

D1. TASCA Focal Plane Detector Setup (Physics)

- first mounting and detector tests

- *setup description*
- *first test of TASCA with the position check (PC) detector*
- *next steps*
 - *installation of the electronics set-up*
 - *completion of the detector set-up*
- *first experiments*
- *further detector development*
 - *dedicated detector chamber for Ge-array*
 - *double sided Si strip detector*
 - *electronics: pulse shape analysis*
 - *...*

TASCA Working groups

TASCA Task Groups

	Task A	Task B	Task C 1.	Task C 2.	Task D 1.	Task D 2.
	Differential pumping, gas control (purity, pressure, exhaust, recycling ...)	Target (preparation, rotation, safety, control, cooling), window, collimator	Separator – Ion optics, magnets, power supplies	Separator – Mechanics (support structures, vacuum chambers, beam dump, ...)	Focal plane – Detectors, data acquisition	Focal plane – RTC, transport
Responsible:	A. Türler (TU München, Garching)	K. Eberhardt (Univ. Mainz)	A. Semchenkov (GSI, Darmstadt)	M. Schädel (GSI, Darmstadt)	D. Ackermann (GSI, Darmstadt)	A. Yakushev (TU München, Garching)
Collaborator:	J. Uusitalo (Univ. of Jyväskylä) M. Schädel (GSI, Darmstadt) K. Morimoto (RIKEN)	B. Lommel, B. Kindler, M. Schädel (GSI, Darmstadt) H.-J. Maier (LMU, München) R. Sudowe (LLNL)	K.E. Gregorich (LBNL, Berkeley) (S. Sytchevsky et. al, St. Petersburg)	J. Uusitalo (Univ. of Jyväskylä)	F.P.Heßberger, P. Kuusiniemi (GSI, Darmstadt) T. Fästermann (TU München, Garching) R. Dressler (PSI, Villigen) C. Scholey (Univ. of Jyväskylä)	Ch. Düllmann (LBNL, Berkeley) R.Eichler (PSI, Villigen)
Advisor:	K.E. Gregorich (LBNL, Berkeley) (somebody from Dubna would be highly welcome)	K.E. Gregorich (LBNL, Berkeley)	M. Leino (Univ. of Jyväskylä) A. Popeko (JINR, Dubna)		M. Leino (Univ. of Jyväskylä) S. Hofmann (GSI, Darmstadt) R. Krücken (TU München, Garching)	K.E. Gregorich (LBNL, Berkeley) H.W. Gäggeler (PSI, Villigen) J.V. Kratz (Univ. Mainz)

TASCA – Detector Set-up Scheme

wobbler

target chamber

beam diagnosis boxes

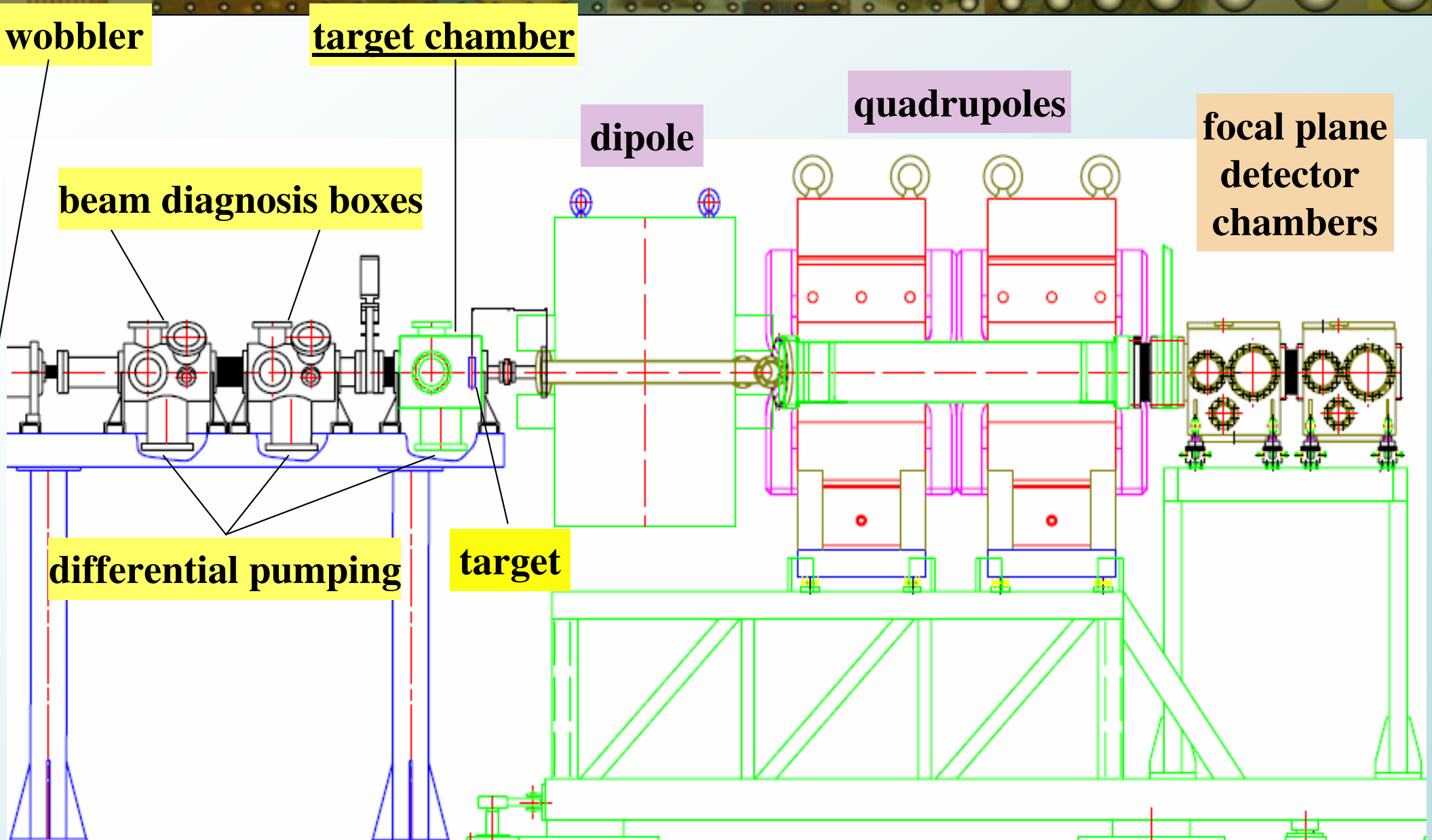
dipole

quadrupoles

focal plane detector chambers

differential pumping

target



TASCA – Detector Set-up Scheme

wobbler

target chamber

beam d

Transmission Detectors

PIN diode arrays (box)

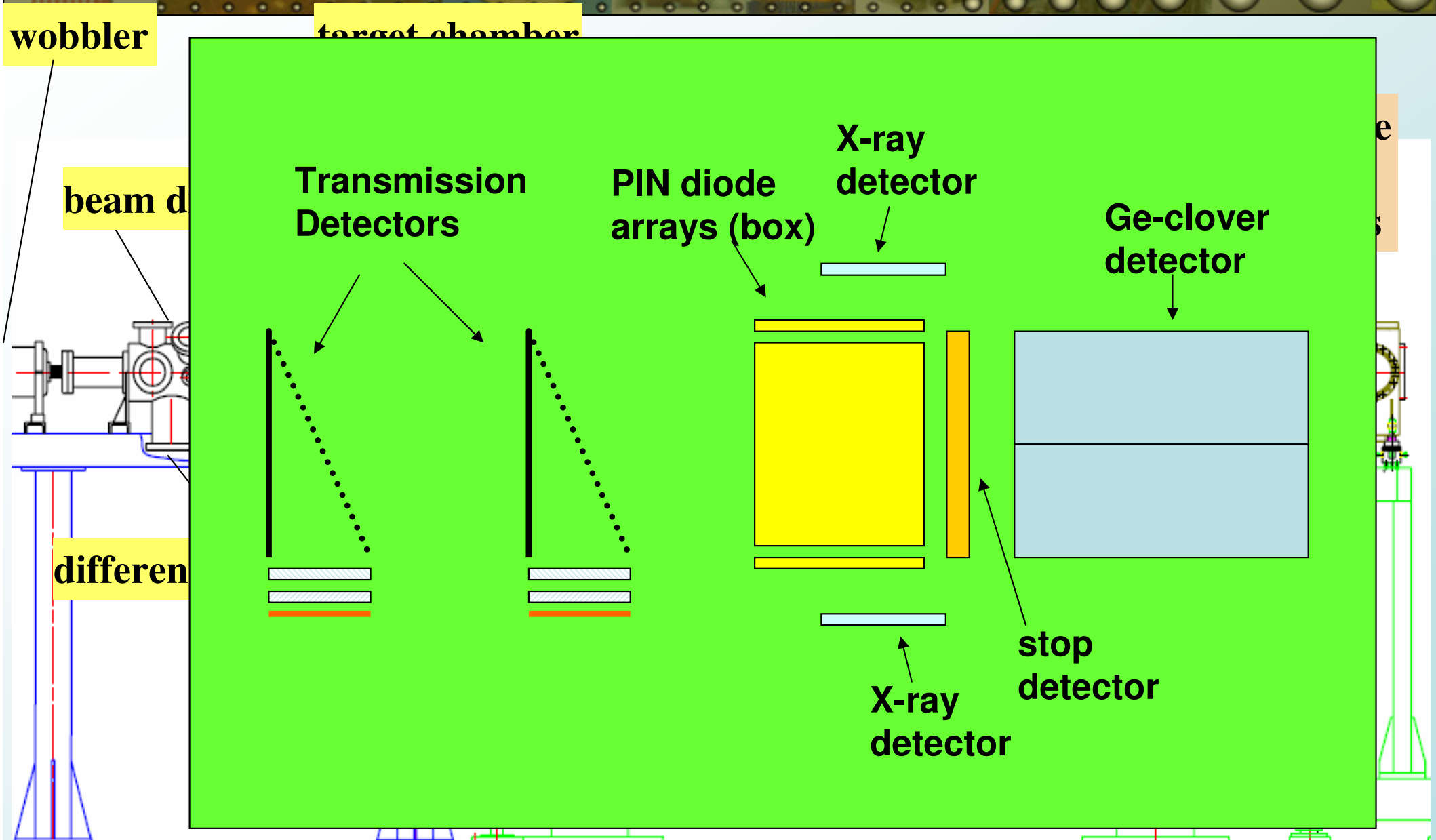
X-ray detector

Ge-clover detector

differen

stop detector

X-ray detector



D1. TASCA Focal Plane Detector Setup (Physics)

- first mounting and detector tests

- *test of X-ray detectors by summer student (Khuyagbaatar, Jadambaa)*
- *after/during completion of TASCA*
 - *mounting of stop detector for first tests of TASCA*
 - *ionoptics*
 - *transmission*
 - *...*
 - *electronics set-up*
 - *analog electronics (from Jyväskylä)*
 - *DAQ-system*
- *future*
 - *completion of the set-up*
 - *stop detector arrangement*
 - *PIN diodes*
 - *Ge detectors*
 - *transmission detectors (PPAC or channelplate/SED (window!))*
 - *first experiments*
 - *... (*

D1. TASCA Focal Plane Detector Setup (Physics)

- first mounting and detector tests

summer 2005

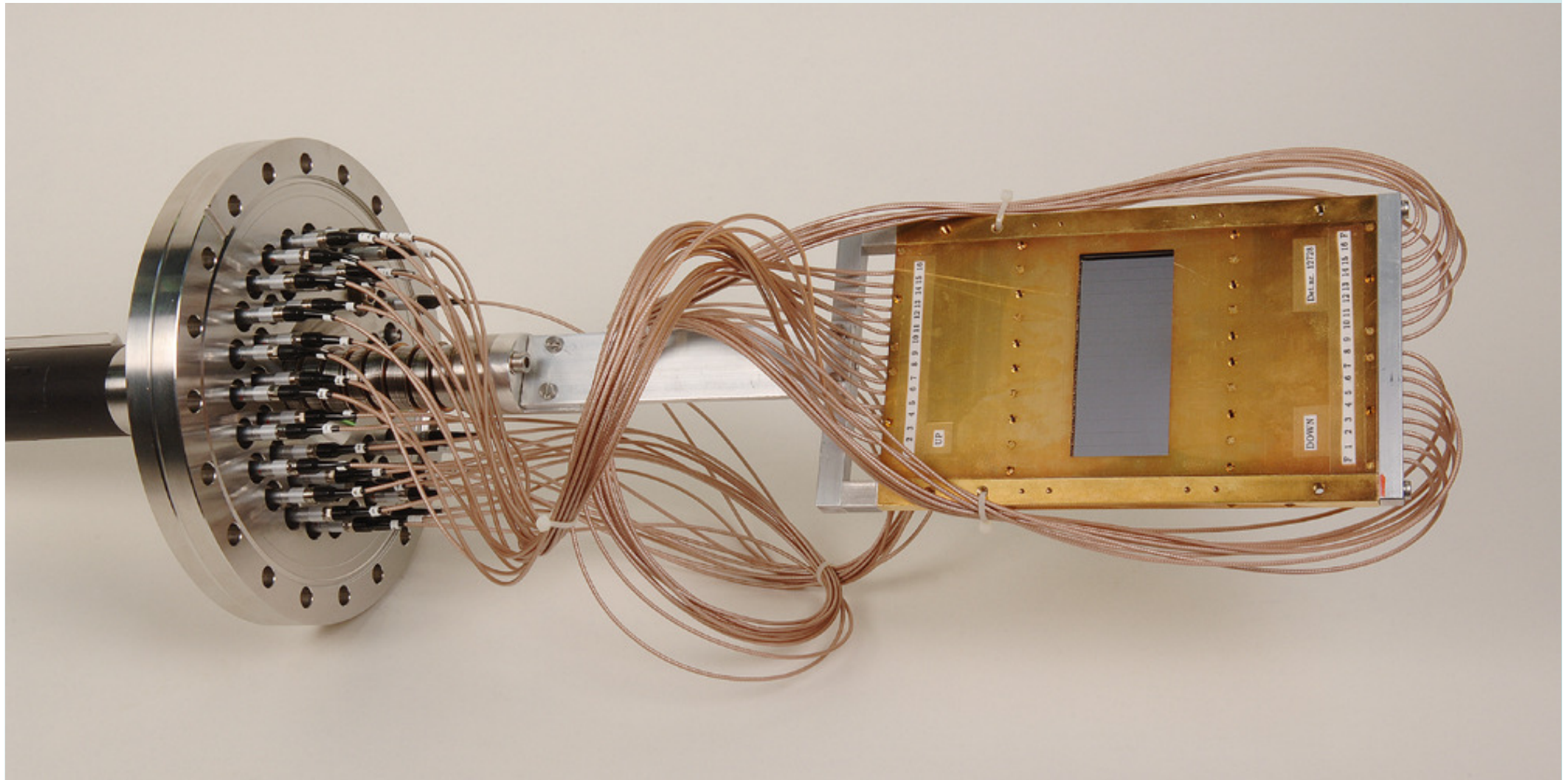
- *test of X-ray detectors by summer student (Khuyagbaatar, Jadambaa)*
- *after/during completion of TASCA*
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The SHIP STOP Detector

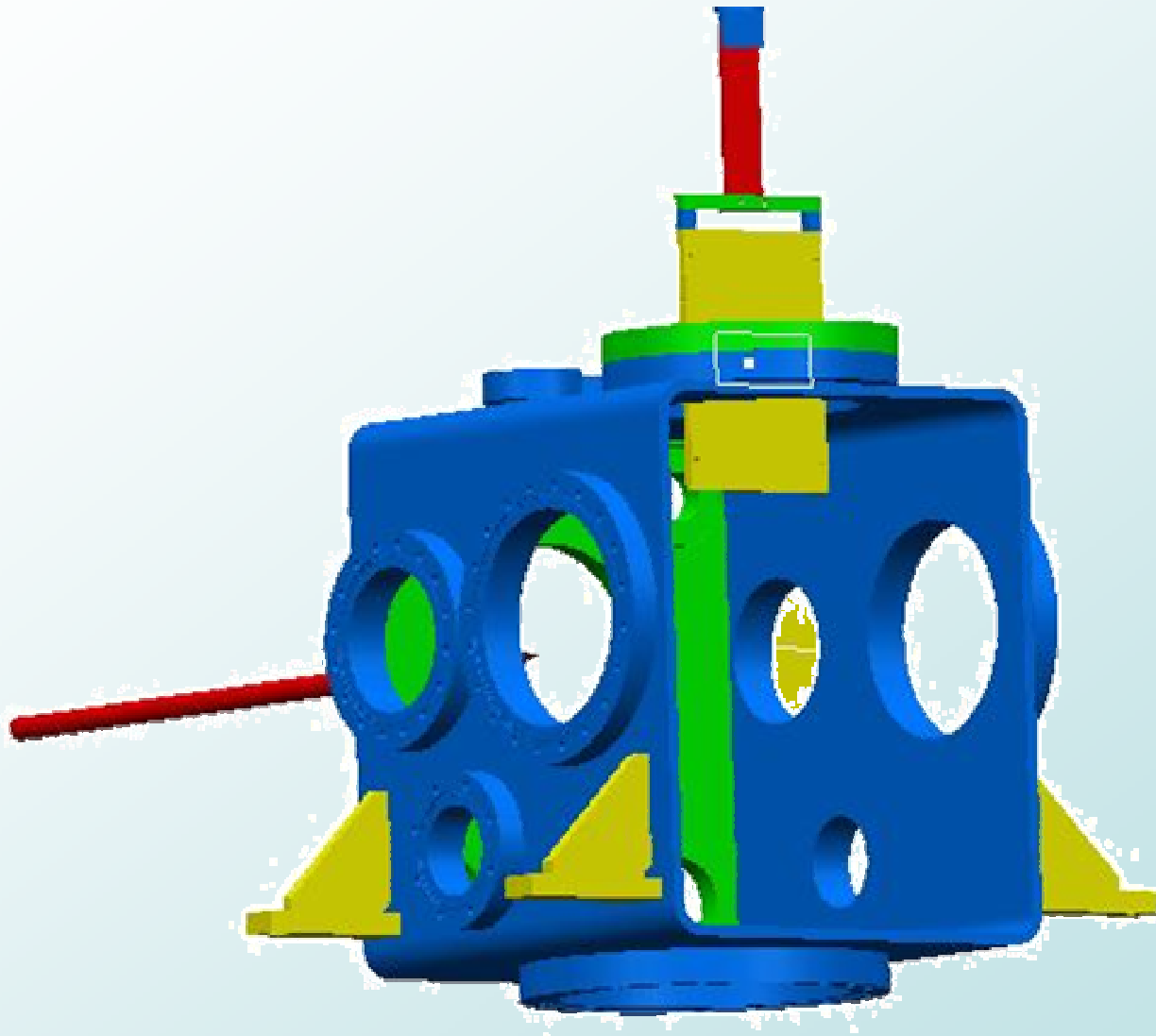
- **(80x35)mm² active area**
- **16 strips - (5x35)mm² active area**
- **300 μ m thickness**
- **resistive layer**
 - **position resolution = 200 μ m \Rightarrow total spatial resolution \approx 1 mm²**
- **energy resolution $\Delta E = 18-20$ keV @ $E_{\alpha} > 6$ MeV**
- **32 signals**



The TASCAs Position Check (PC) Detector



The TASCA Position Check (PC) Detector



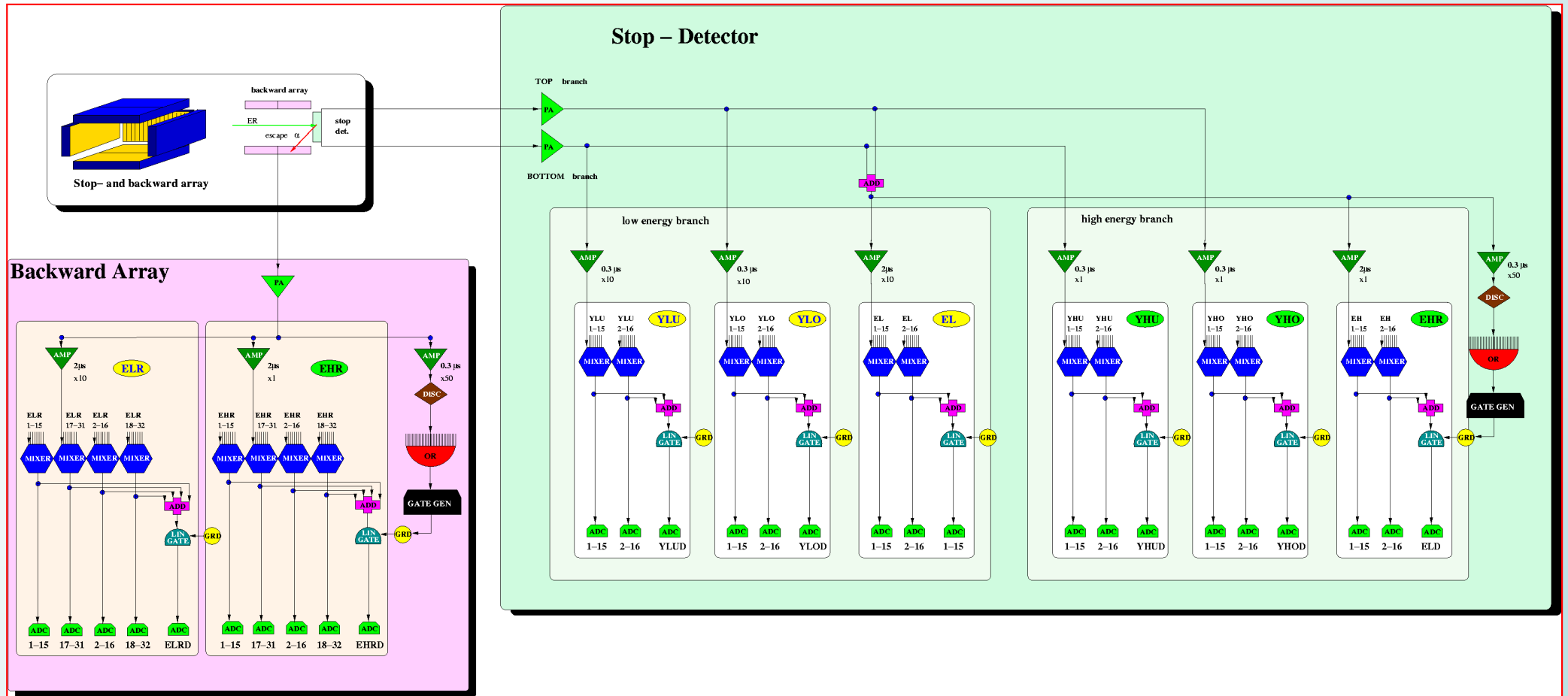
D1. TASCA Focal Plane Detector Setup (Physics)

- first mounting and detector tests

- ✓ *test of X-ray detectors by summer student (Khuyagbaatar, Jadambaa)* *summer 2005*
- ✓ *after/during completion of TASCA* *winter 2005/ spring 2006*
 - *mounting of stop detector for first tests of TASCA*
 - *ionoptics*
 - *transmission*
 - *...*
 - *electronics set-up*
 - *analog electronics (from Jyväskylä - Cath Scholey)* *June 2006*
 - *DAQ-system*
- *future*
 - *completion of the set-up*
 - *stop detector arrangement*
 - *PIN diodes*
 - *Ge detectors*
 - *transmission detectors (PPAC or channelplate/SED (window!))*
 - *first experiments*
 - *...* (

D1. TASCA Focal Plane Detector Setup (Physics)

- first mounting and detector tests



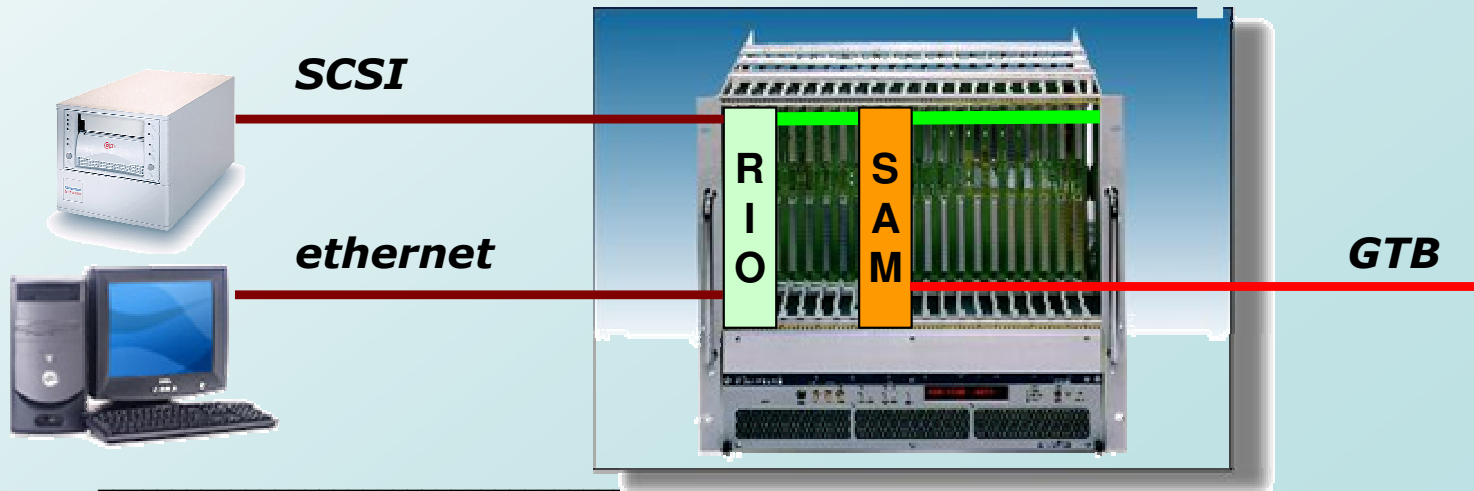
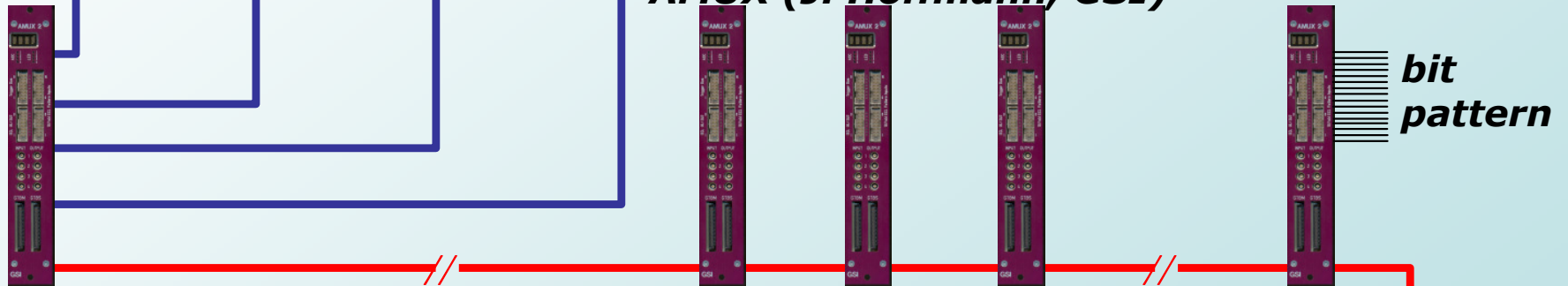
New DAQ SHIP



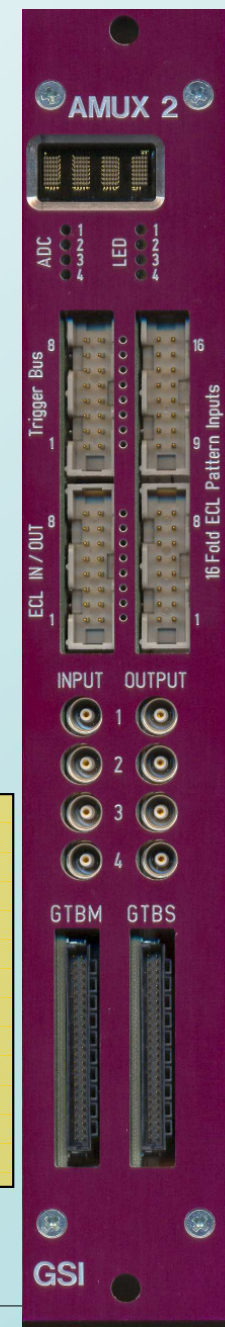
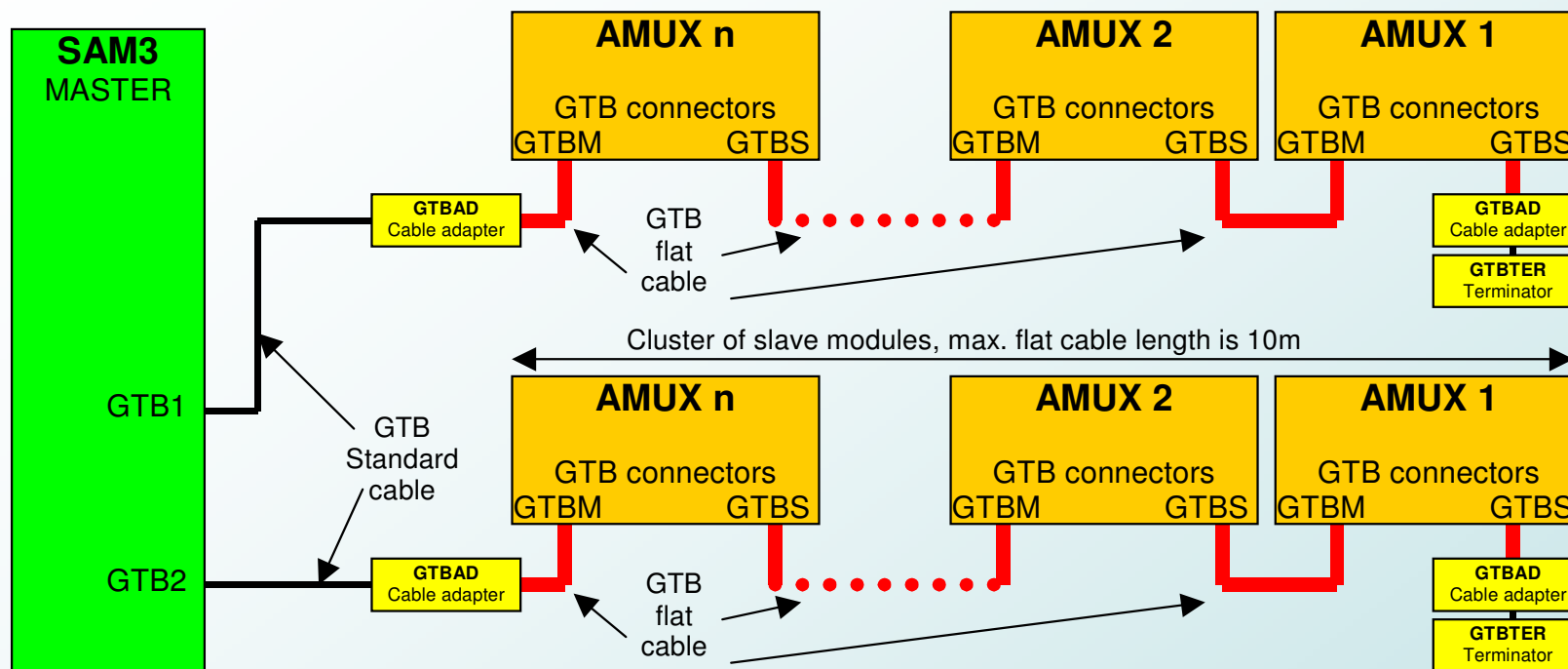
**NIM ADC
Silena 7423
13 bit (8k)**

- >> 50 parameters
- max. rate \approx 50 kHz
- random trigger
- real time clock
- dead time 10 μ s

**NIM ADC multiplexer
AMUX (J. Hoffmann, GSI)**



AMUX - GTB Interface



- **daisy chain connection to SAM3 (up to 2x15 units) via GTB bus**
- **event building and data transfer to DAQ-CPU by the readout processor SAM3**
- **random trigger (first unit with data triggers readout)**
- **max rate 50 kHz (tested in the lab)**
- **high resolution real time clock**

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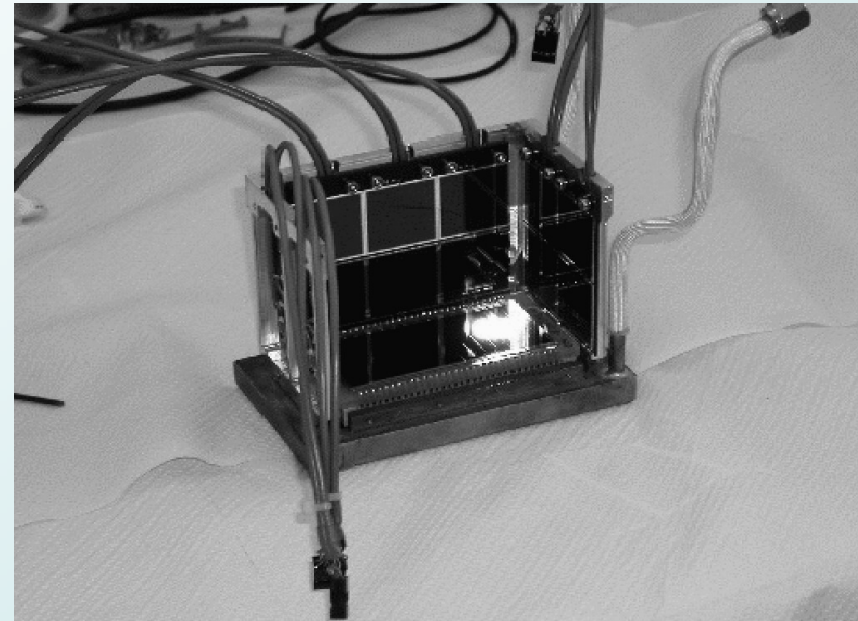
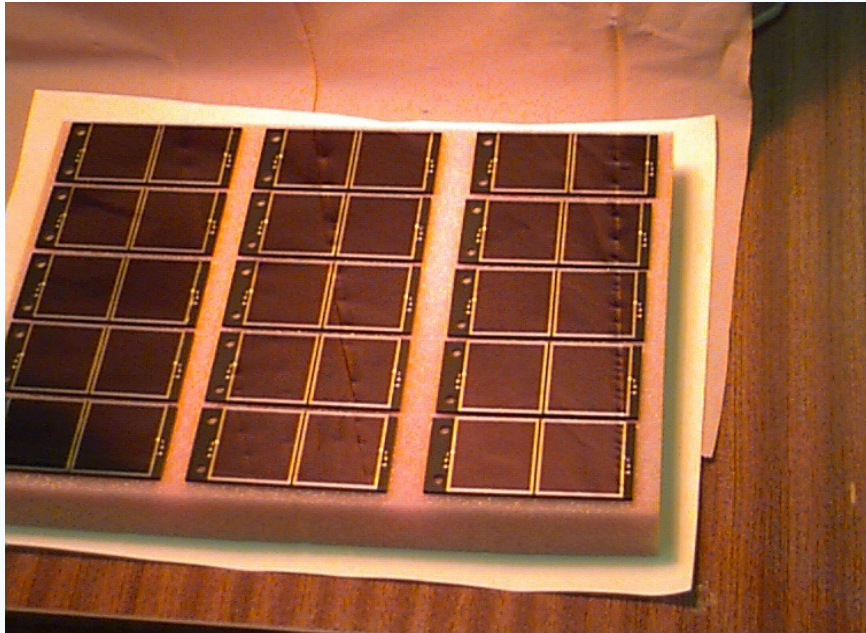
- first mounting and detector tests

- ✓ *test of X-ray detectors by summer student (Khuyagbaatar, Jadambaa)* *summer 2005*
- ✓ *after/during completion of TASCA* *winter 2005/
spring 2006*
 - *mounting of stop detector for first tests of TASCA*
 - (✓) *ionoptics*
 - (✓) *transmission*
 - ✓ *first reaction products in the focal plane of TASCA (April 27th 2006)*
 - *electronics set-up*
 - *analog electronics (from Jyväskylä - Cath Scholes)* *June 2006*
 - *DAQ-system*
- *future*
 - *completion of the set-up*
 - *stop detector arrangement*
 - *PIN diodes*
 - *Ge detectors*
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 - *first experiments*
 - *...* (

*money requested at the
last BMBF round 2006-2007
(A. Türler)*

PIN diodes

- RITU/GREAT



- ***GREAT Pin diode array***
- ***(28x28)mm² active area***
- ***32 elements***
- ***500 μm thickness***
- ***low noise (capacity) → low energy threshold***

The Ge-Clover detector

- 4 crystals (70x90)mm²

- efficiency per crystal

$$\varepsilon_{\gamma} = 23\% \text{ at } 1.3 \text{ MeV}$$

- <2 cm behind STOP detector

- Al-window 0.5 mm thickness

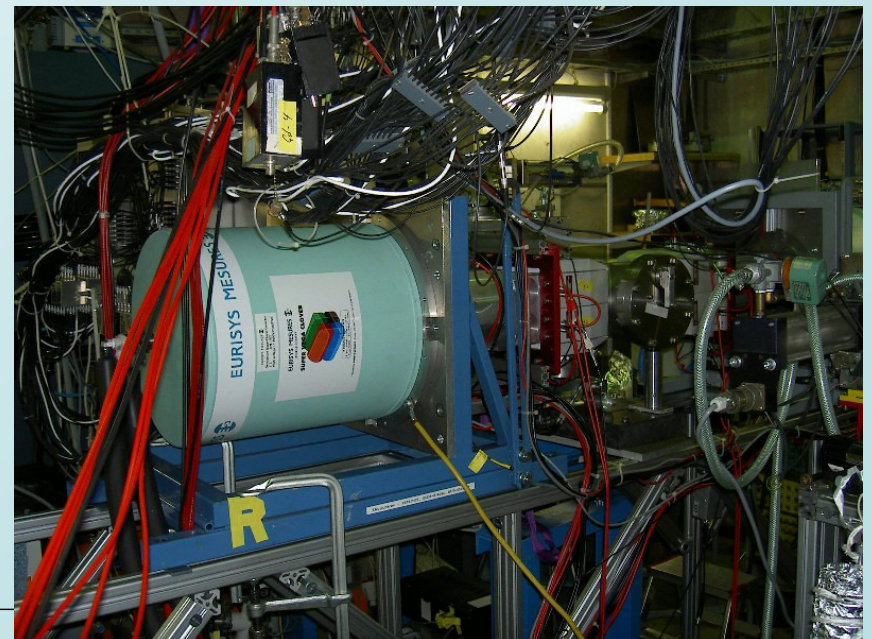
- total efficiency from α - γ coincidences

$$\varepsilon_{\text{exp}} = 15\% \text{ at } E_{\gamma} = 150 \text{ keV}$$

- alternative: SHIP clover

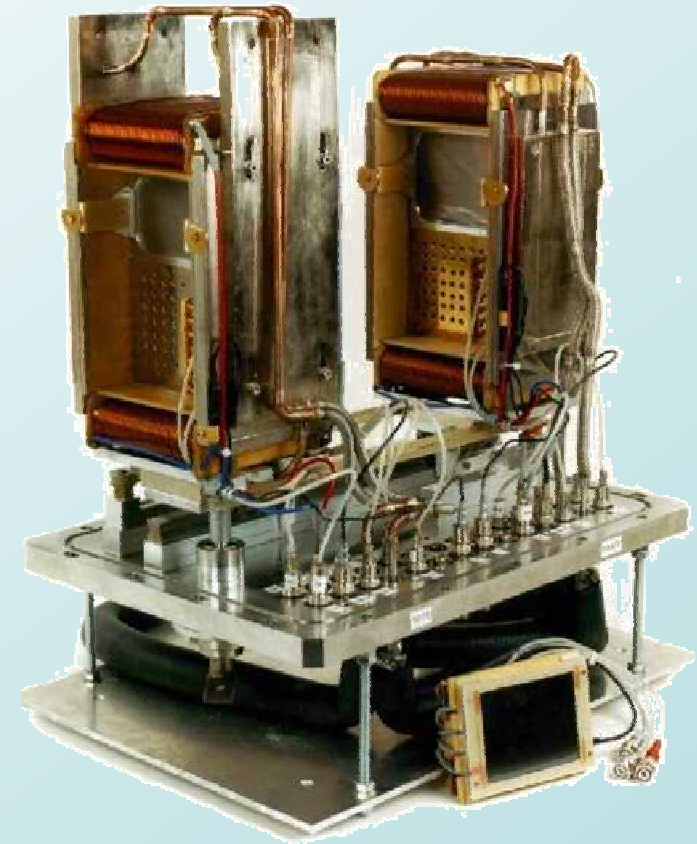
- 4 crystals (50x79)mm²

- efficiency per crystal 20% at 1.3 MeV



The Veto and TOF Detectors

- **3 units**
 - **total efficiency > 99%**
- **2 C-foils**
 - **(55/74x100)mm²**
 - **entrance foil coated with MgO for more efficient e⁻ emission**
 - **second foil for homogenous acceleration field**
- **magnetic deflection onto a pair of micro channelplates**
- **time resolution \approx 500 ps**
- **alternative for TASCAs: SED (E. Polacco) or PPAC (L. Corradi, LNL; FMA at ANL)**



Call for "Virtual Institutes" by the HGF - SHE Proposal Selected by the GSI-WD

Vernetzung mit Hochschulen – Virtuelle Institute

Ausschreibung

für **10 Virtuelle Institute**, gefördert aus dem Impuls- und Vernetzungsfonds des Präsidenten vom 7. April 2006

Bewerbungsfrist: 7. Juli 2006

→ **deadline July 7th 2006**



(Tischvorlage für die WD-Sitzung am **26.04.2006**)
Vorschlag für ein

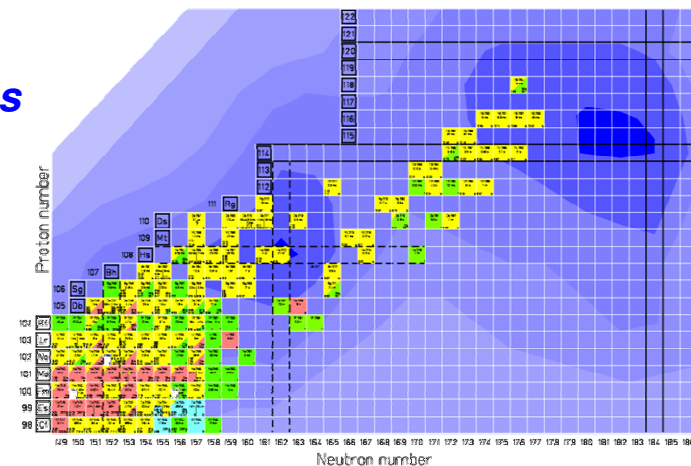
Virtuelles Institut

Schwere Elemente

- *SuperHeavy Elements – Chemical and Physical Properties*

**Physikalische und Chemische
Eigenschaften**

*Selected by the GSI
scientific council (WD)
as 1 of 2 to be elaborated*



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Schweiz

*Partner Institutions and
Spokespersons*

