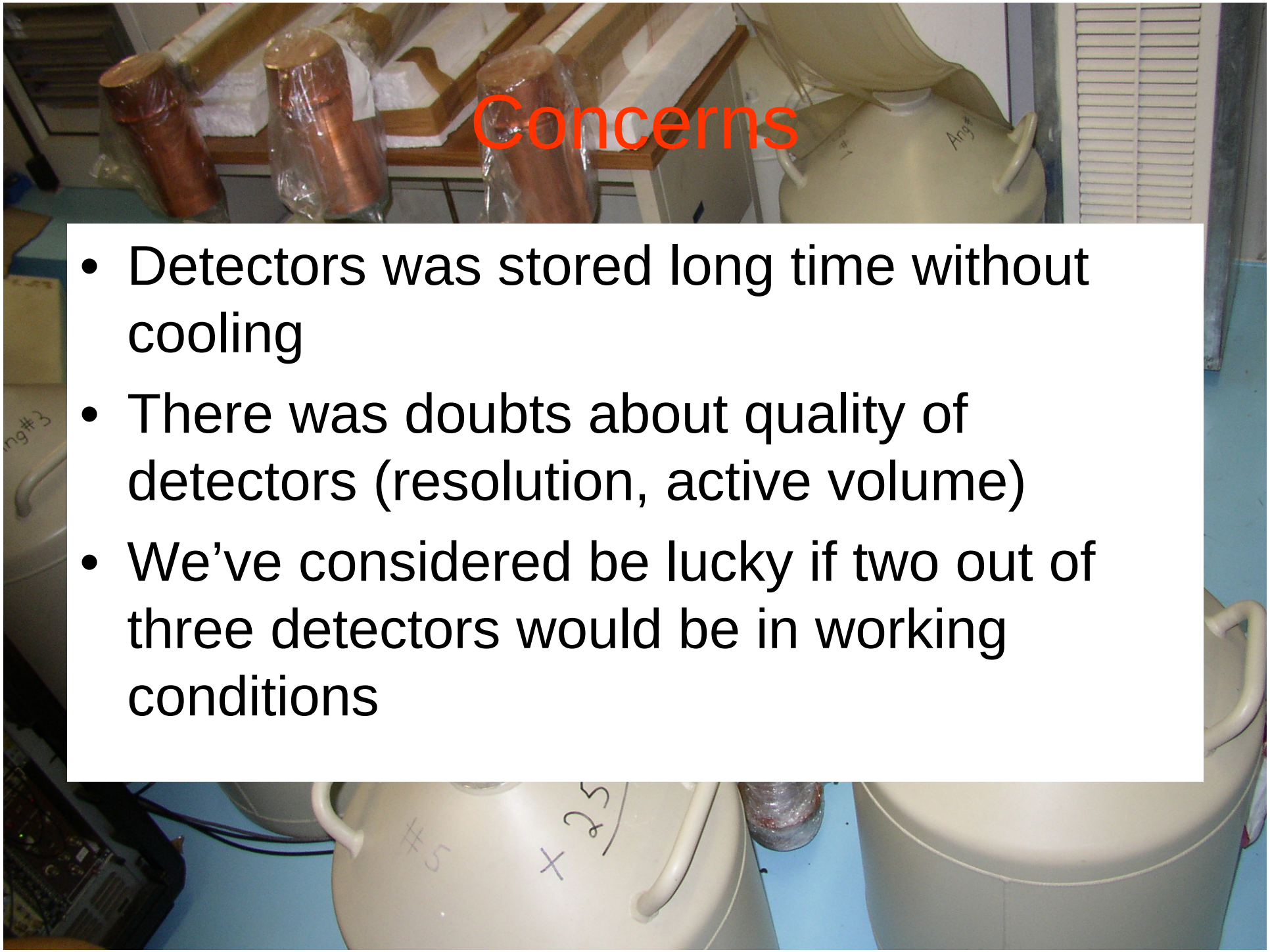
Status of IGEX detectors

O.Chkvorets

On behalf of TG-1 of GERDA collaboration

Heidelberg, Feb 20, 2006



Concerns

- Detectors was stored long time without cooling
- There was doubts about quality of detectors (resolution, active volume)
- We’ve considered be lucky if two out of three detectors would be in working conditions

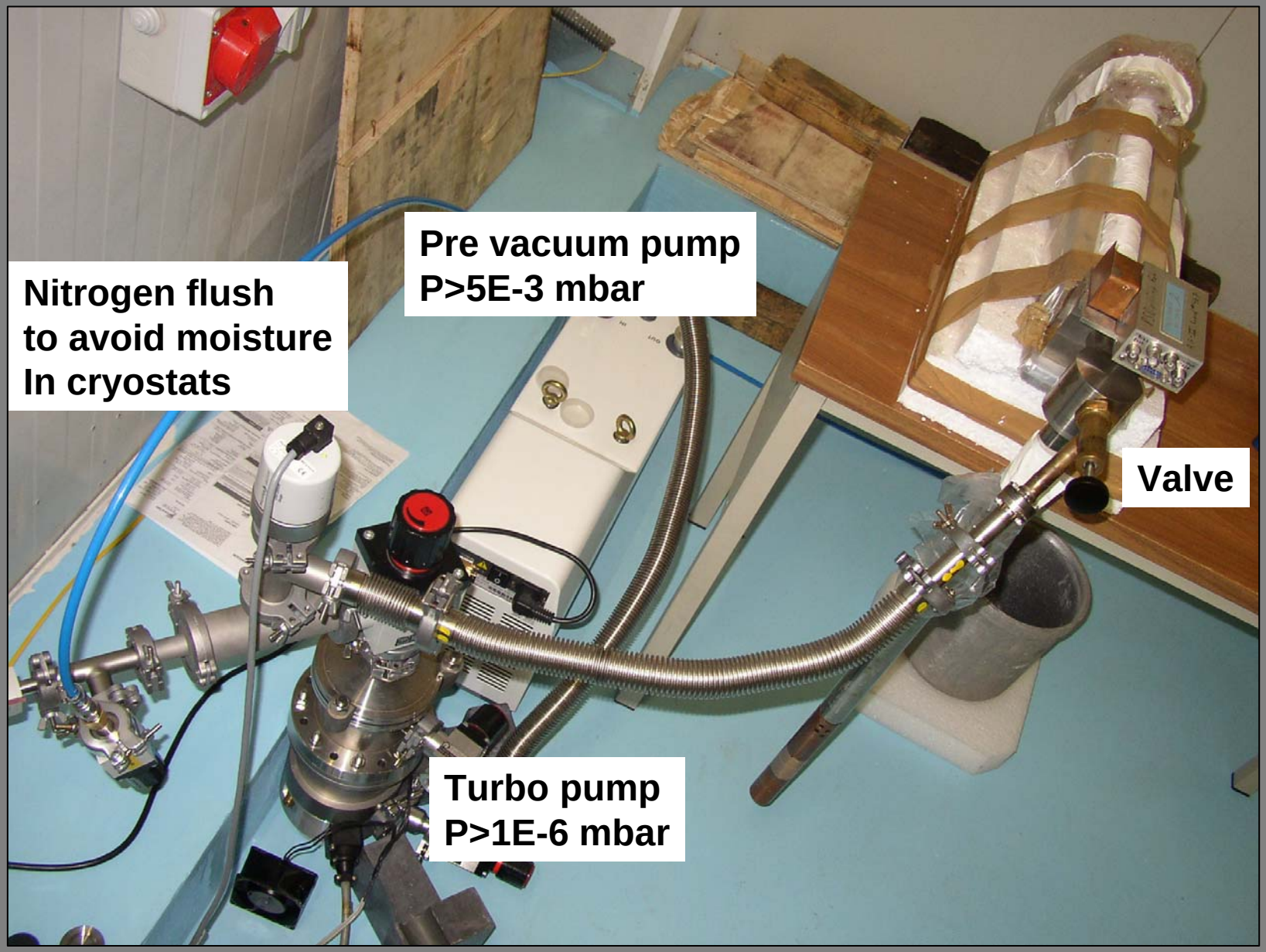
History and parameters of the IGEX detectors

	RG-1	RG-2	RG-3
Crystal grown at Oxford Inc. Oak Ridge, Tenn.	25.09.93	16.02.94	01.12.94
Detector completed	02.11.93	10.05.94	15.04.94
Serial Number	28005-S	28006-S	28007-S
Diameter and Length, mm	77.6; 84.3	78.6; 84.0	79.2; 82.5
Total Mass, g	2149.9	2194.0	2121.0
Dead Layer, microns	~800	~800	~500
Energy resolution at 1332keV (FWHM keV)	2.16	2.37	2.13
Operating Voltage, V	+4800	+3800	+3800
Installed in Homestake	09.11.93	22.05.94	
Removed from Homestake	15.06.97	27.12.96	
Installed in Canfranc	15.07.97	25.01.97	10.05.95
Moved from Canfranc to LNGS	18.11.05	18.11.05	18.11.05

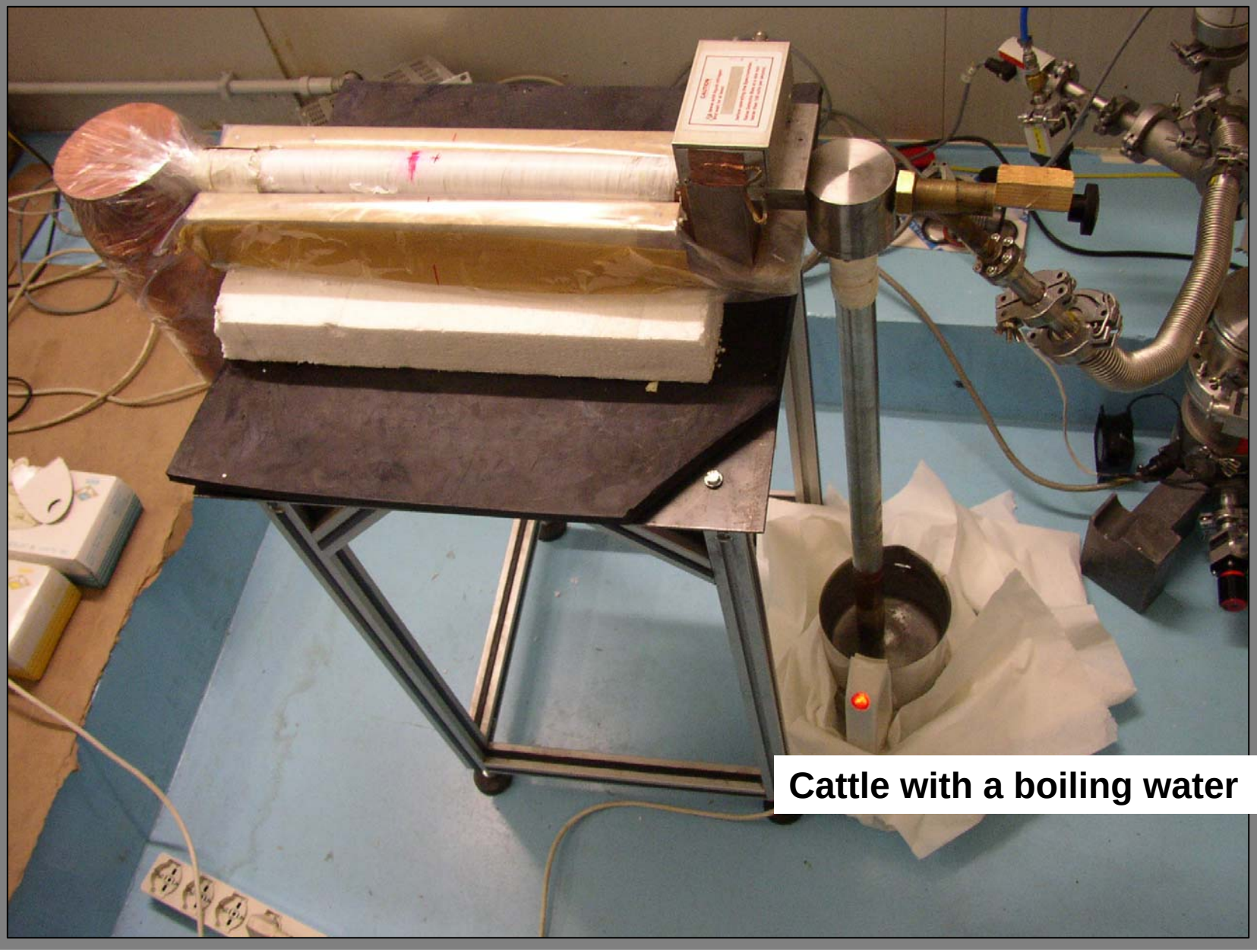
Plan of work with the IGEX detectors

- Check of cryostats vacuum
- Pump cryostats to best possible vacuum
- Start heating with simultaneous pumping
- Pumping - Heating till vacuum starts improve
- Stop heating and continue pumping till best vacuum reached
- Test of resolution, counting characteristic and leakage current

HV pumping system



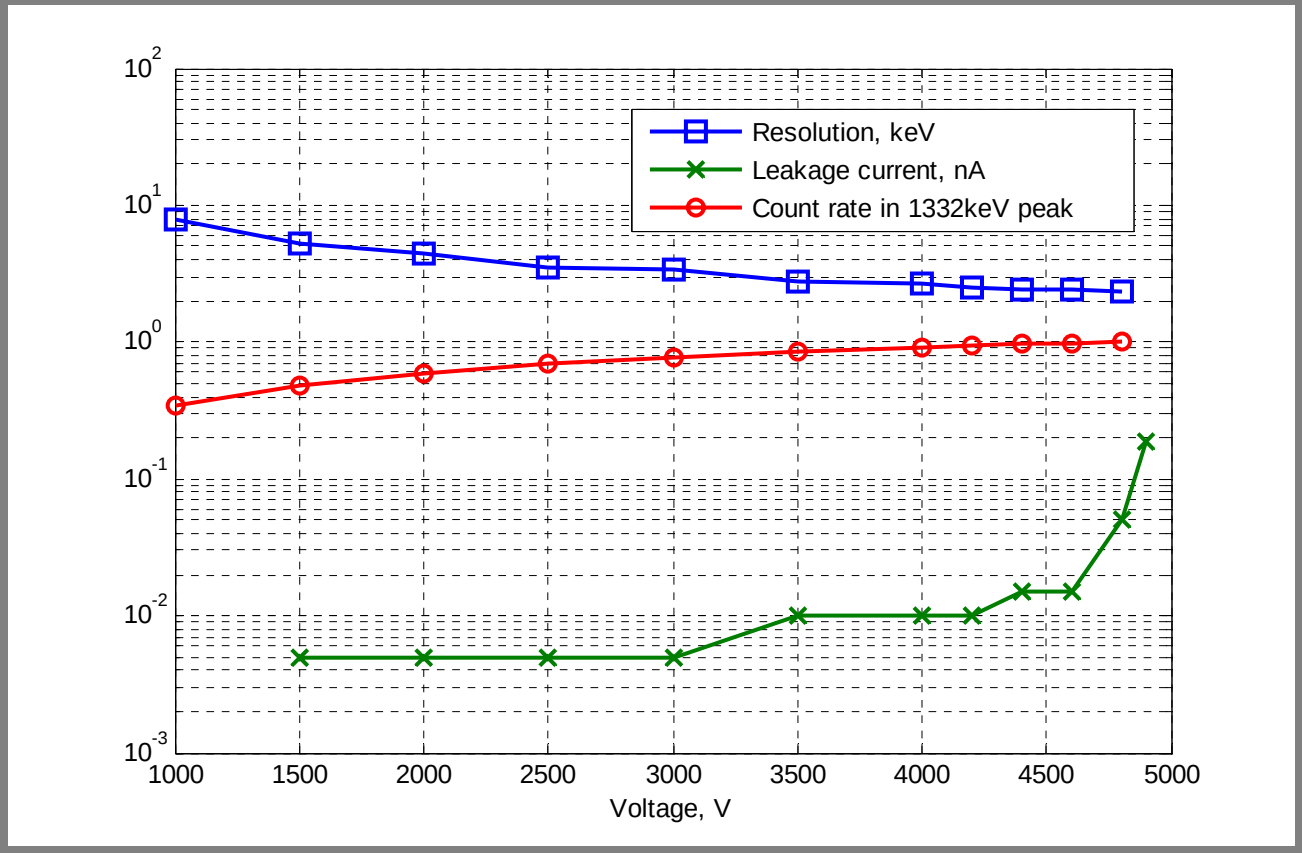
Heating the cryostats



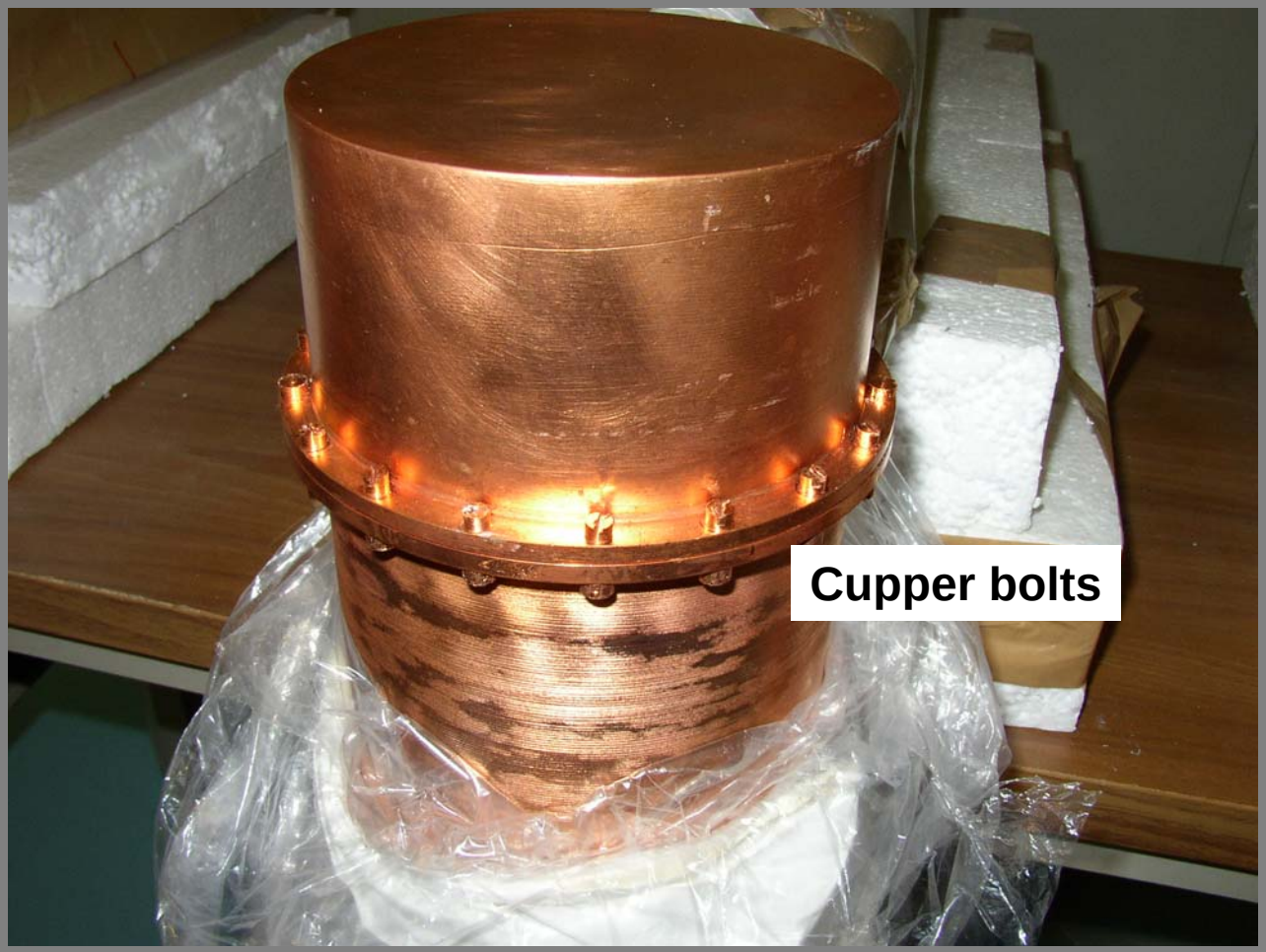
Cattle with a boiling water

Rico Grande - I

Leakage current, resolution and count rate vs. HV

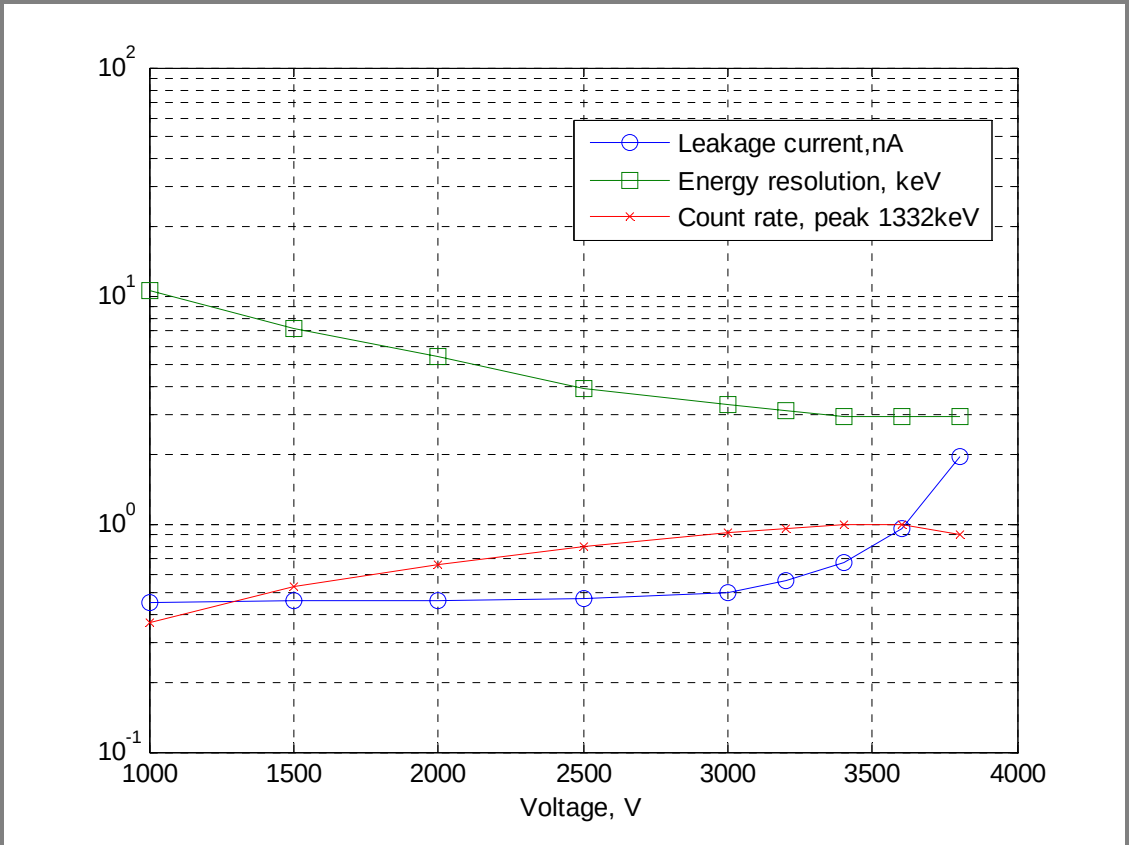


Rico Grande–II has high leak
It was not tighten
Vacuum improved after bolts were tighten



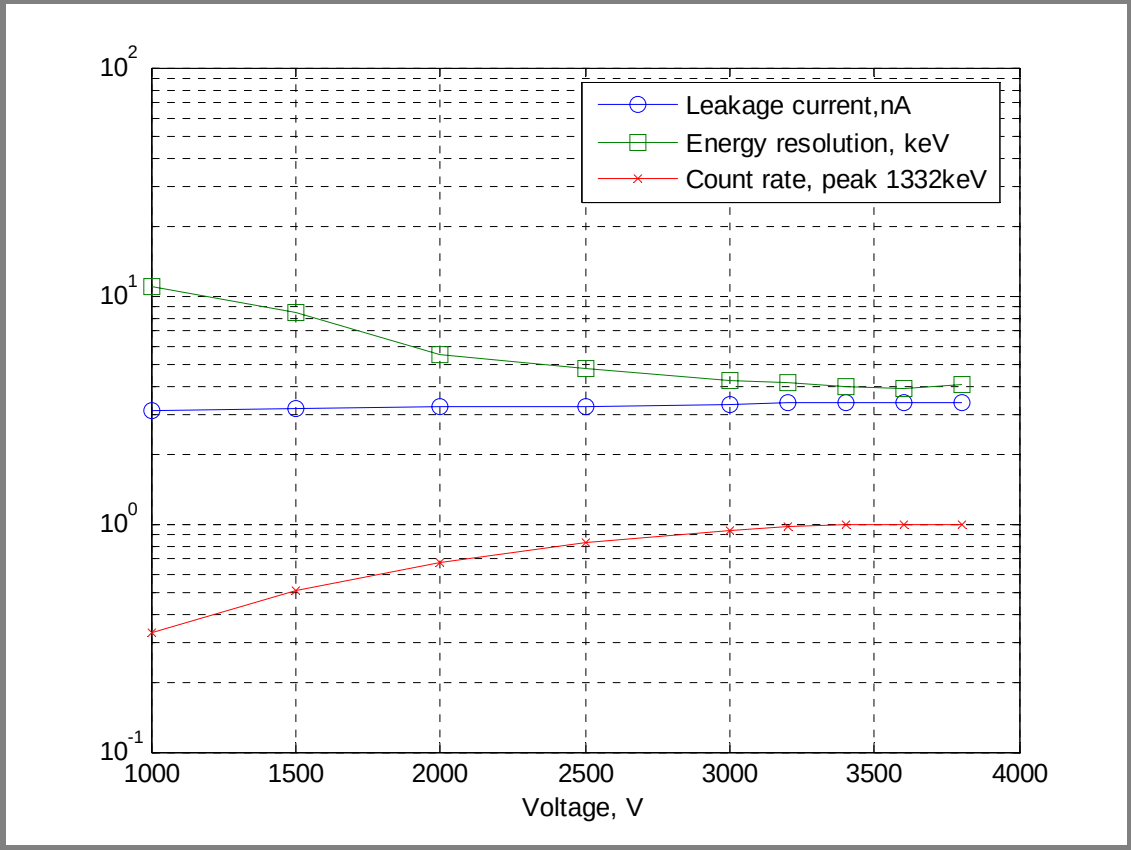
Rico Grande – II

Leakage current, resolution and count rate vs. HV



Rico Grande – III

Leakage current, resolution and count rate vs. HV



Chronology of Energy resolution improvement for IGEX detectors

	1993-94	25.11.05	04.12.05	10.12.05	22.12.05
RG-1	2.16	2.6	2.34	2.38	2.21
RG-2	2.37	10	7.94	3.01	2.31
RG-3	2.13	4.7	2.74	3.9	2.26

Summary and Conclusions

- Heating-pumping cycles were performed for all IGEX detectors
- Vacuum leak on RG-II was found and fixed
- Leakage current, resolution and counting characteristics were measured and documented in GERDA report

Resolutions and HV working points of detectors are restored to original and detectors perform good.

To do:

Necessary estimate dead layer thickness with precise measurements with Ba-133 and Co-60 sources, because detectors were long time without cooling