Experimental Proposal S330

- Title ^{100}Sn: Gamov-Teller Strength in its Decay
  Search for its Isomer
  Particle Stability of Heavier Nuclei
- Spokesperson: Thomas Faestermann, TU München
- GSI Contact Person: Magda Gorska, GSI
- Year of Approval: 2006
- Shifts: 57 + 30 approved (main + parasitic)
  0 + 13? used (main + parasitic)
  57 + 17? left (main + parasitic)

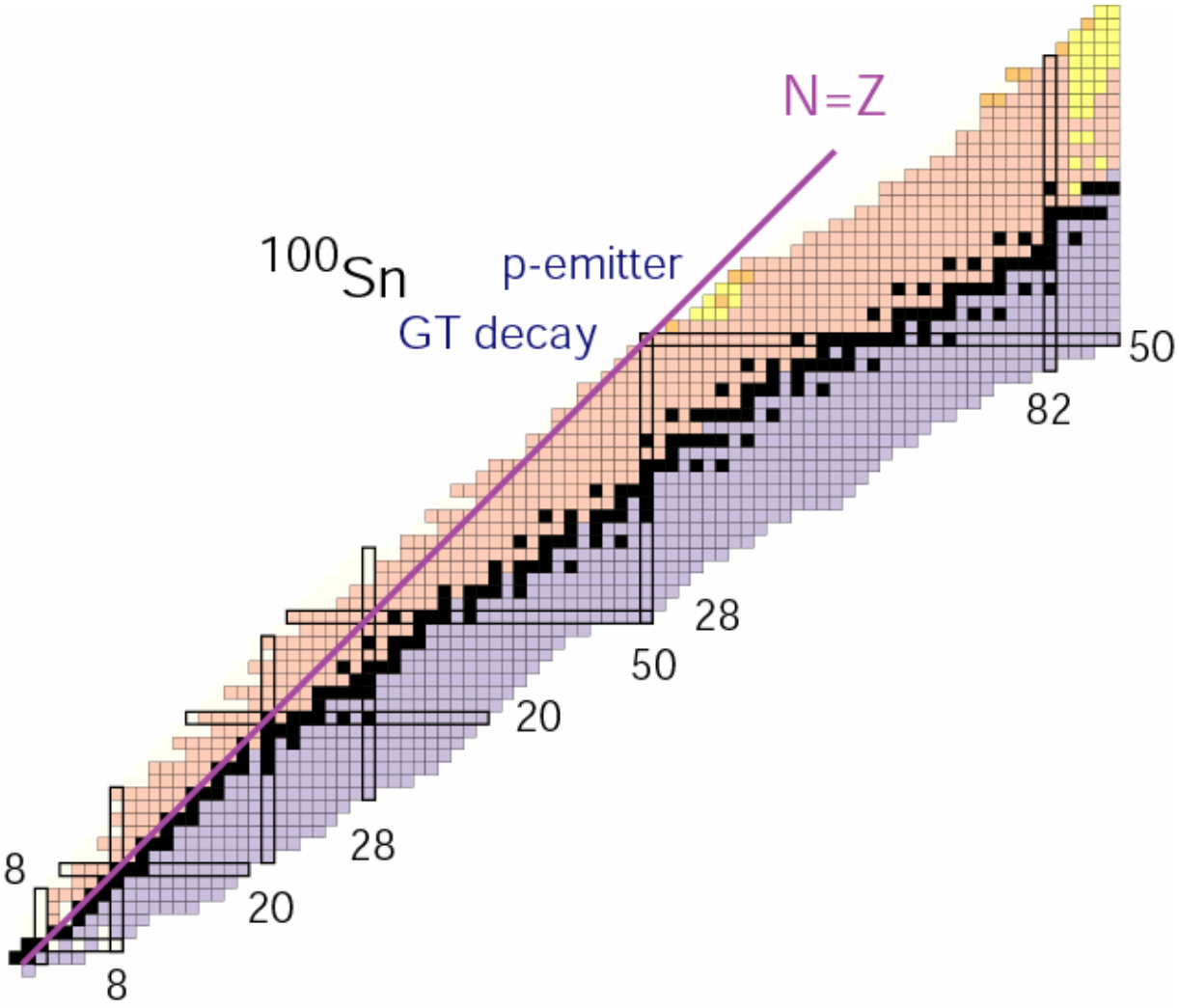
Physics Motivation

- Physics motivation + goals of the experiment

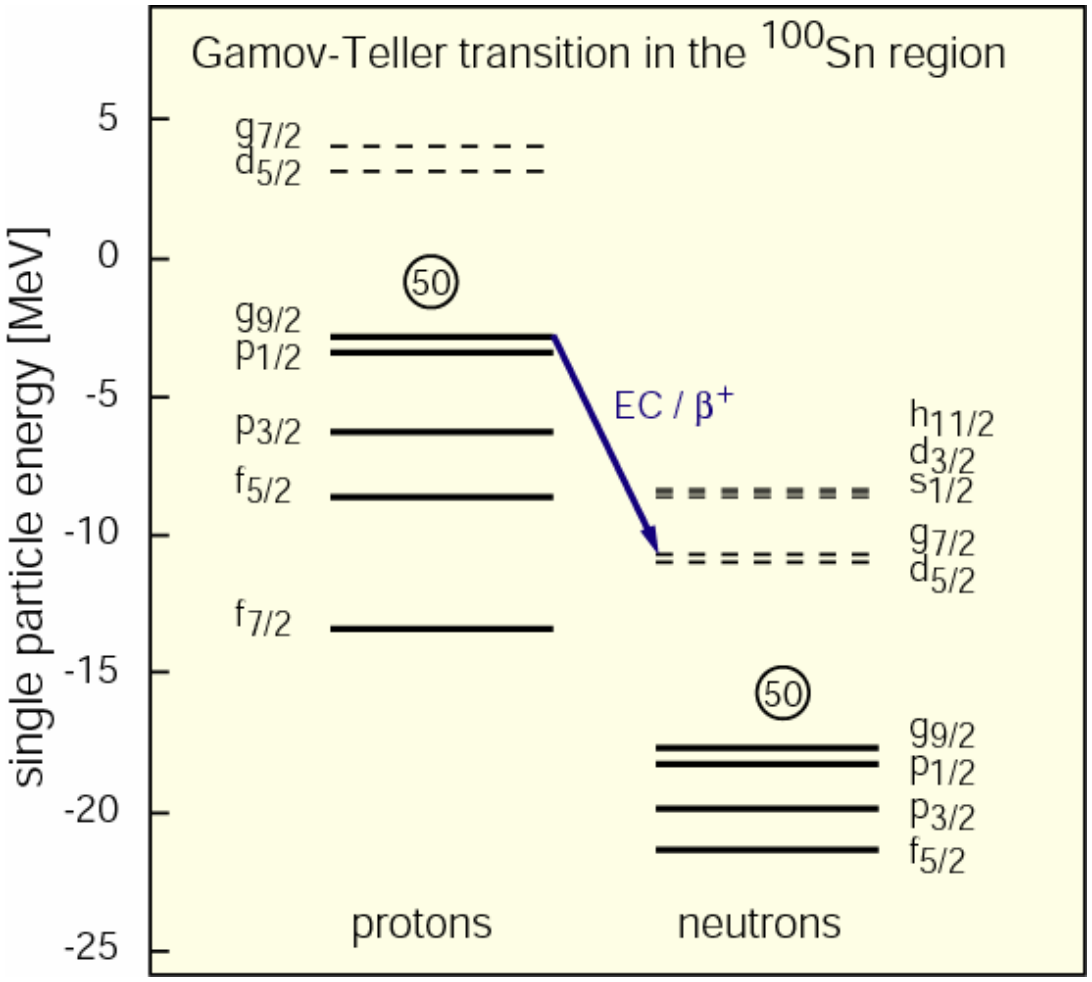
^{100}Sn: Gamov-Teller Strength in its Decay
Search for its Isomer
Particle Stability of Heavier Nuclei

S330

TUM
GSI
Edinburgh
MSU
Surrey
Uppsala
Warsaw
+
RISING



Shell Model Orbitals



ideal testing ground
for GT-strength:

pure spin-flip transition
$0^+ \Rightarrow (\pi g_{9/2}^{-1}\, \nu g_{7/2})1^+$

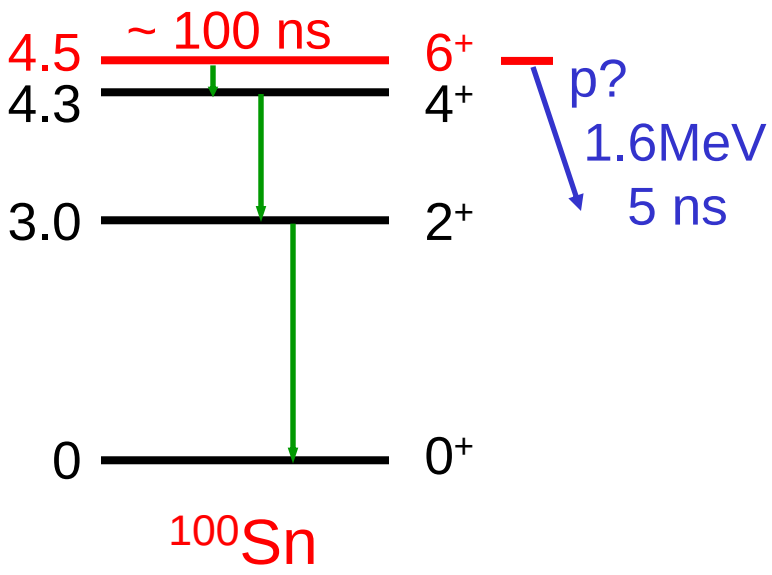
large decay energy
=> most of GT resonance
in β-decay window

a) measure:
$T_{1/2}$
endpoint energy
(branching)
=> GT-strength

get ~ 300 ^{100}Sn decays

b) ^{100}Sn 6^+ Isomer?

estimate:



300 ^{100}Sn => 150 isomers =>
80 implanted => 20-5 γ detected

c) Proton or α Radioactivity?

^{105}Sb: 1% p-branch?
claimed by LBL
not seen at GSI
test with $4 \cdot 10^4$ in 2 hours
(^{109}I α-branch proofs no!)

^{104}Sb: p-branch?
test with $2 \cdot 10^4$ in 1 day

^{103}Sb:
observable after 200ns?
observed at GANIL !
test with 400 in 1 day

^{104}Te:
observable after 200ns?
search with 3 in 1 day

Setup

- FRS focal planes equipment →
- Is the setup ready? nearly →
- Is there any new or non-standard equipment required? →
- Is there a modification or a new DAQ required?
- What is the requested primary beam and intensity?

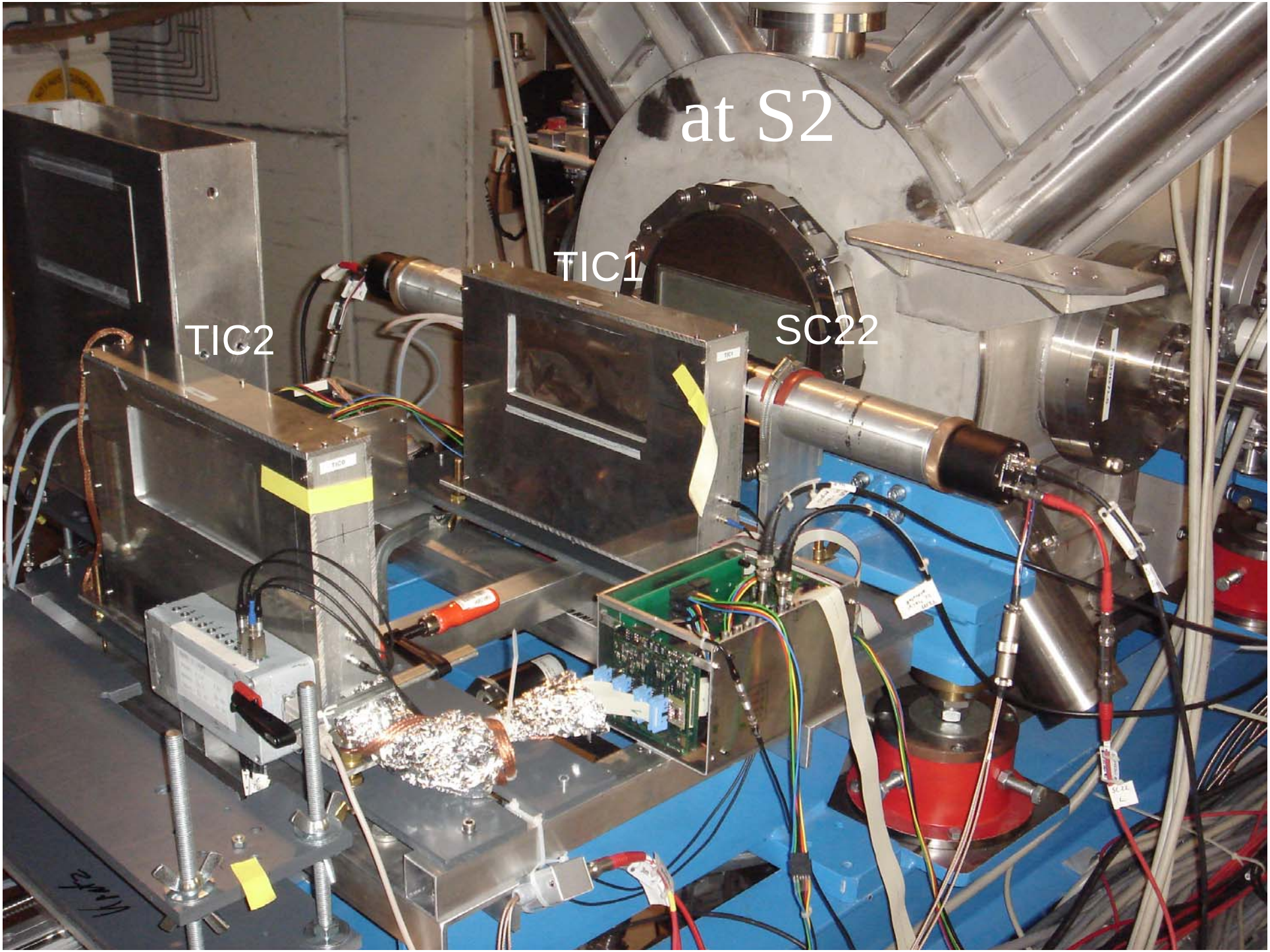
  ^{124}Xe $4*10^{9}$/spill
- How many shifts are requested for 2008?

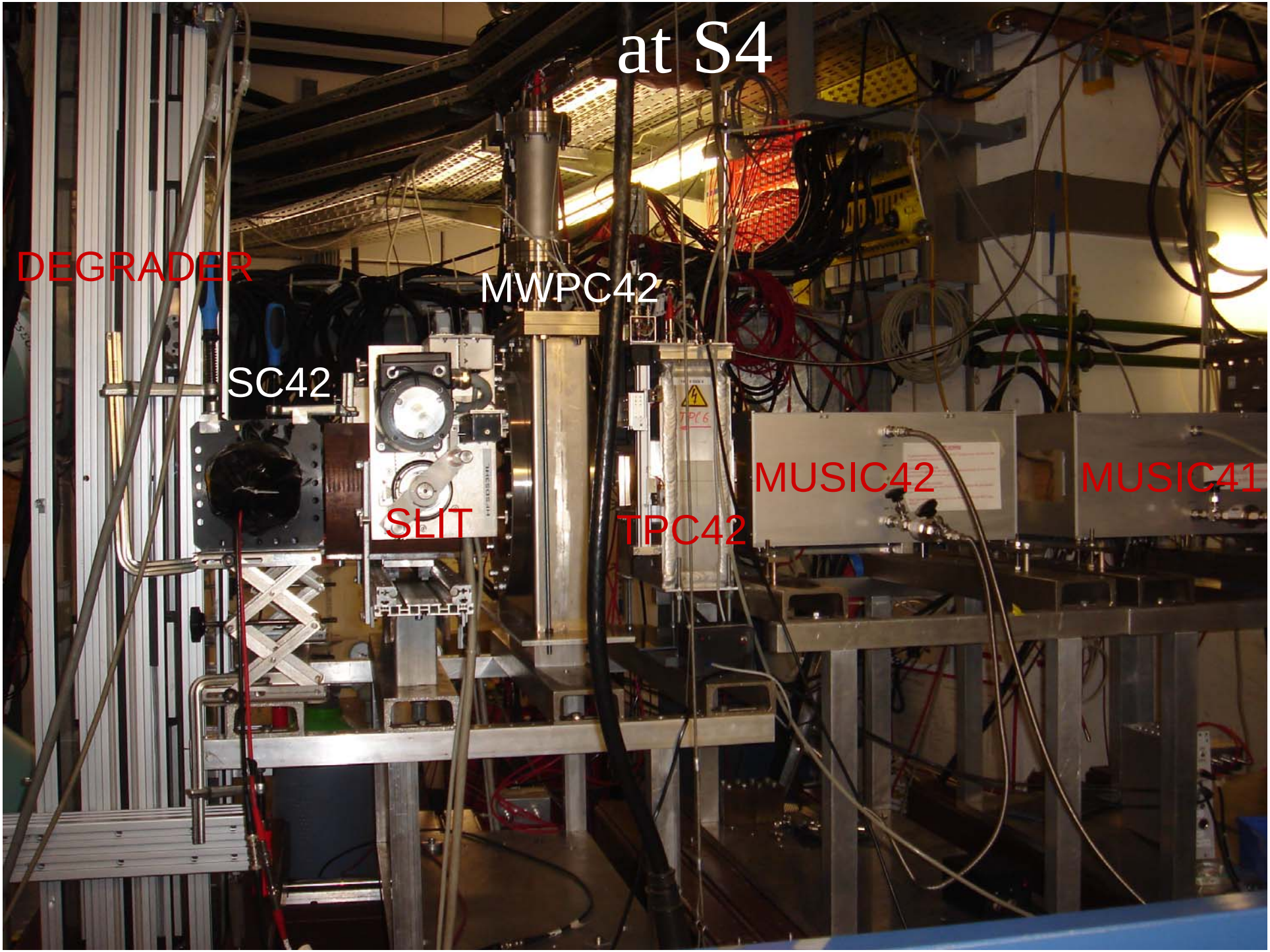
  57 + 9 parasitic

Parasitic ^{129}Xe Beam Sept. 2007

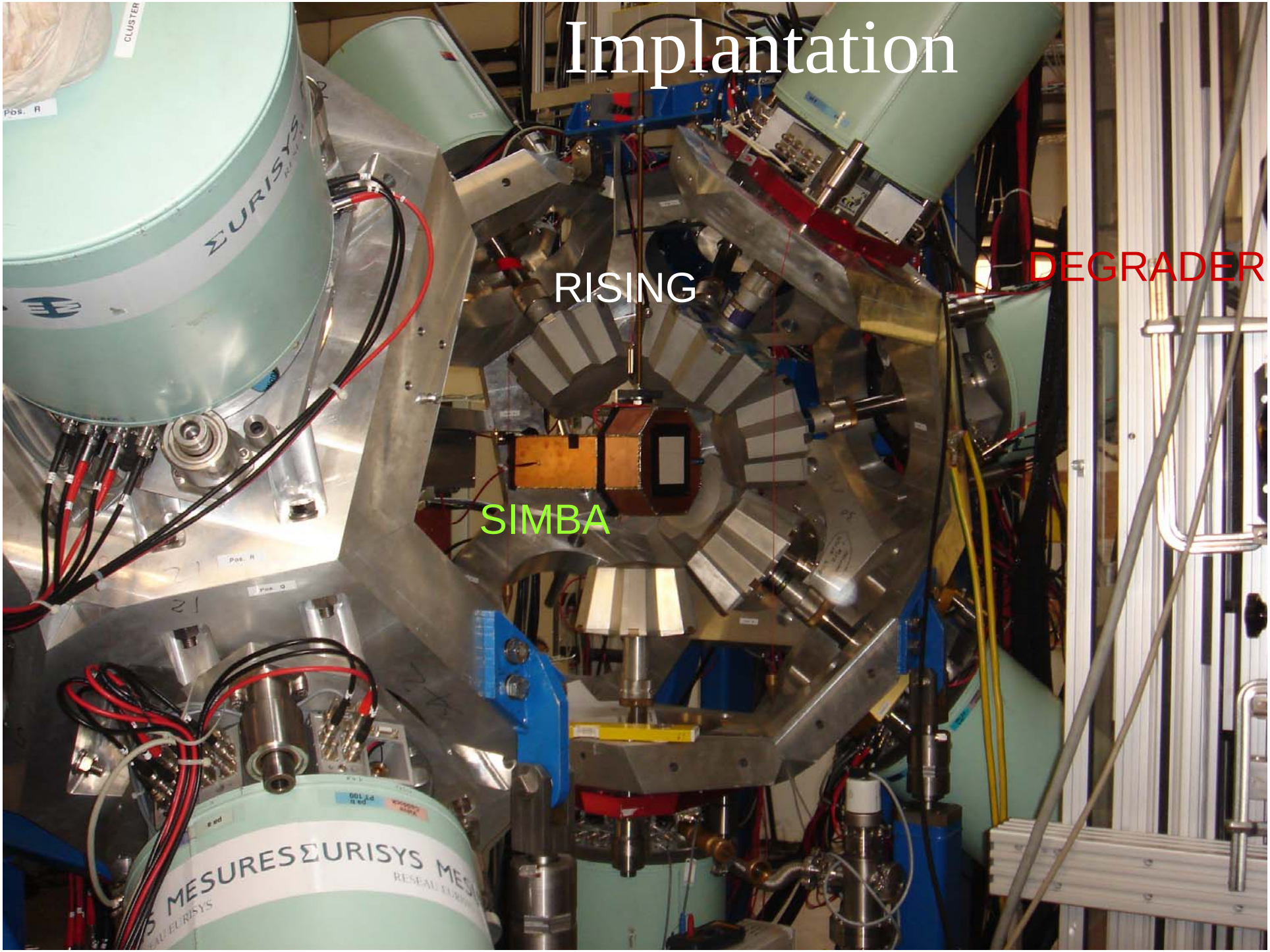
additional identification detectors:

- 2 additional scintillators @ S2, S4
- 2 tracking ionization chambers (TIC) @ S2
  - x and y information (1 mm pitch)
  - Gassiplex multiplexed readout
  - rate up to 200 kHz
- 2 MUSIC‘s @ S4
  - both functional again
  - one repaired (was not gas tight)
- 2 TPC‘s (Bratislava) tested @ S4
  - rate up to 200 kHz
  - supposed to become
  - standard FRS position detectors

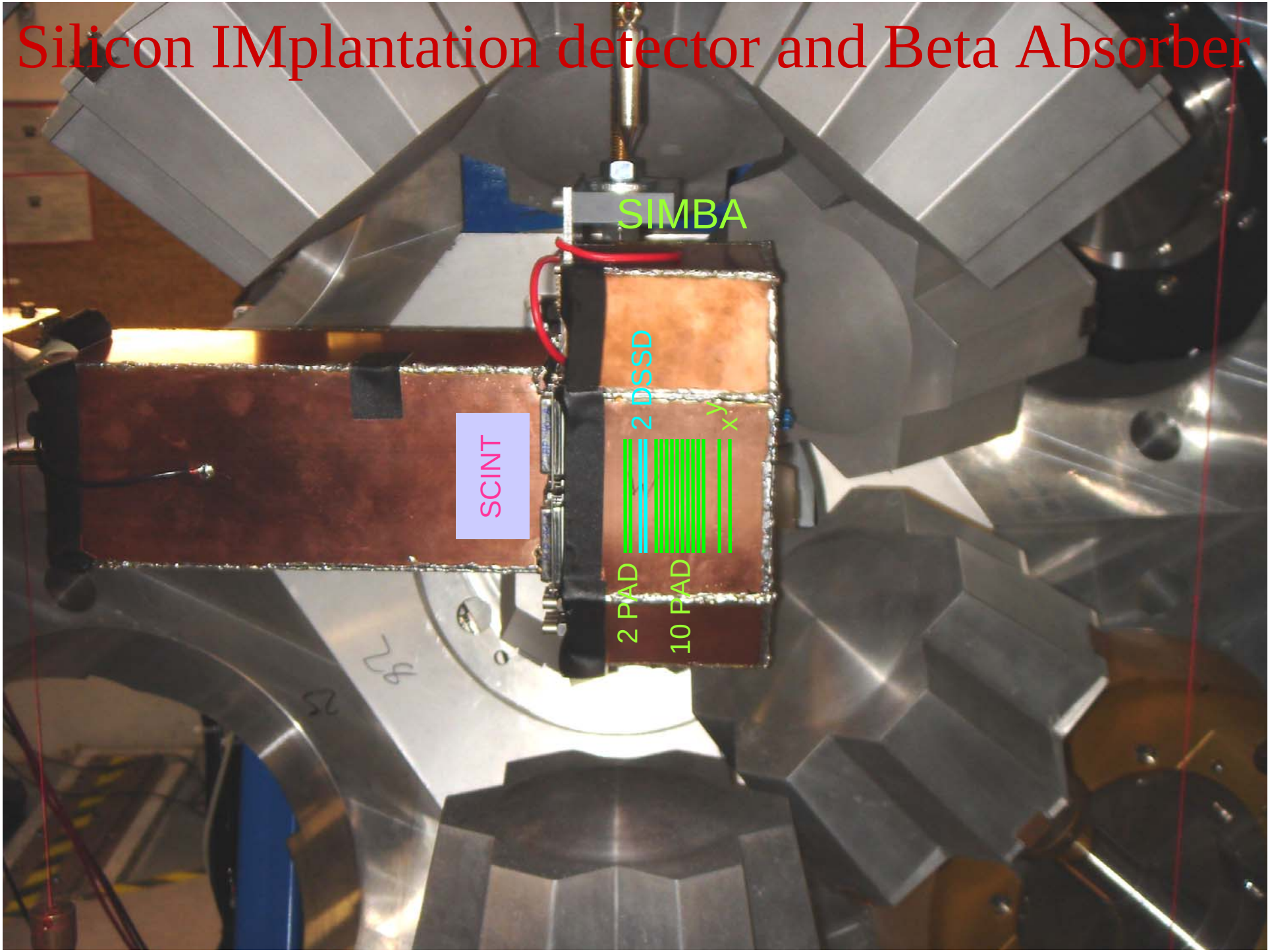

at S2
TIC1
TIC2
SC22


at S4
DEGRADER
MWPC42
SC42
SLIT
TPC42
MUSIC42
MUSIC41

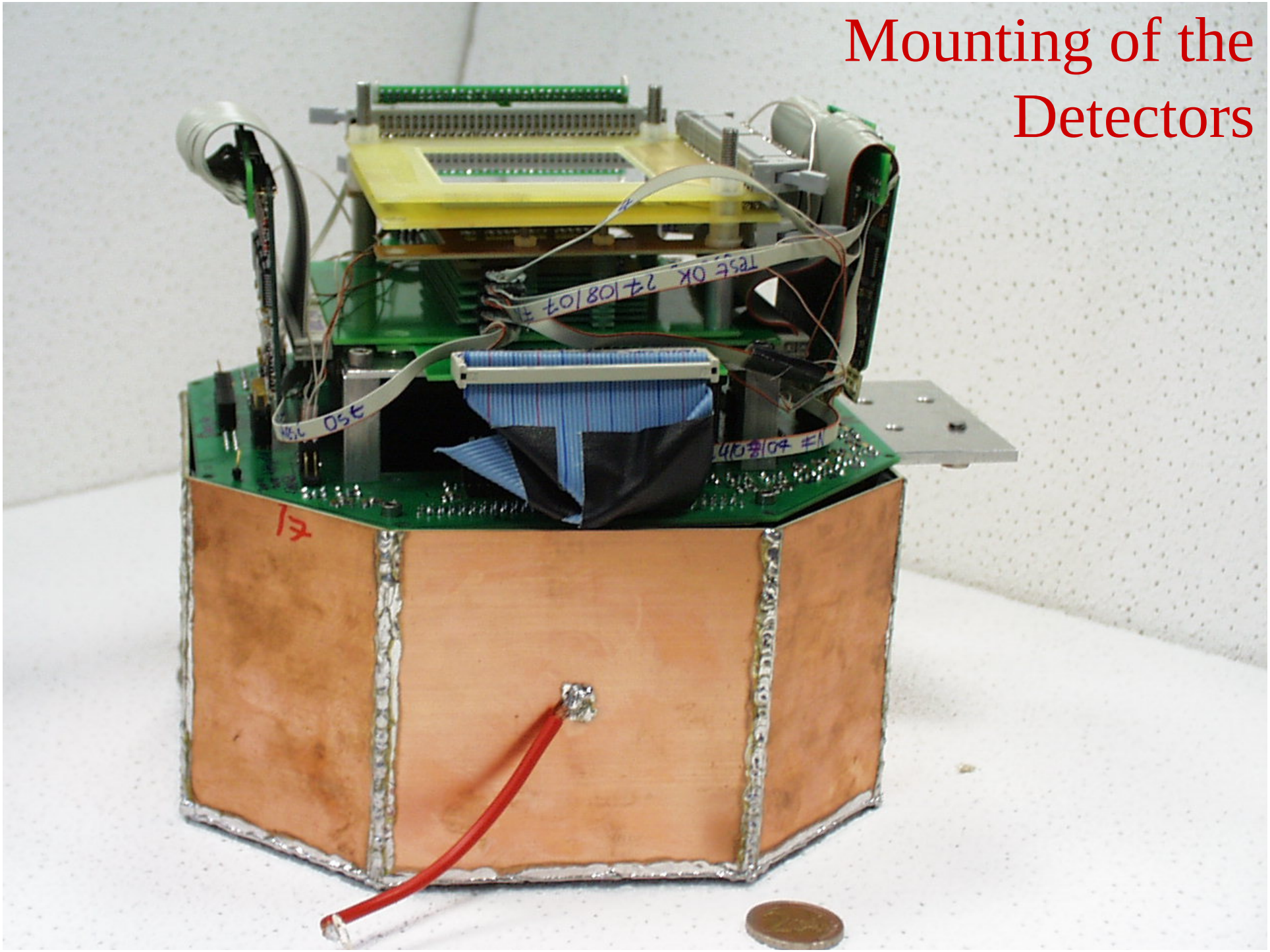
Implantation



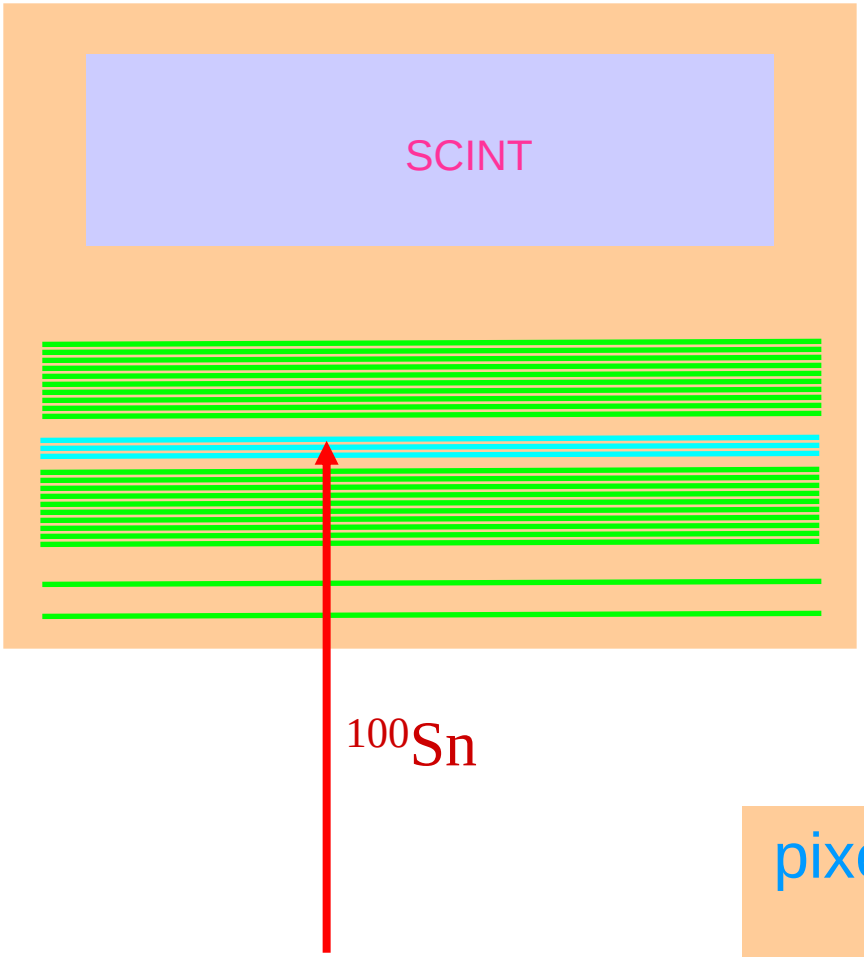
Silicon IMplantation detector and Beta Absorber



Mounting of the Detectors



Final Implantation Detector



10 SSSD 60x40x1 mm^3

3 DSSD 60x40x0.7 mm^3

10 SSSD 60x40x1 mm^3

} Gassiplex + Mesytec

Y SSSD 60x60x0.3 mm^3

X SSSD 60x60x0.3 mm^3

} R - chain

pixels in implantation zone:
3x60x40 = 7200

real experiment: Feb 27, 2008 hopefully