes dismantled from cryostats				4						
Diodes refurbished & tested				6						
Contacts redone - if needed					9					
Refurbishment finished							11			
Prototype diode string/array tested			3							
Materials for string/array screened					8					
Diode strings/arrays assembled							12			
<b>Infrastructure</b>										
LArGe test bench installed					7					

# Critical issues

- Transfer of IGEX detectors timely
- Get barrack refurbished timely
- Design of detector support system for Ortec-type detectors / integration with
- Selection/screening of materials for detector support (CuBe?)
- Involvement of many groups/people (good!), however dedicated man power currently short