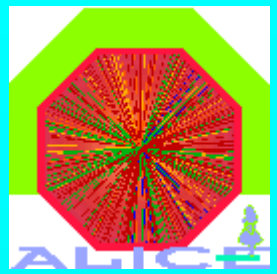
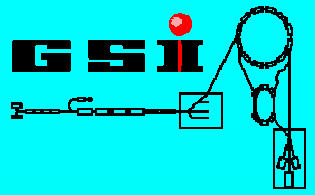
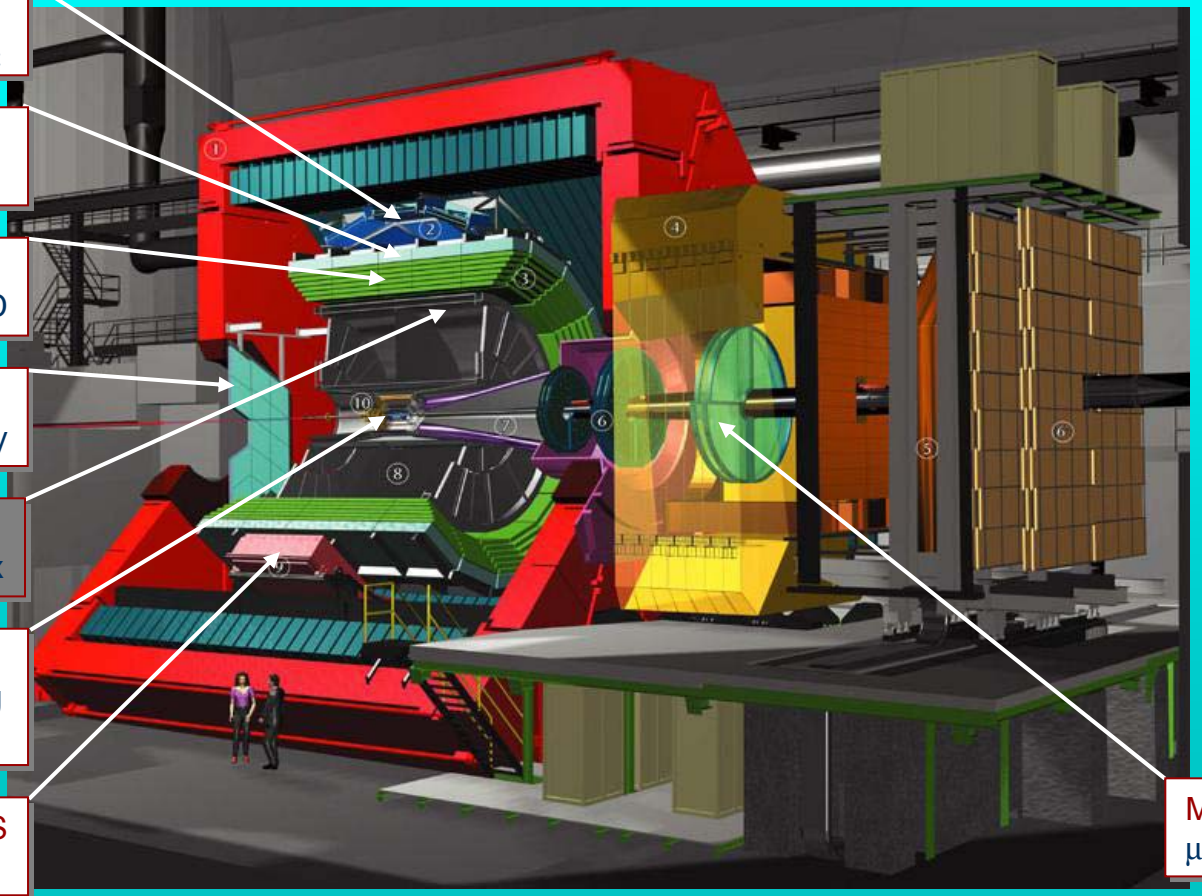




Alice TPC Construction

D. Vranic

The ALICE Detector



HMPID
PID (RICH) @ high p_t

TOF
PID p_t = 1-3 GeV/c

TRD
Electron ID

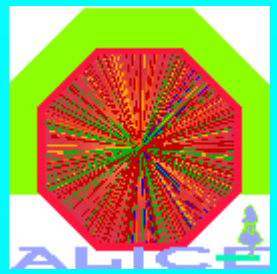
PMD
γ multiplicity

TPC
Tracking, dEdx

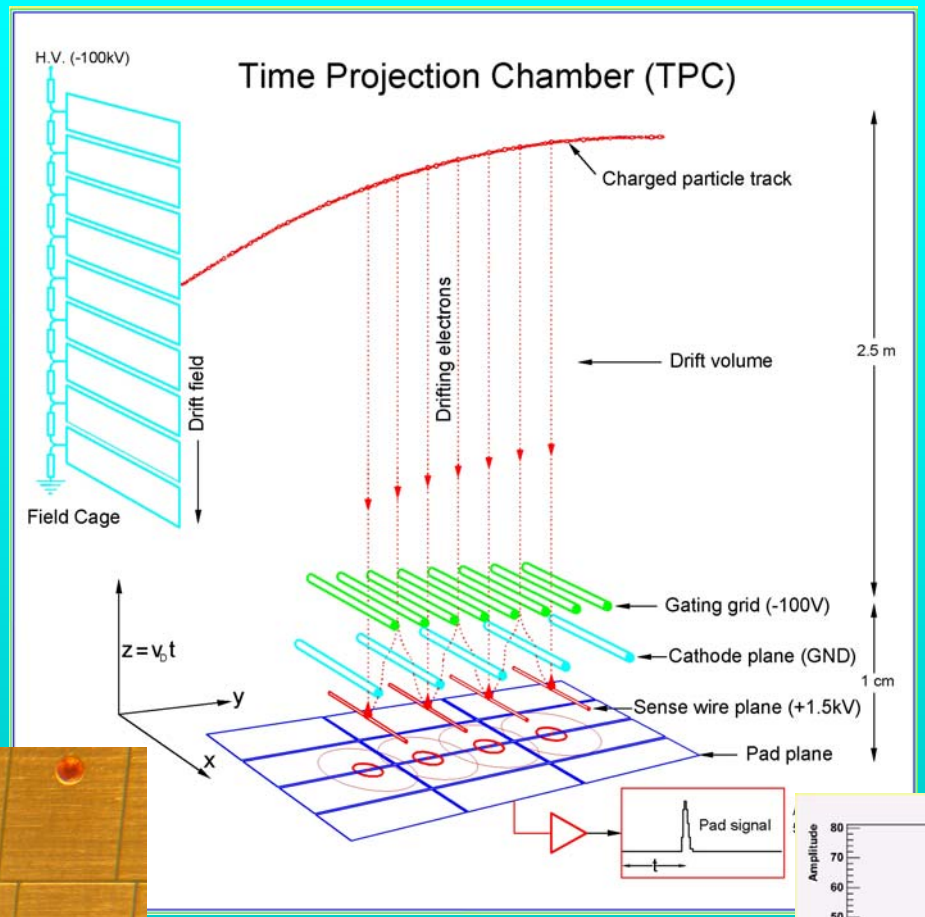
ITS
Low p_t tracking
Vertexing

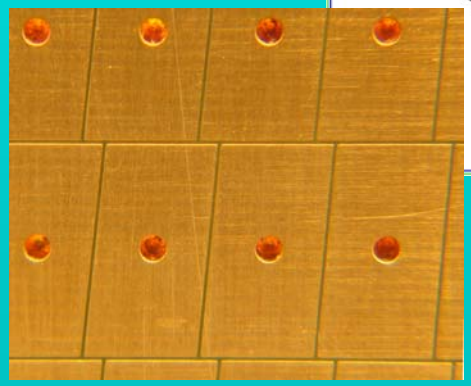
PHOS
γ,π^0

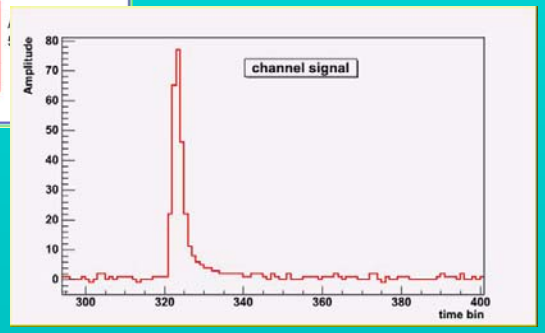
MUON
μ-pairs



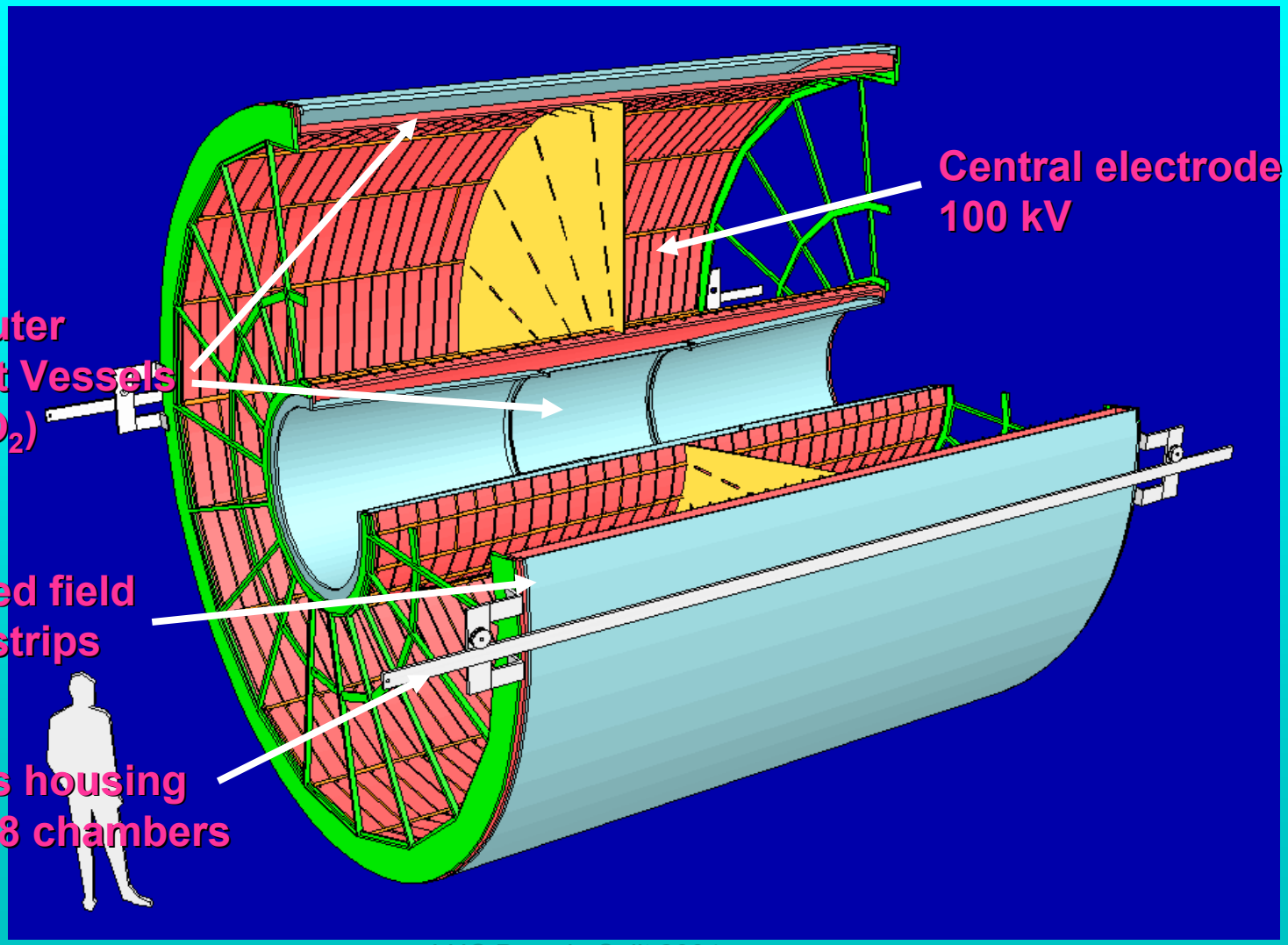
TPC Principle



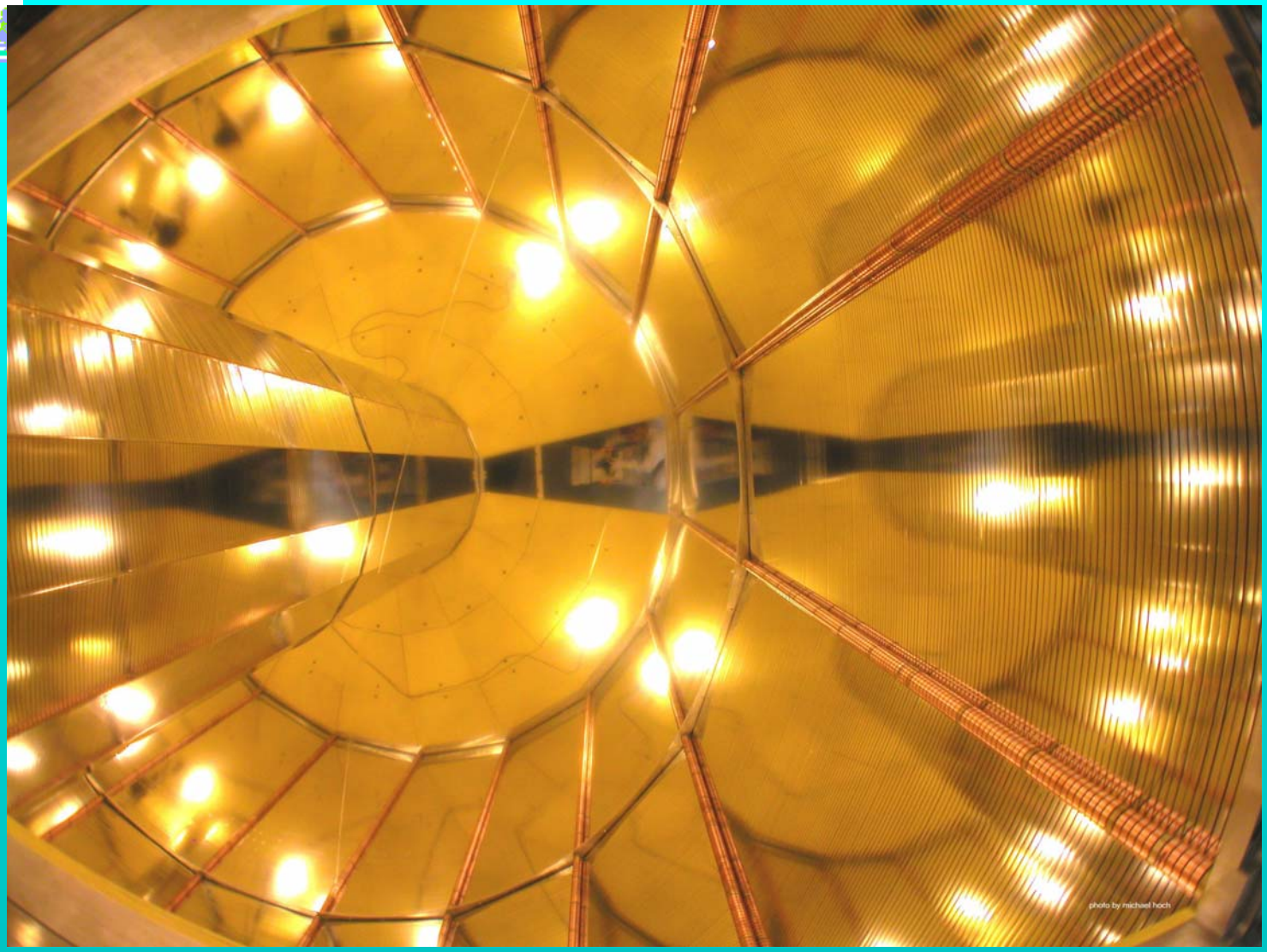




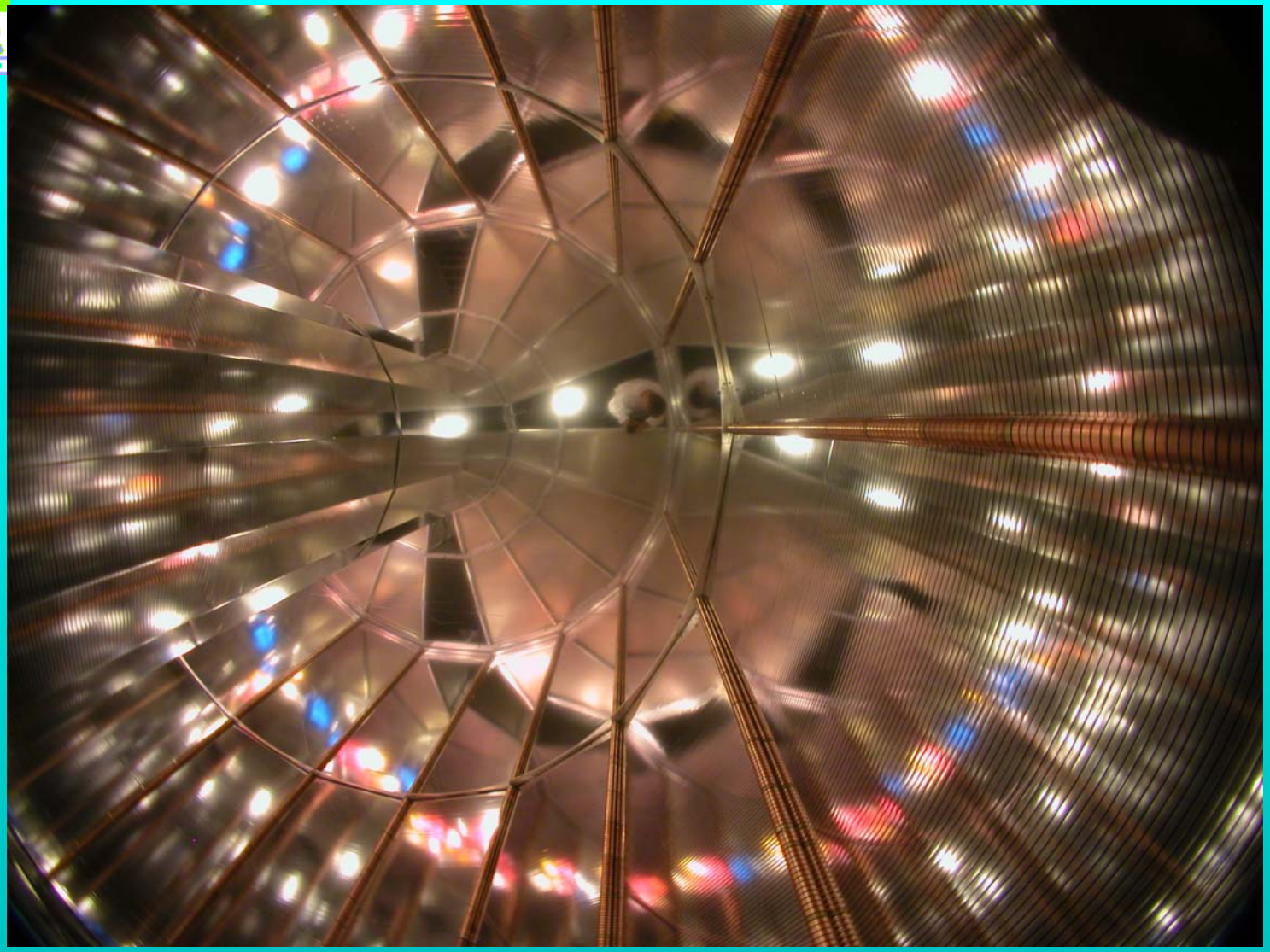
Field Cage


Central electrode
100 kV
Inner and Outer
Containment Vessels
(150 mm, CO_2)
Suspended field
defining strips
400 V/cm
Endplates housing
2 × 2 × 18 chambers

Field Cage

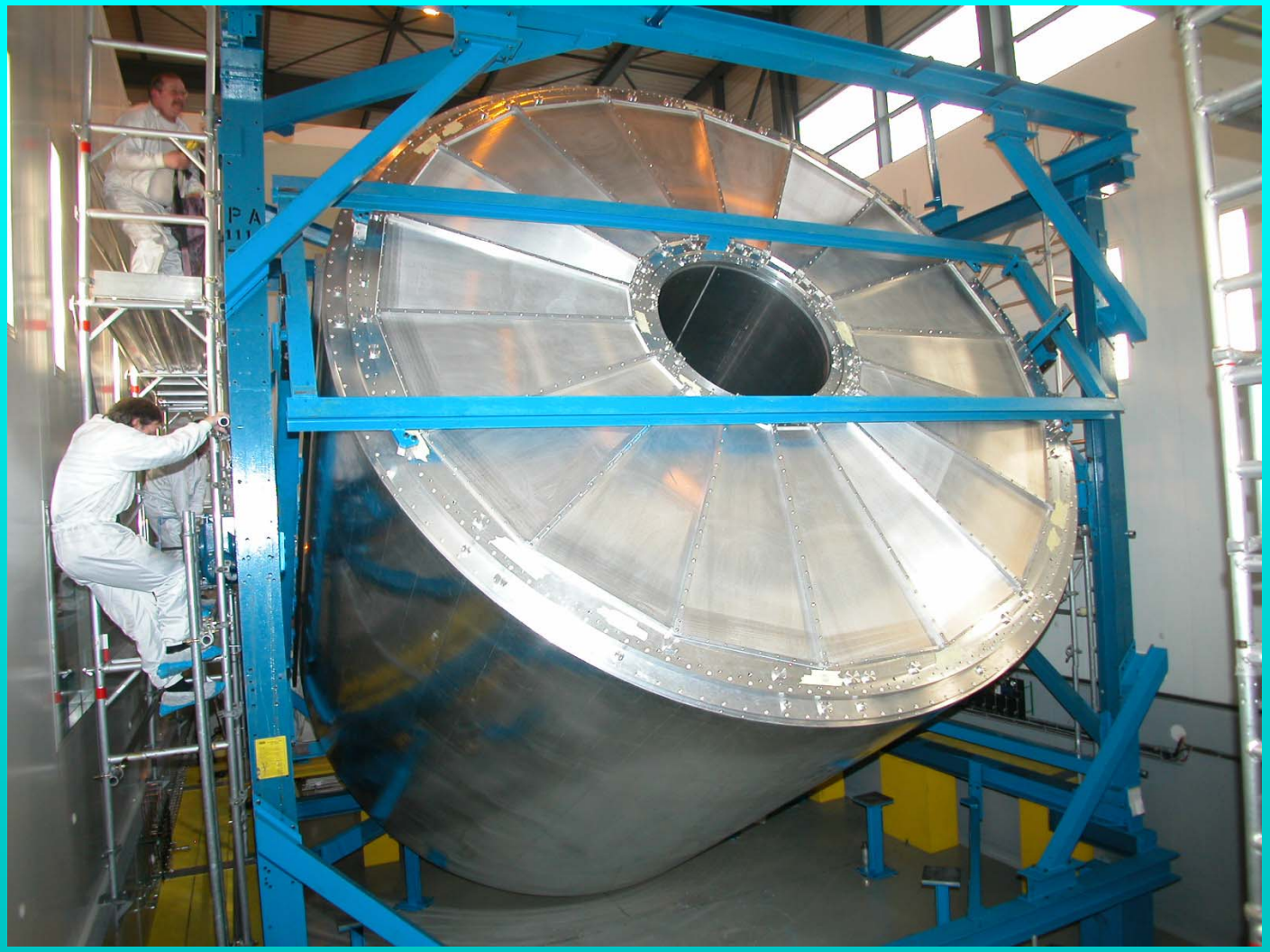


Field Cage

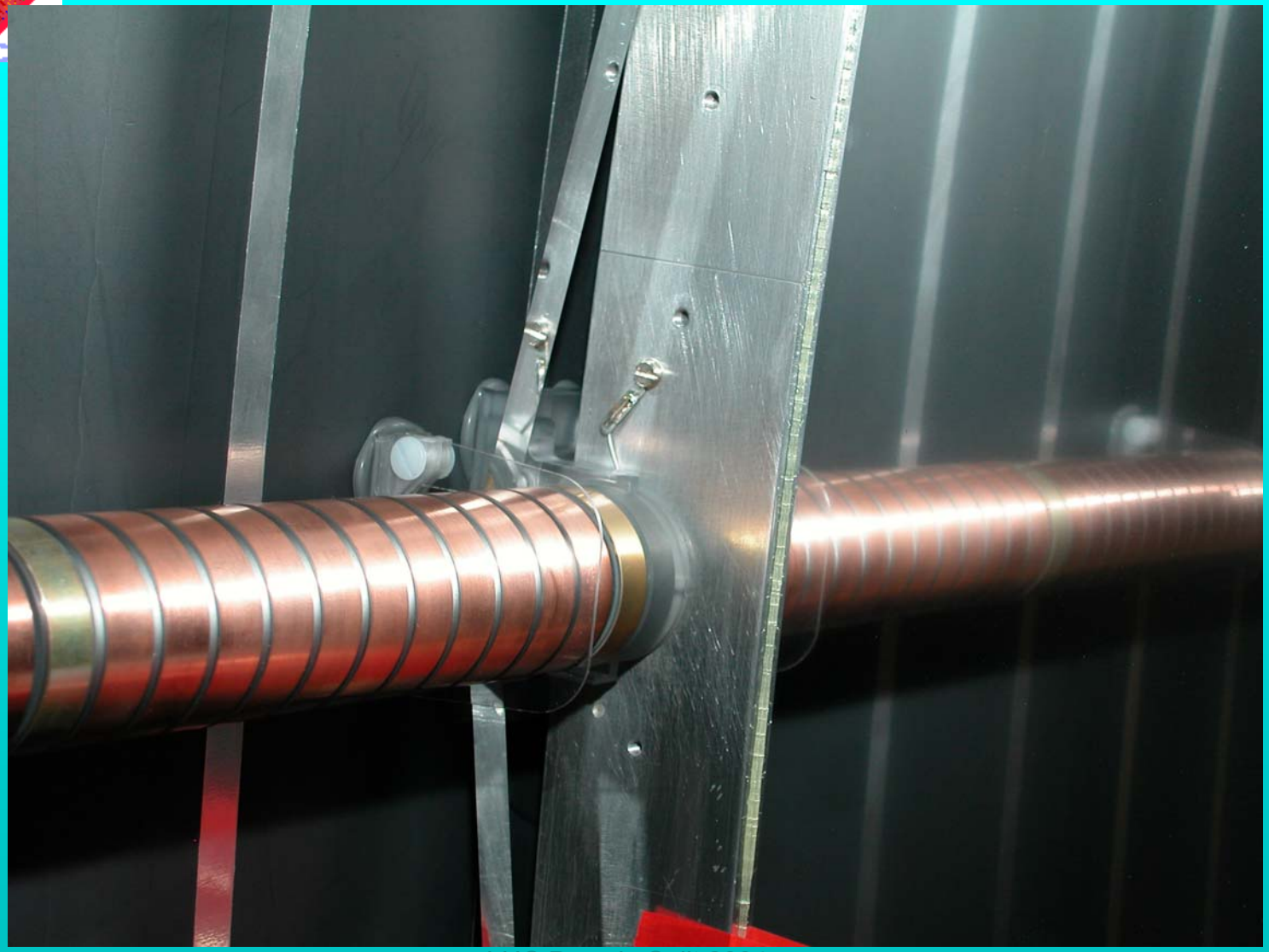


Field Cage

Field Cage Outside

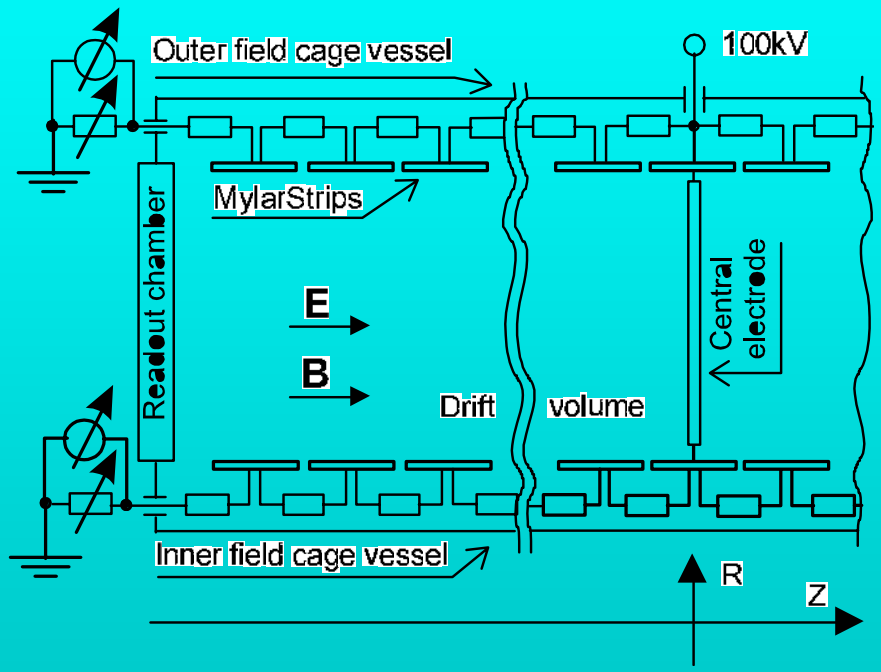


Strips Support Tube



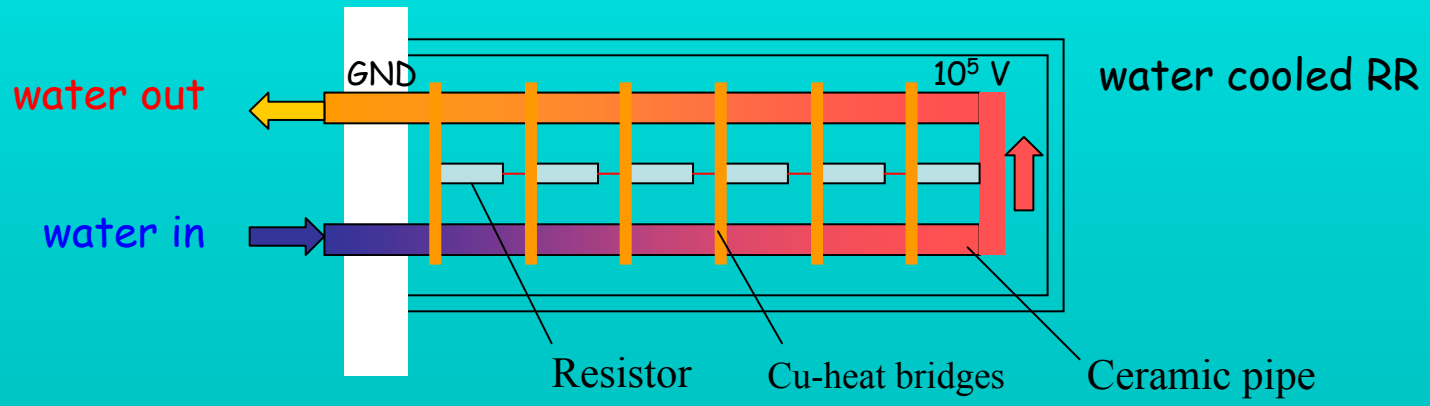
Voltage Divider Chain (Resistor Rod)

- A minimum current (≈100 µA) through resistor chain is required to ensure drift field stability
- dissipation of 4 x 8 Watt as heat into drift space
- cooling needed

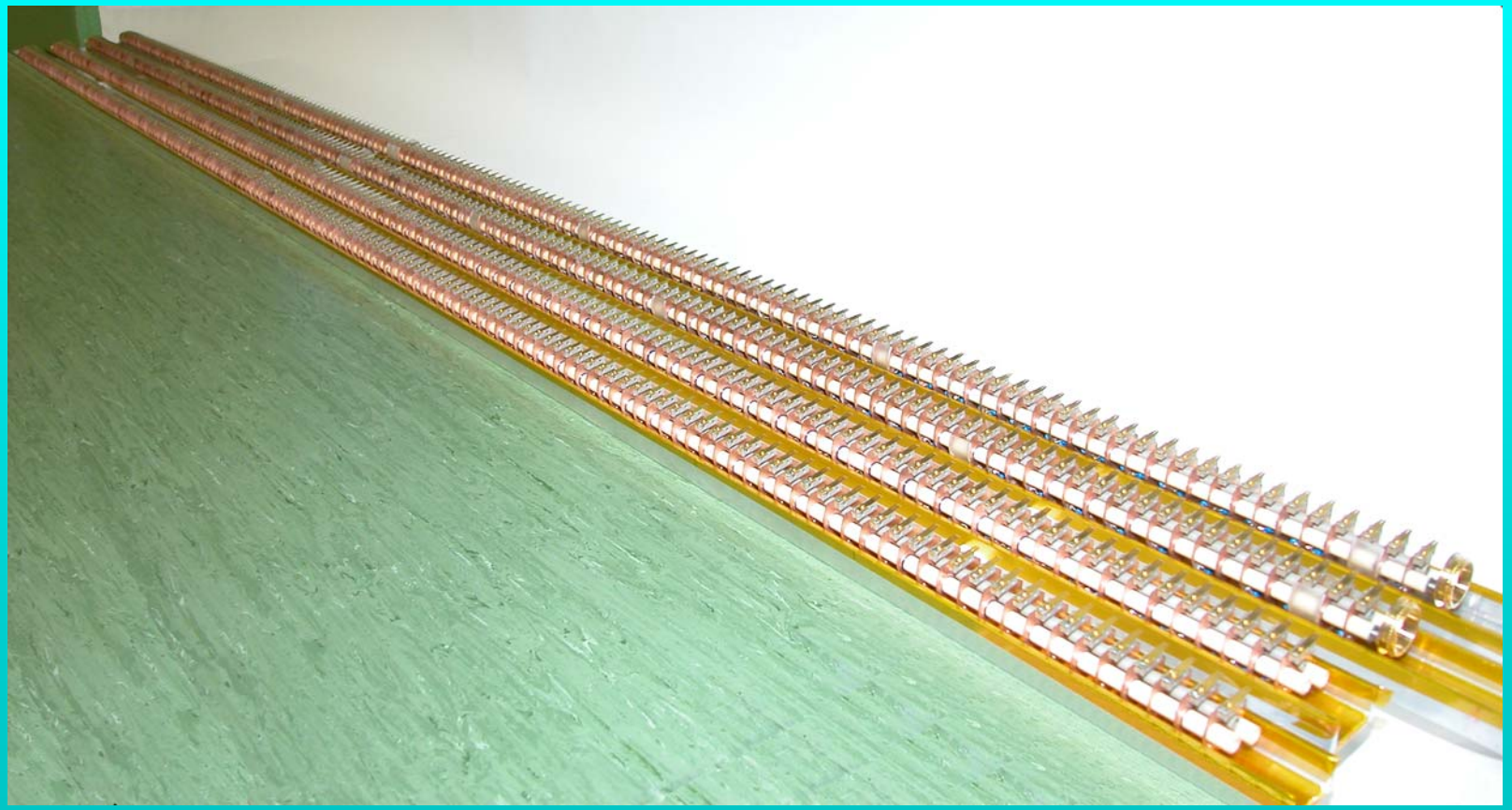


RESISTOR ROD

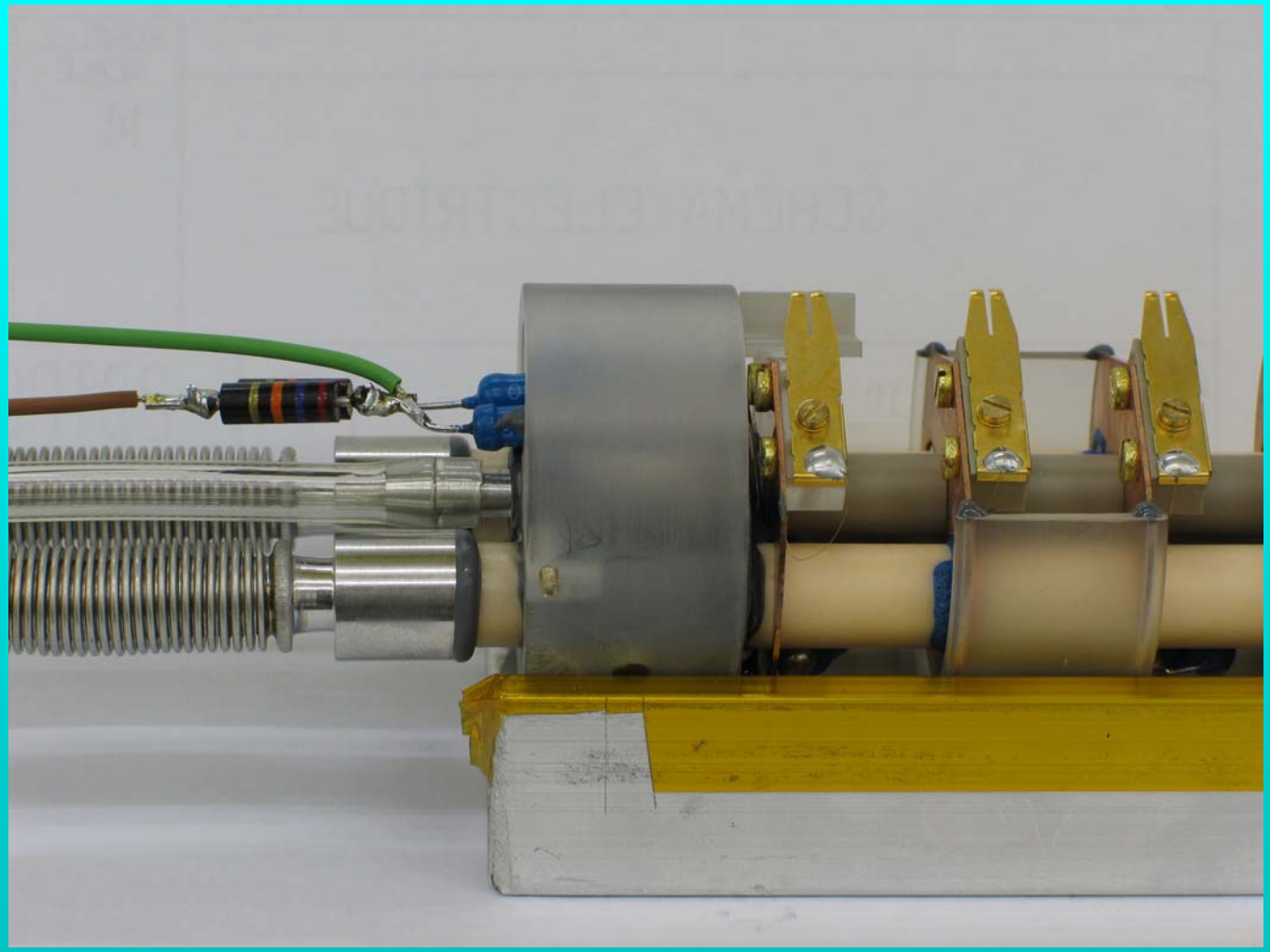
- removable, water cooled resistor rod
  - serviceable in case of resistor failure
  - leakless cooling
  - high cooling efficiency
  - ultra-pure water: 18 µS/cm



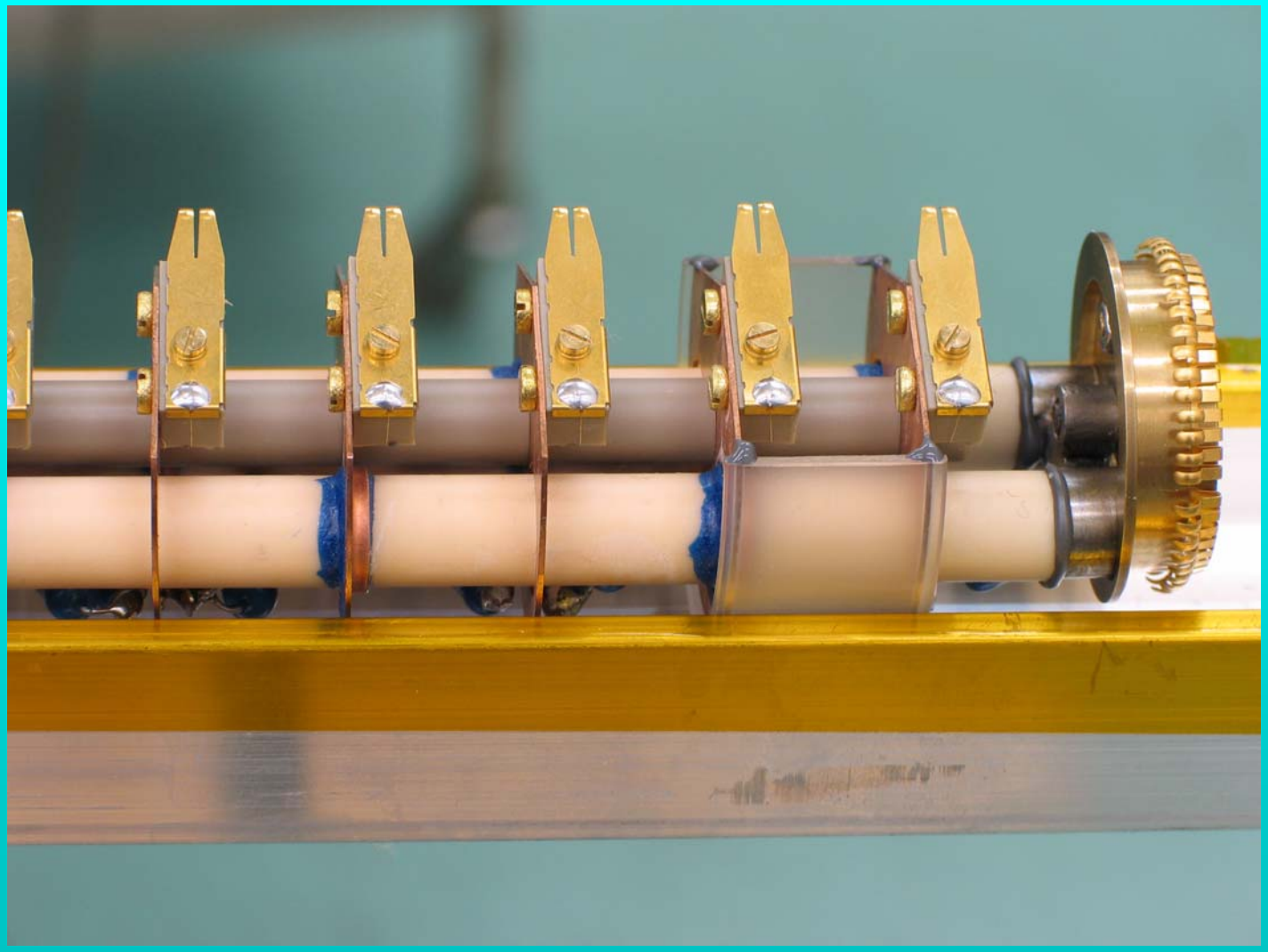
Resistor Rods



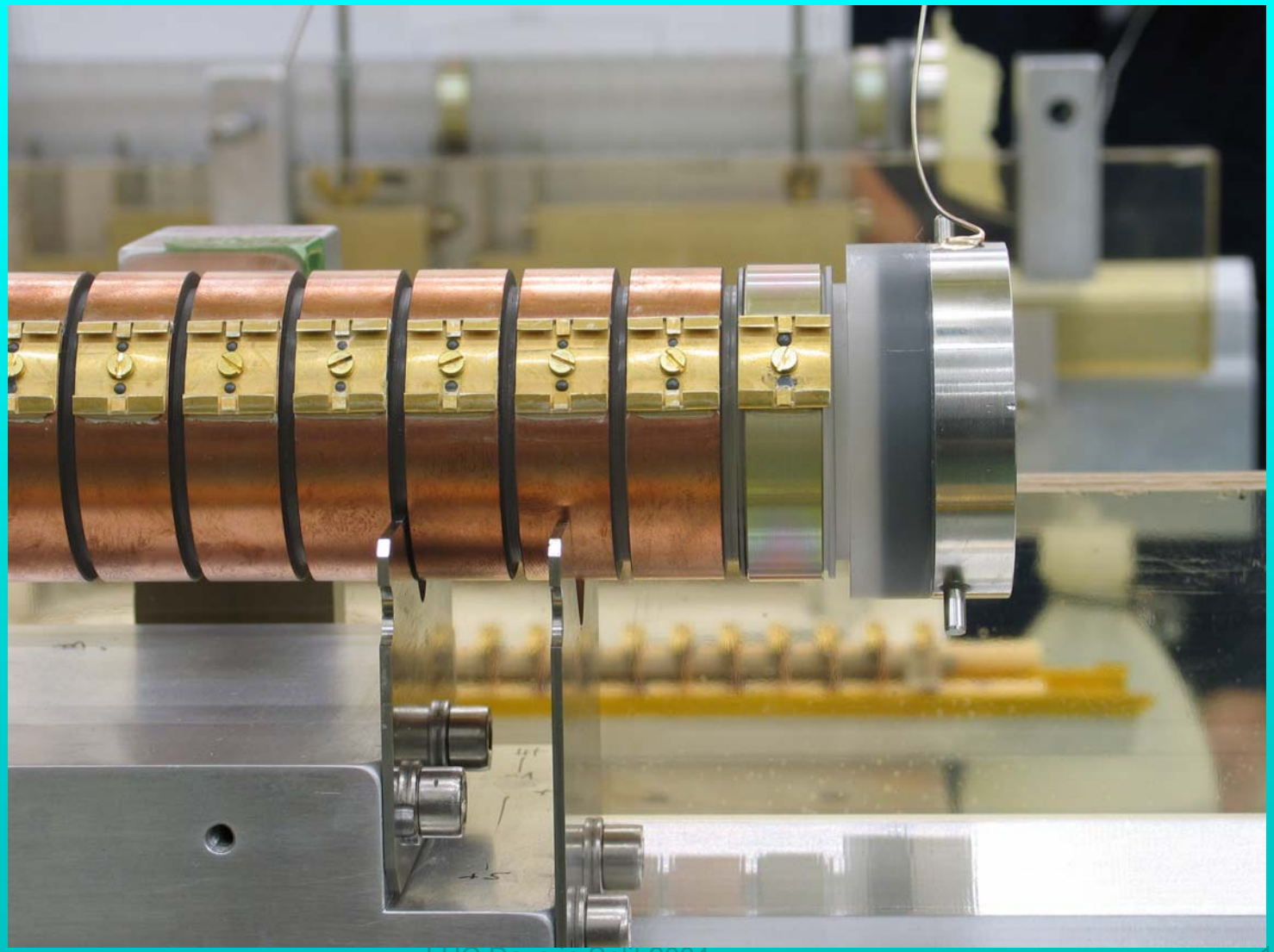
Resistor Rod LV Side

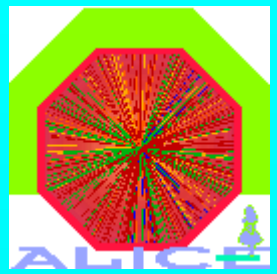


Resistor Rod HV Side

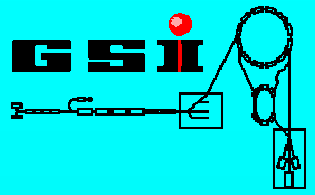


Macrolon Tube





Characteristics of the gas $Ne\text{-}CO_2$ [90-10]



Non saturated drift velocity (as with Ar):

strong dependence of Vd on everything

Very 'sensitive' Townsend coefficients:

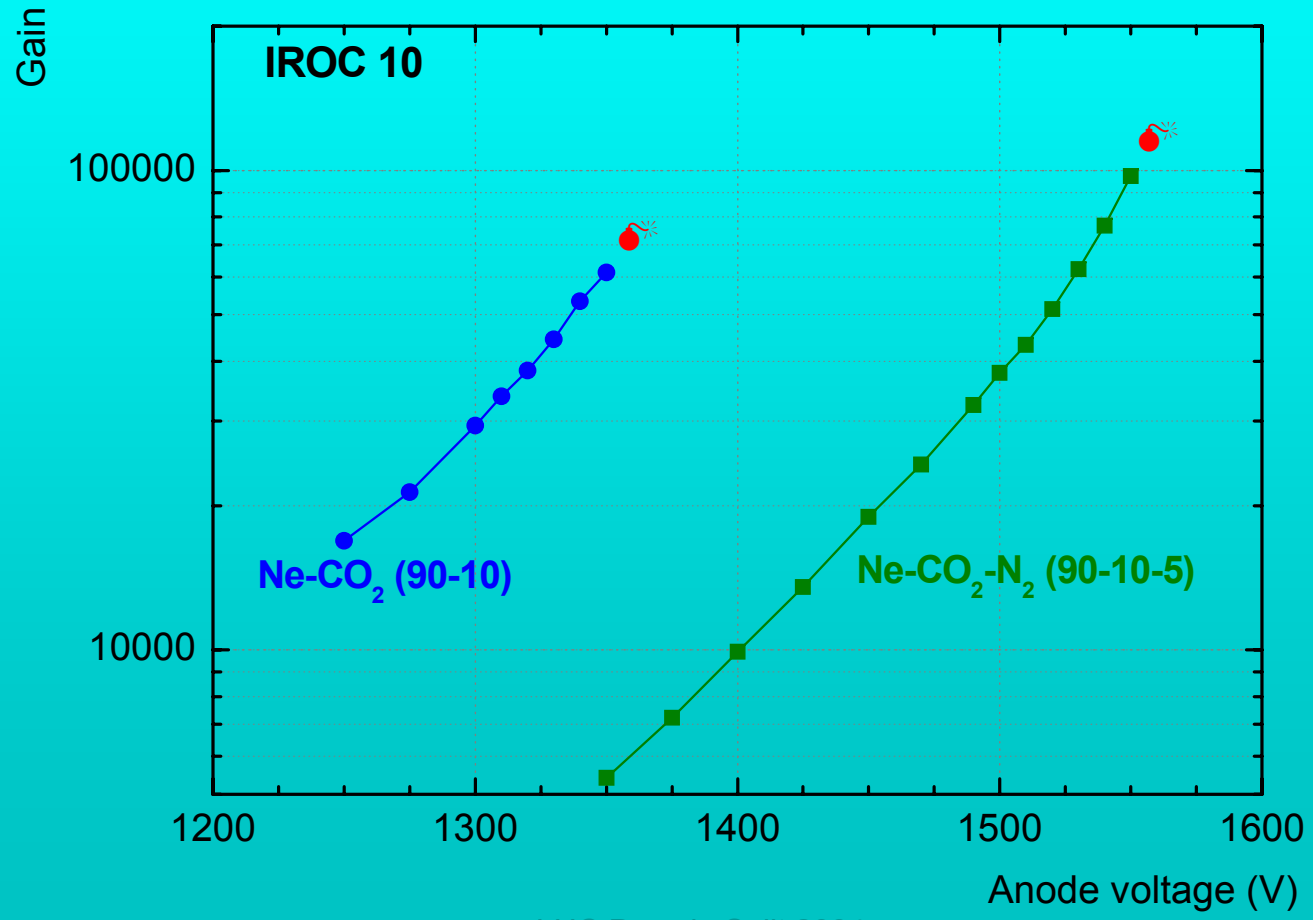
strong dependence of Gain on everything

(Everything: T, P, E, composition, purity, ...)

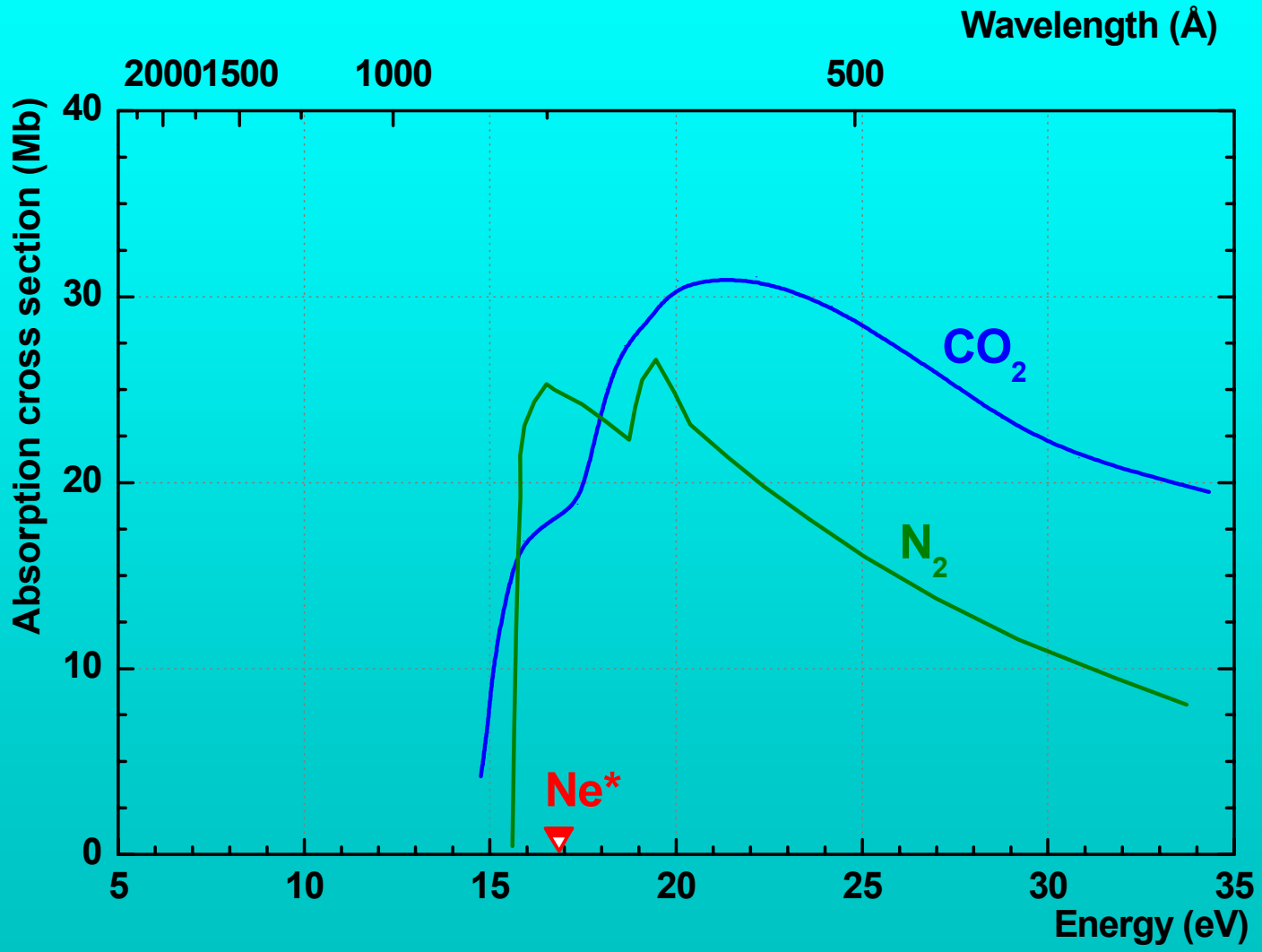
Poor stability: tendency to undergo self-sustained glow discharges due to minor imperfections in chamber construction

Is there any other quencher out there?

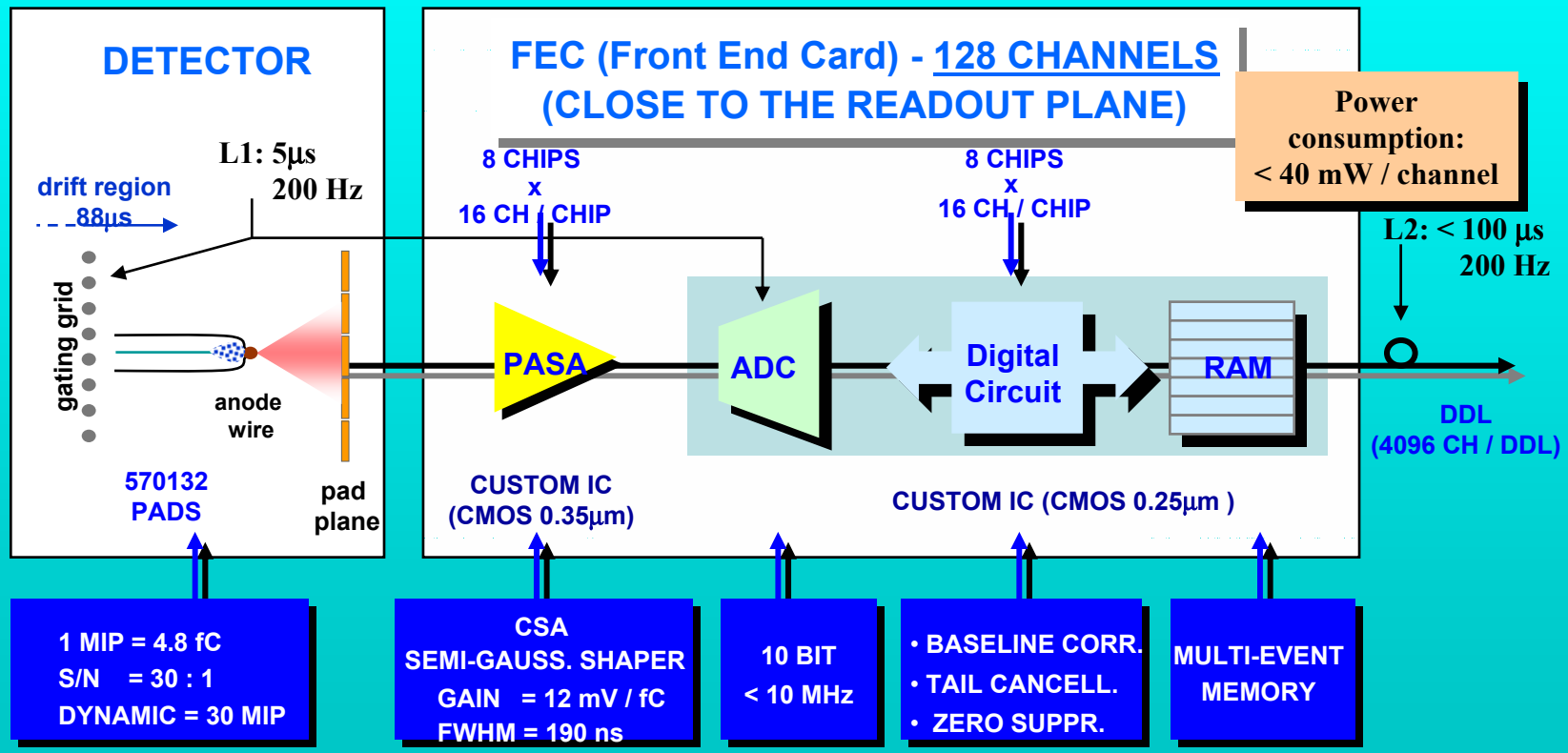
N_2 vs. no N_2: Stability
Instantaneous maximum gain



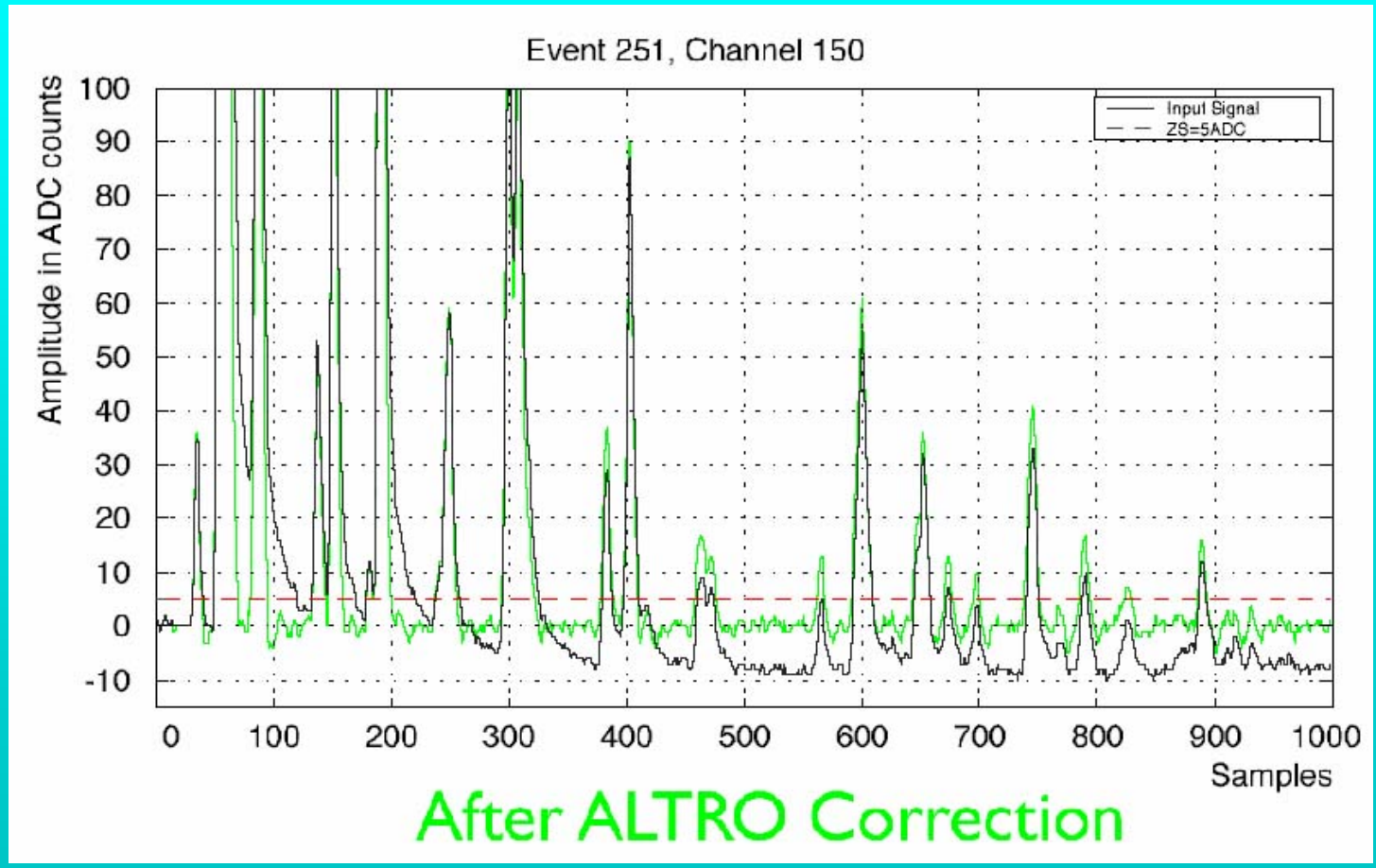
Why N_2 helps with Neon?



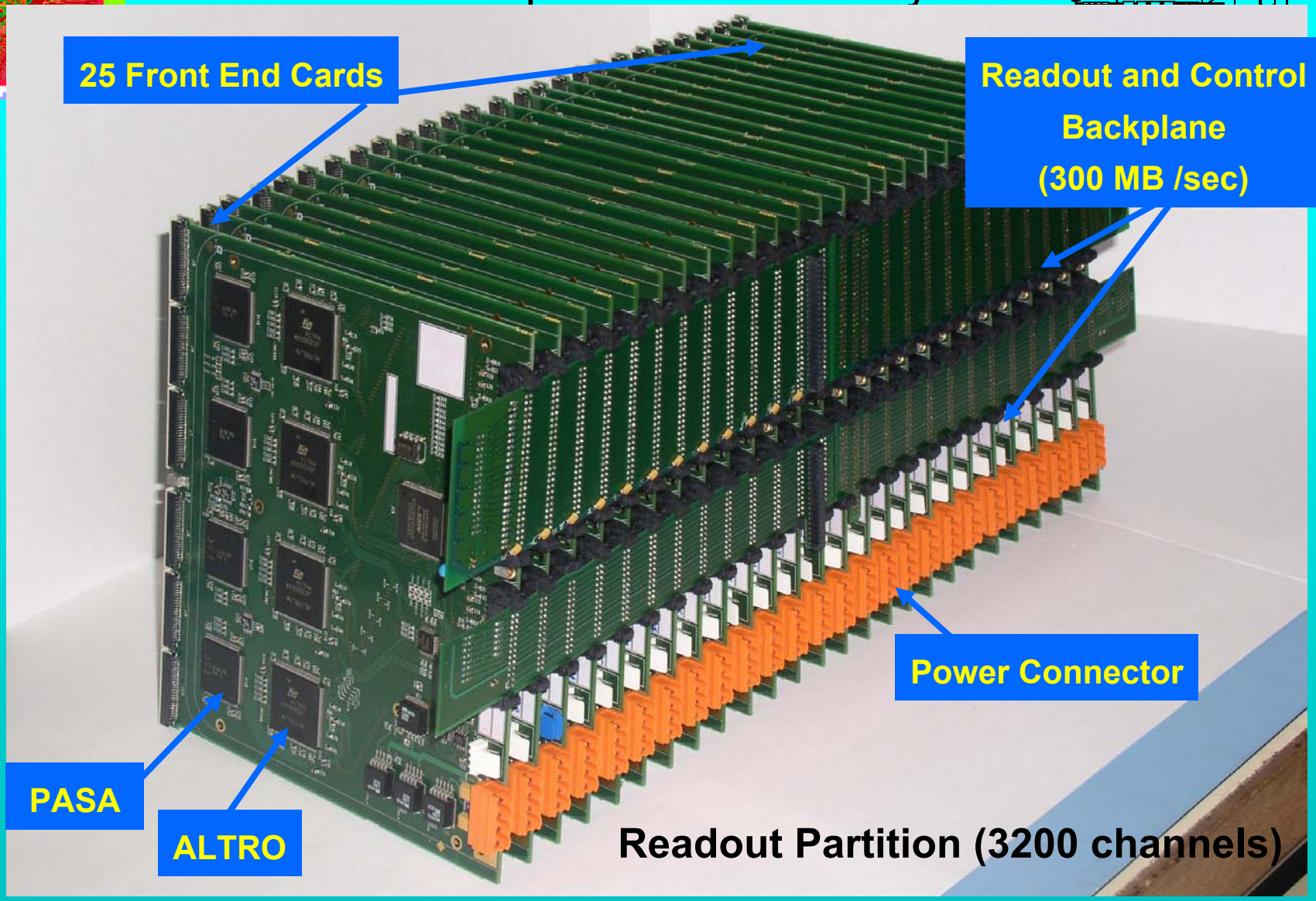
Front End Electronics



ALTRO - digital tail cancellation and baseline restauration



FEE Components Assembly



FEC Installation

Electronics Production

-PASA 40 000 chips (18000 produced), end of production: March 04
-ALTRO (digital chip): 44000 chips produced by March 04
-FEC 4800 boards (50 produced). Production finished Oct. 04.
-Automatic (robot) tests running: 1200 chips/day

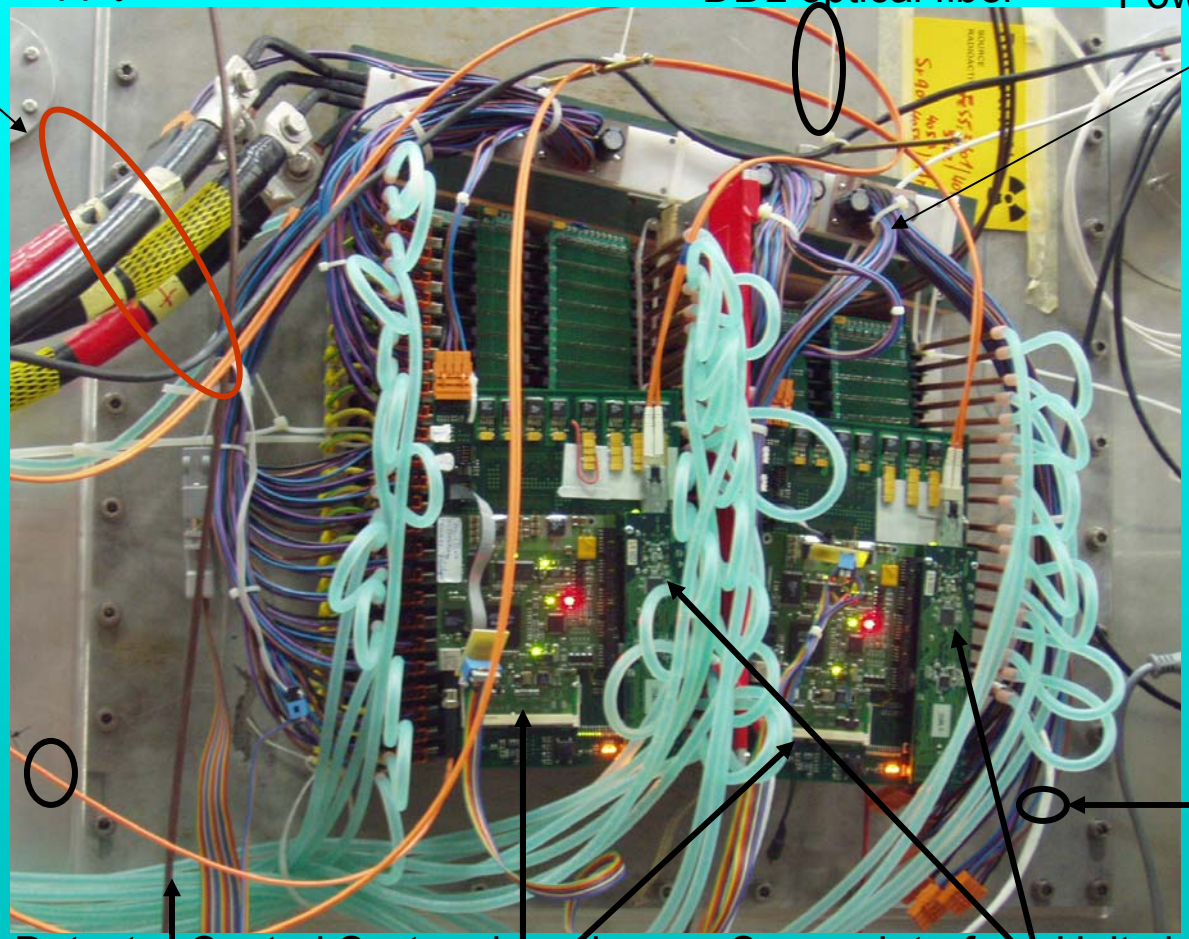
Readout Modules

Production finished!

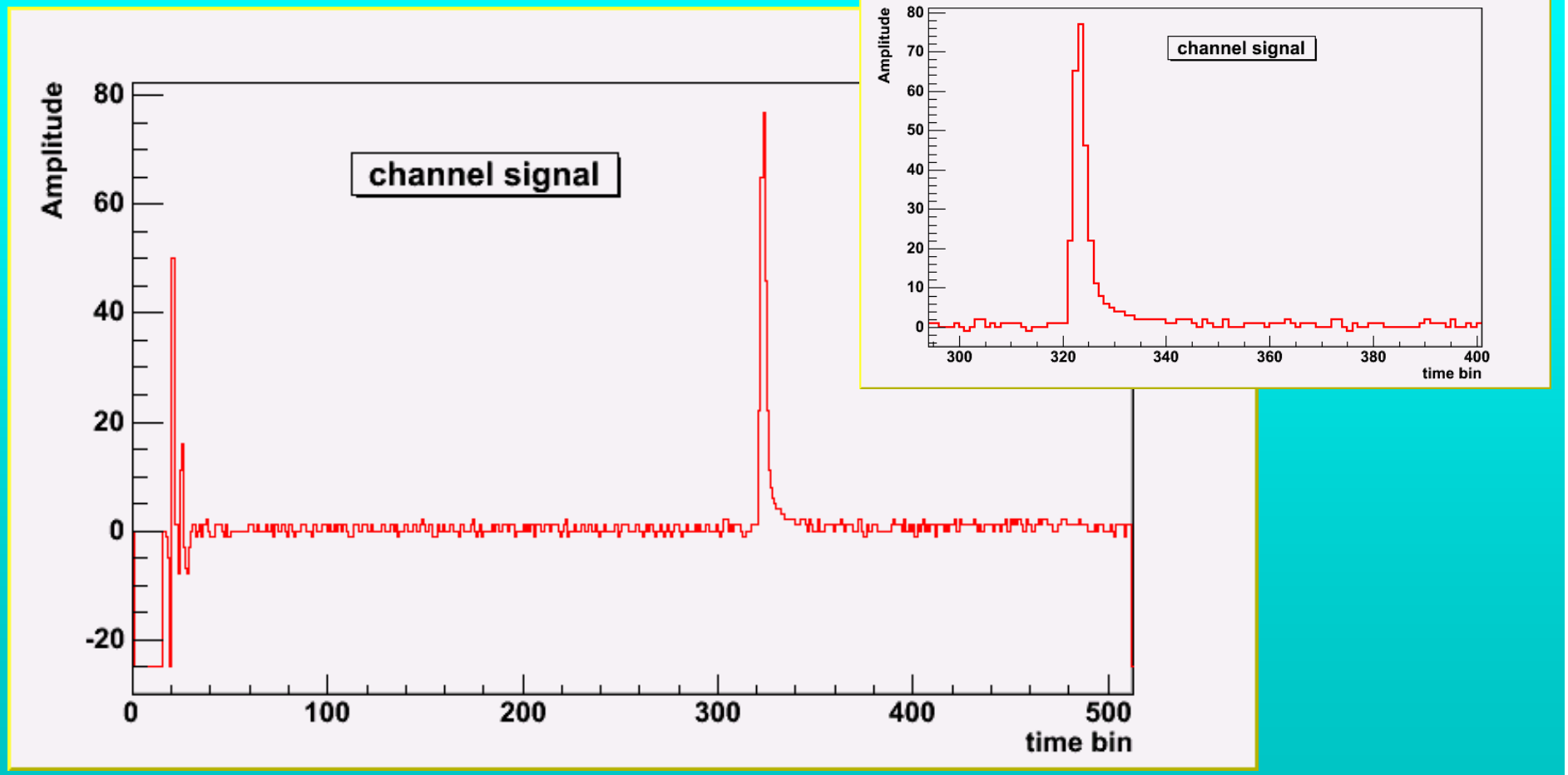
40 IROC modules (36+4)
40 OROC modules (36+4)

Transport to CERN
Installation next year

Test Run

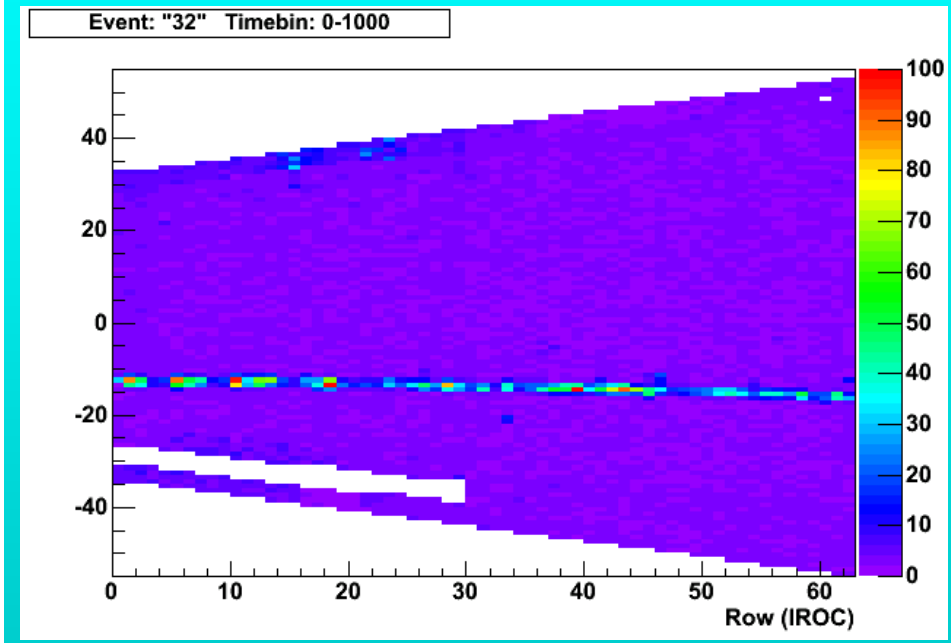

150 mm2 power supply cables
40 + 40 m
long cables
correct specs
DDL optical fiber
Power supply bus bar
14.7 mF
capacitors
25 FECs
18 FECs
TTC link
DCS Ethernet
cable
Detector Control System boards
Source Interface Units boards

Signal

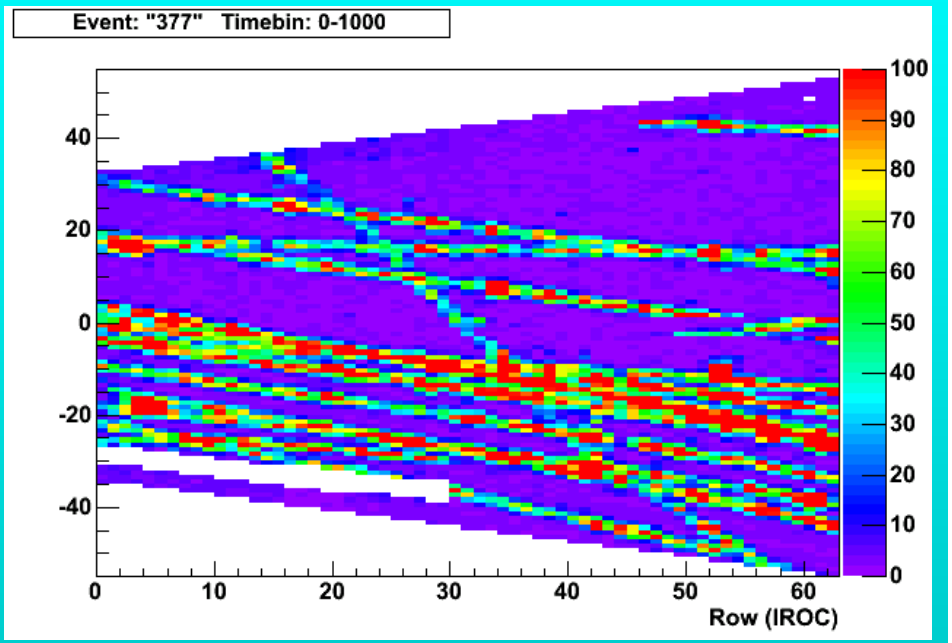

channel signal
Amplitude
time bin
0
100
200
300
400
500
-20
0
20
40
60
80
channel signal
Amplitude
time bin
0
10
20
30
40
50
60
70
80
300
320
340
360
380
400

Events

Single track



Multiple tracks – with Pb target



Drift field: 400V/cm

Sense voltage: +1480 V

Gate voltage: +130 V ± 100V

Drift length: ~1m

Status

Field cage Done!
IROC production Done!
OROC production Done!
Production end Party Not done!

FEC production in progress
Installation next Year (beginning)