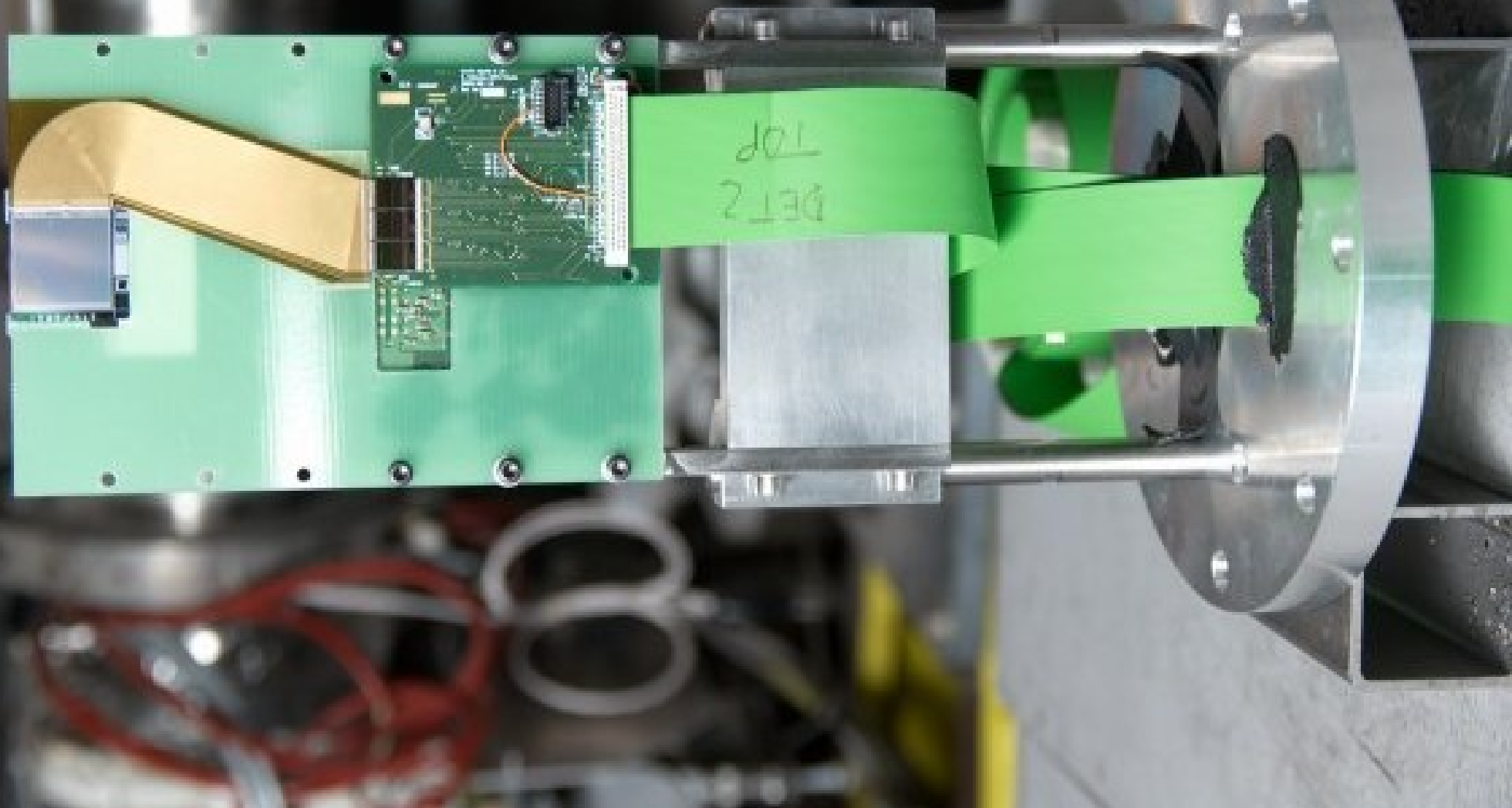# *The UA9 experiment*

LHC collimators: the PRESENT

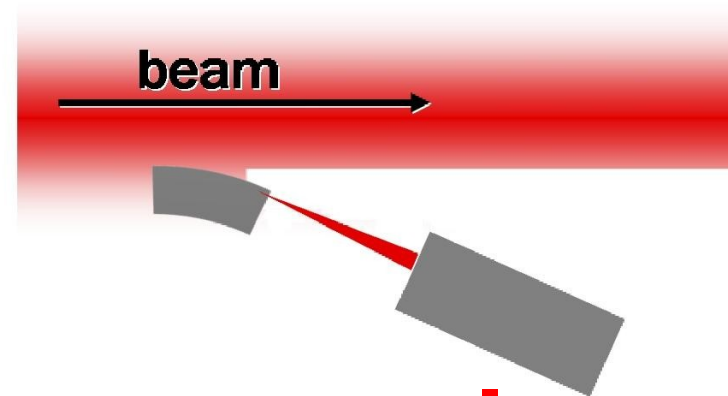# *Using crystals ....*

beam →

beam →

↓

↓
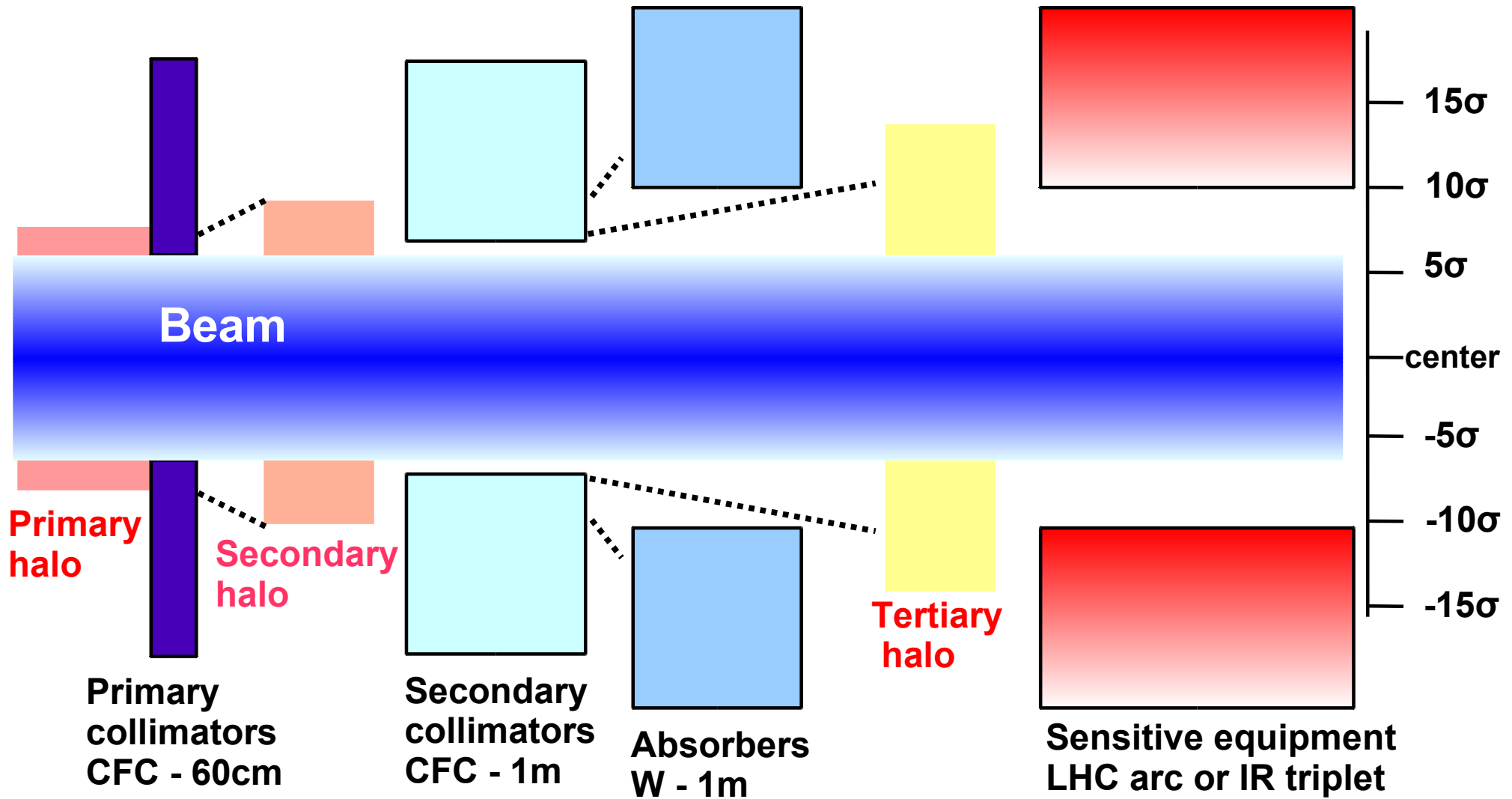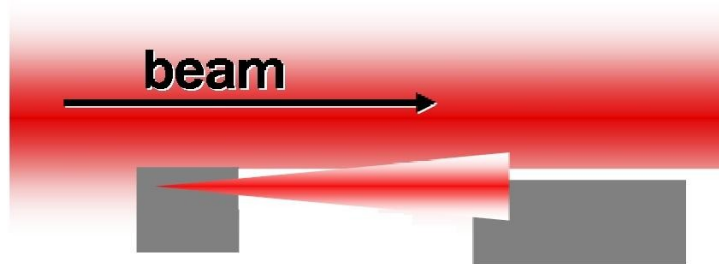
The halo is scattered over the whole angular range

The halo is steered in a precise direction

➔ *The impact parameter of the particles on the secondary collimator has to be maximized*

➔ *The requirement on the alignment of the secondary collimator is stringent*

➔ *The cleaning efficiency increases*

➔ *The constraints on the alignment of the secondary collimator are released*

➔ *The secondary collimator can be farther from the core → impedance decreases*

Collimation with crystals: UA9

- ➔ **Define the layout → LSS5 straight section of the SPS ring**

- ➔ **Define the observables**

- ➔ **Decide what to use → detectors, goniometers, roman pots, secondary collimators**

- ➔ **Find the way to create the halo (RD22); proton beam of 120GeV/c**

- ➔ **Define the time schedule: READY to take data in 2009 (rushing against time)**

(approved by CERN Research Board on the 3rd of September and by NTA as NTA-CRYSTAL)

- ➔ *COLLIMATION EFFICIENCY*

- ➔ *MEASUREMENT OF THE PHASE SPACE*

- ➔ *MEASUREMENT OF THE LOSSES ALONG THE RING (with beam loss monitors)*

CRYSTAL: WHO - the COLLABORATION

CERN

BNL
FNAL
SLAC

IHEP
JINR
PNPI

INFN:
Ferrara, LNL,
MiB, Roma1
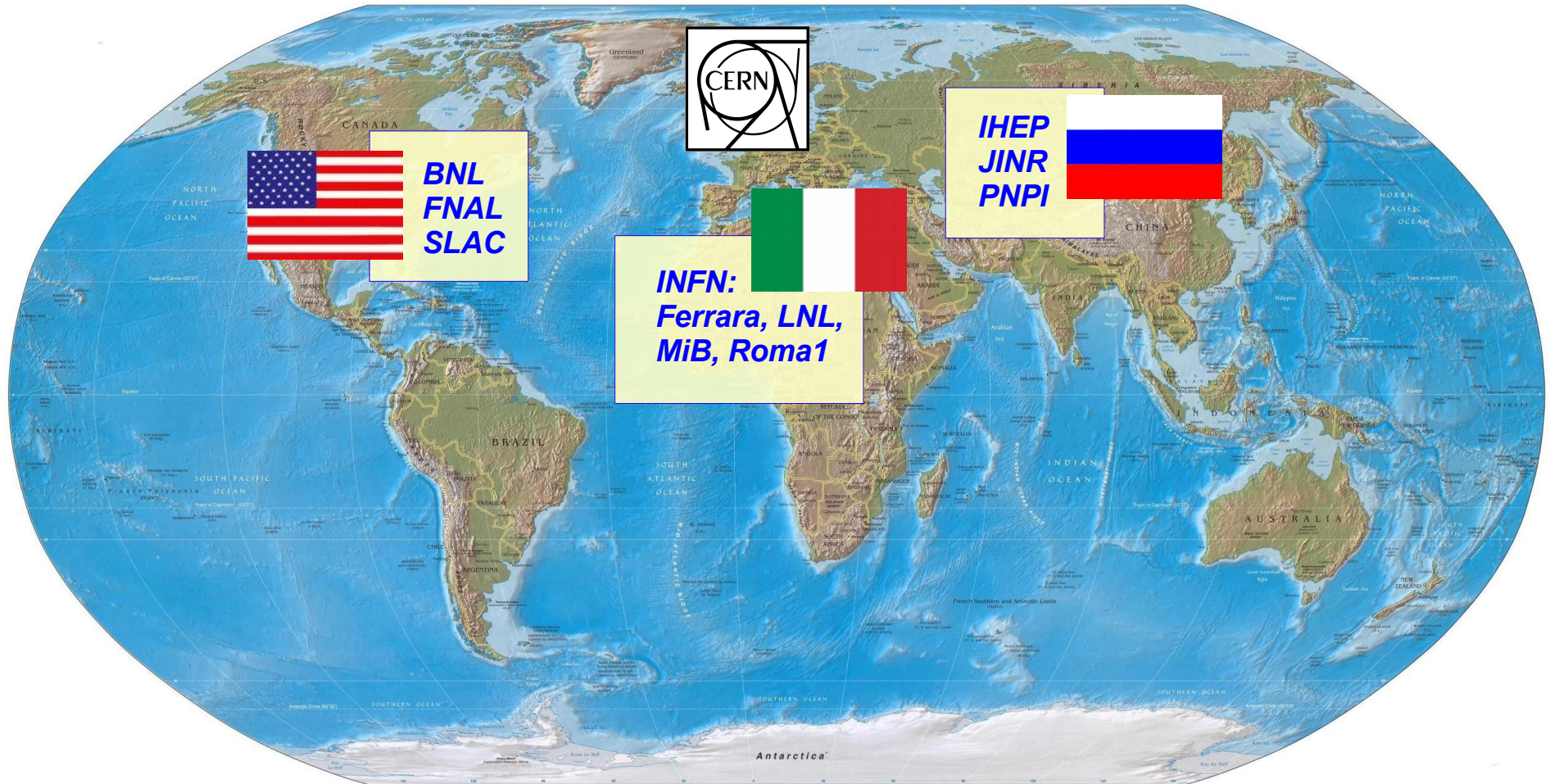
For a total of 54 participants

The basic idea: collimate and track
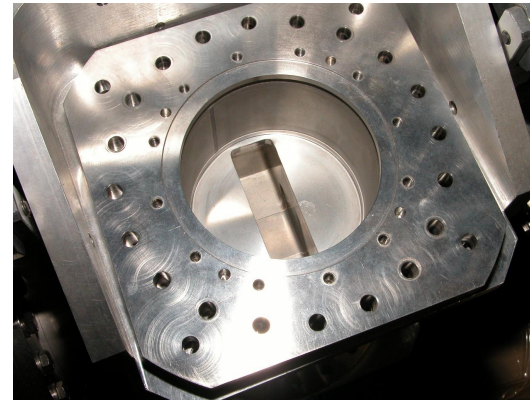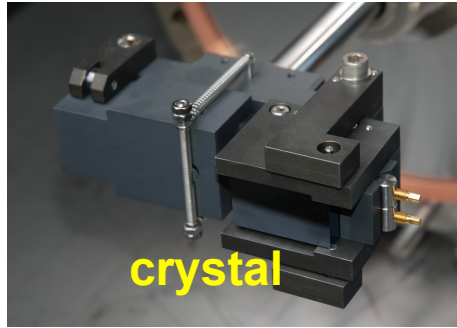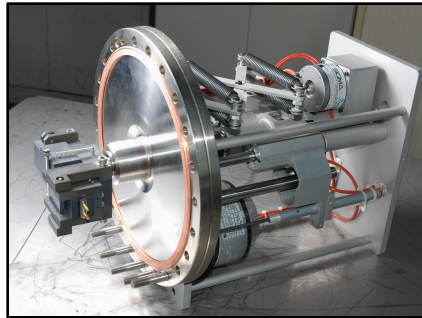
crystal

goniometers
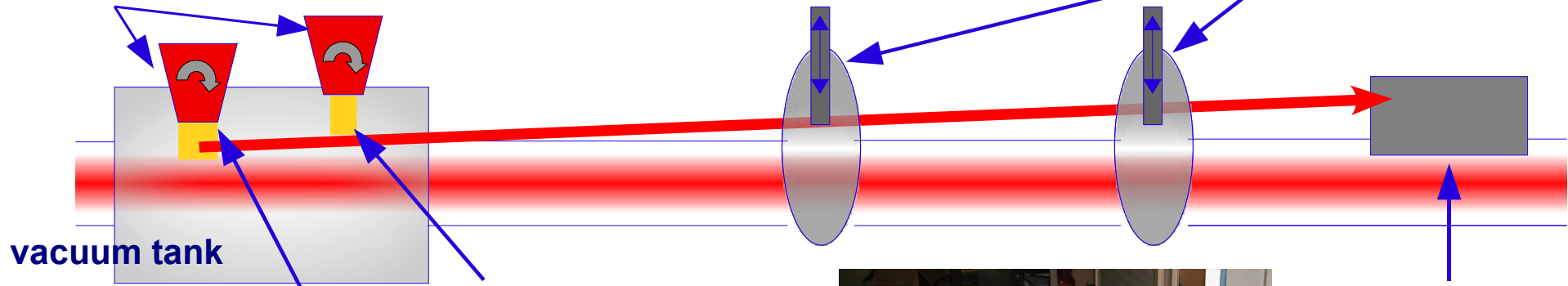
roman pots
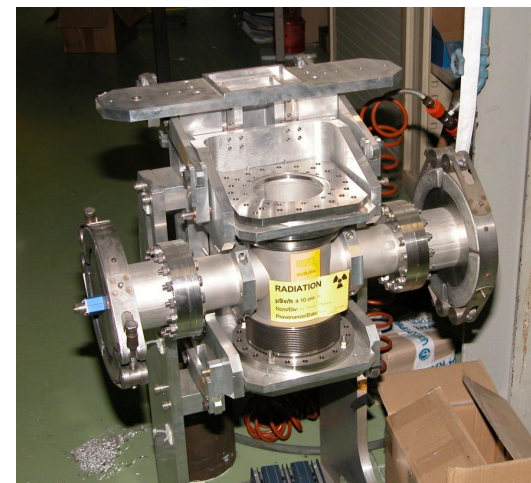
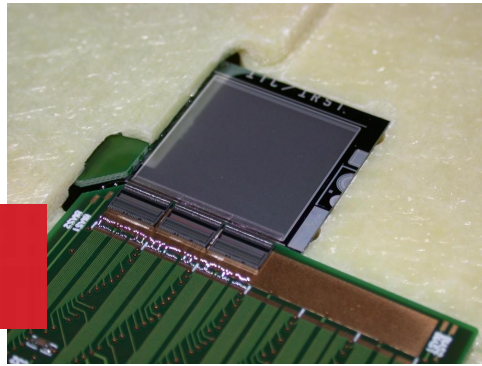1 crystal

1 crystal

vacuum tank

TAL Secondary collimator

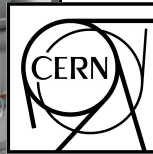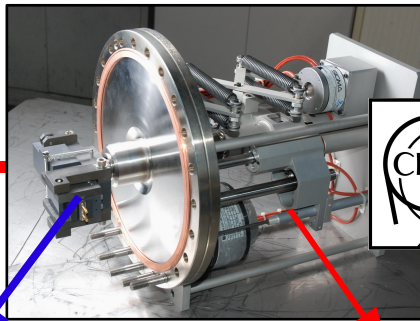*(maximize phase difference to exploit the maximum distance of the steered beam from the core)*
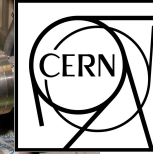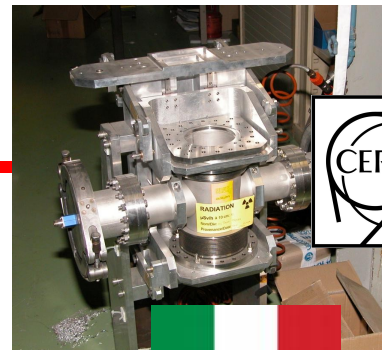
Who's doing what ...

DETECTORS / DAQ

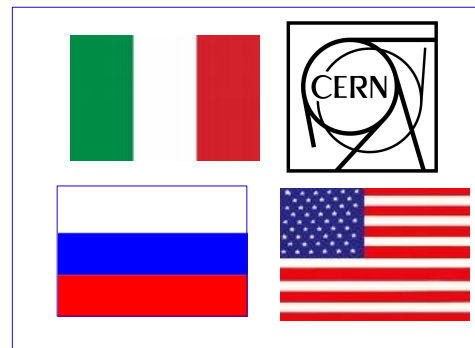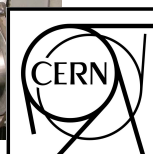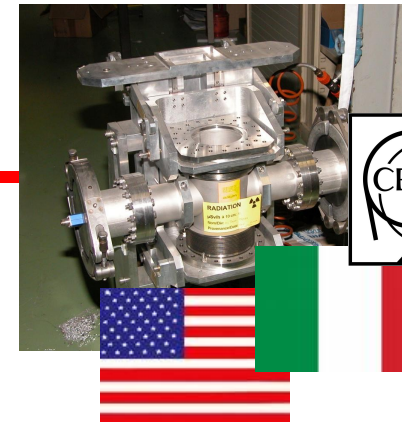**BEAM / INFRASTRUCTURE / CONTROLS**

CRYSTAL STATION

RP1

RP2

SIMULATION

Como/Trieste contribution

ITEMS

- ➔ **Tracking silicon detectors with self triggering electronics**
- ➔ **DAQ and slow controls**
- ➔ **Online analysis**
- ➔ **Simulation (crystal emulator – CRYM, roman pot and detector simulation, TAL)**

PEOPLE

- ➔ **D. Bolognini, S. Hasan, A. Berra, A. Mattera, D. Lietti, M. Prest (Uninsubria/ MiB)**
- ➔ **E. Vallazza (Ts)**

http://insulab.dfm.uninsubria.it/ and follow the UA9 indication
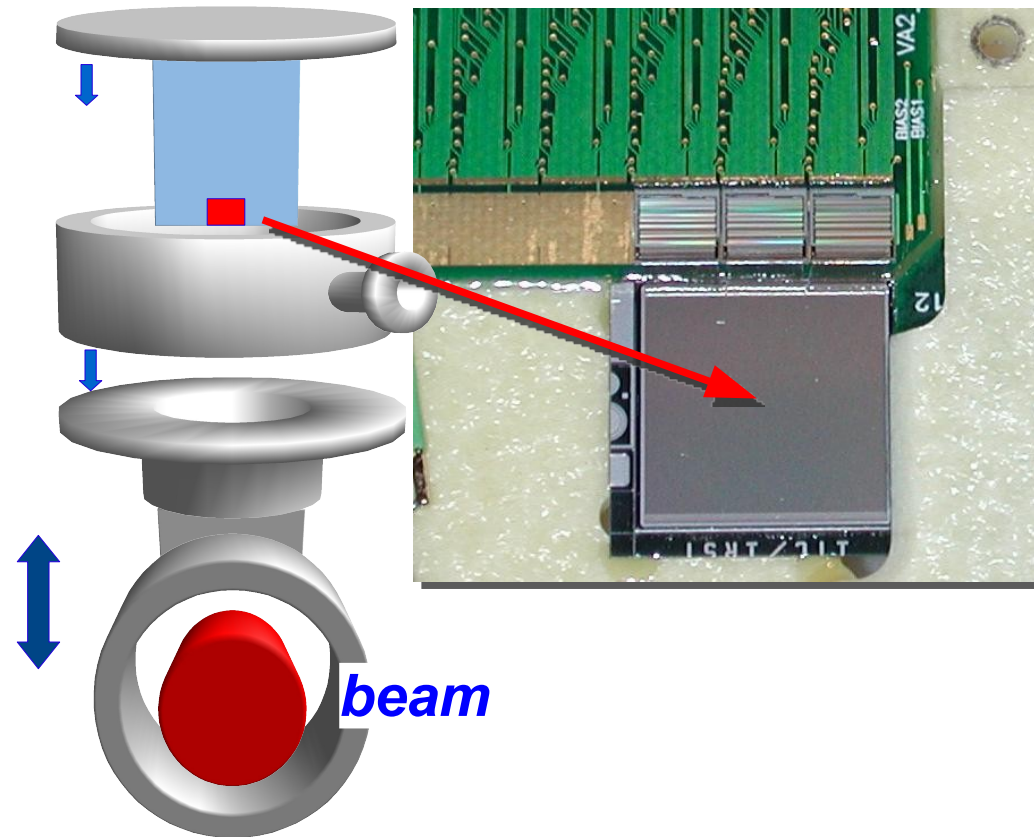
beam

REQUIREMENTS

- ➢ **Limited multiple scattering**
- ➢ **High spatial resolution**
- ➢ **Self triggering**
- ➢ **Active region inside the beam**
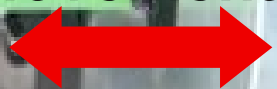
FULFILLED WITH

- ➢ **Double side silicon detector with a strip pitch of 50µm**
- ➢ **Cut at 500µm from the border**
- ➢ **Self-triggering ASIC (VA1TA)**
- ➢ **SOC (System On Chip)**
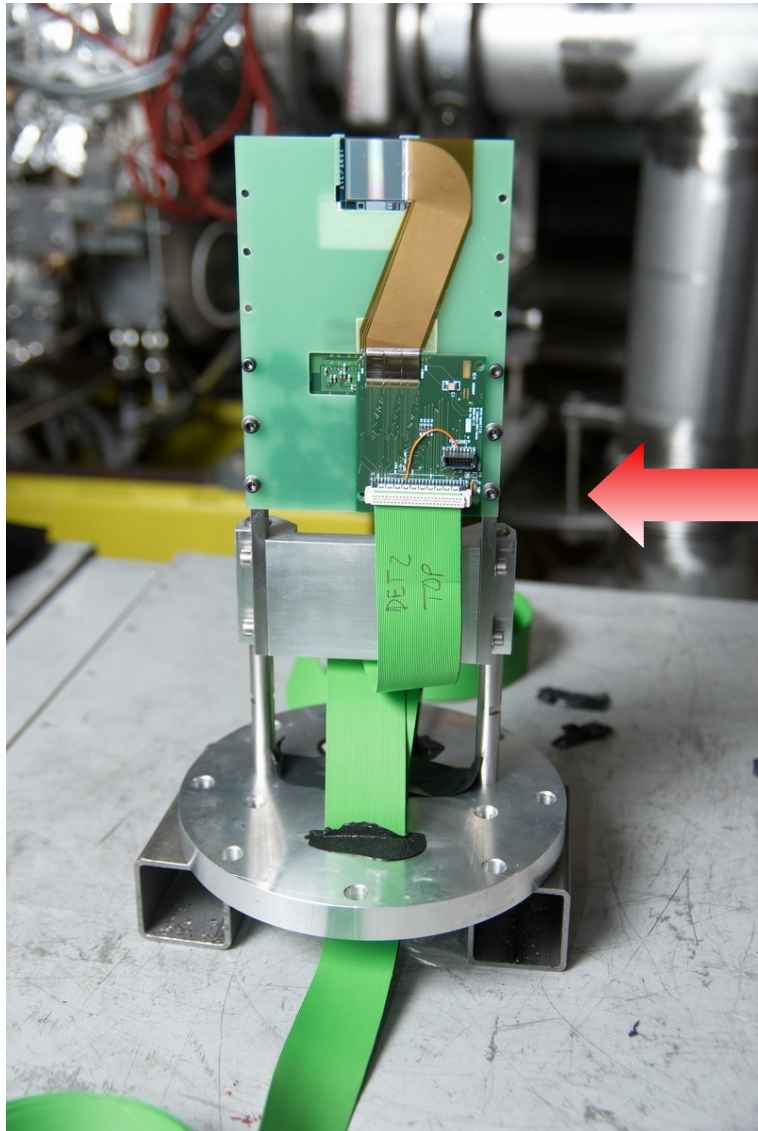
/2009

Tungsten collimator
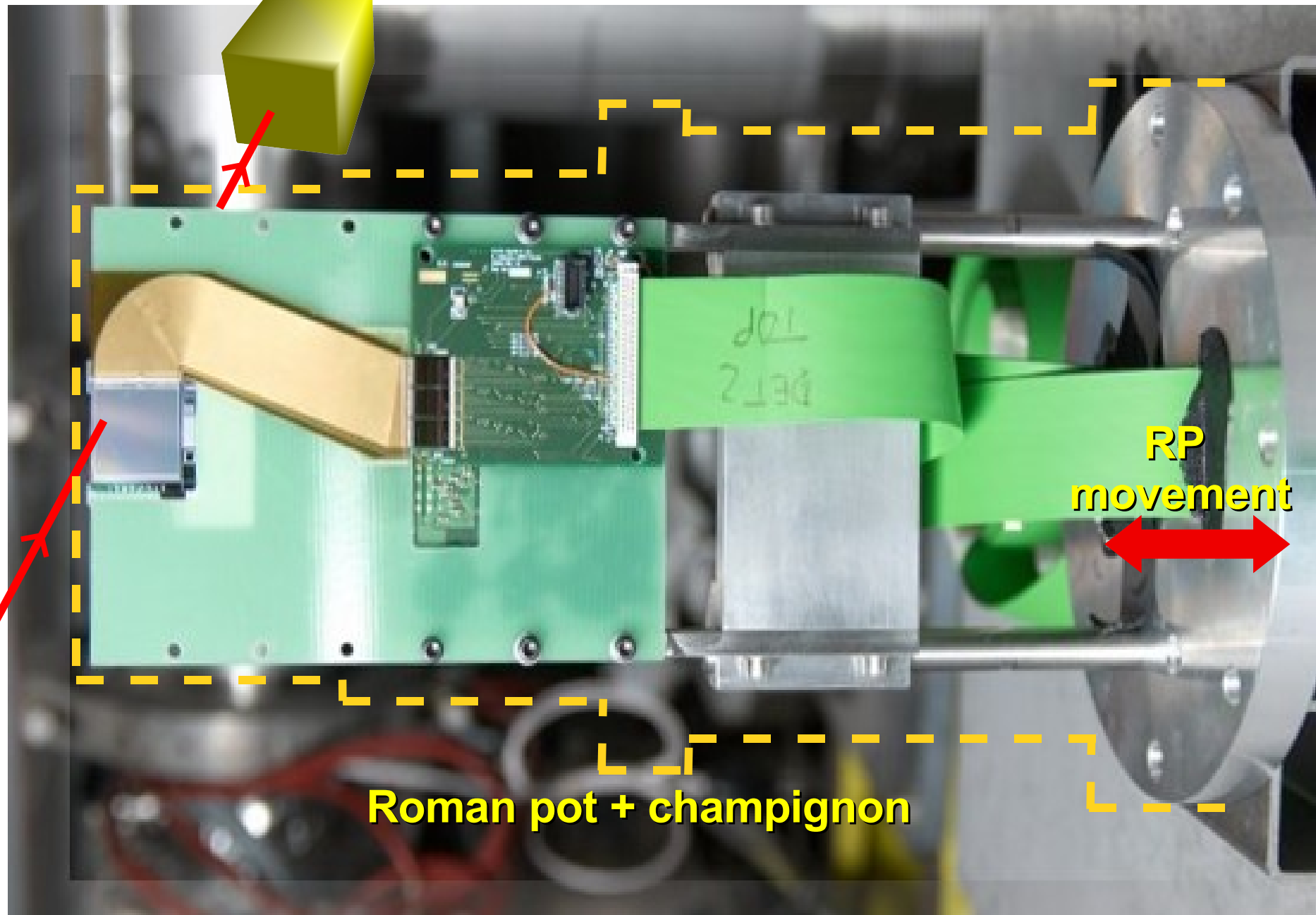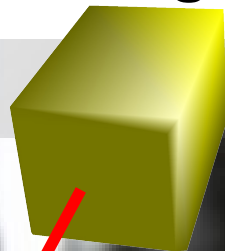
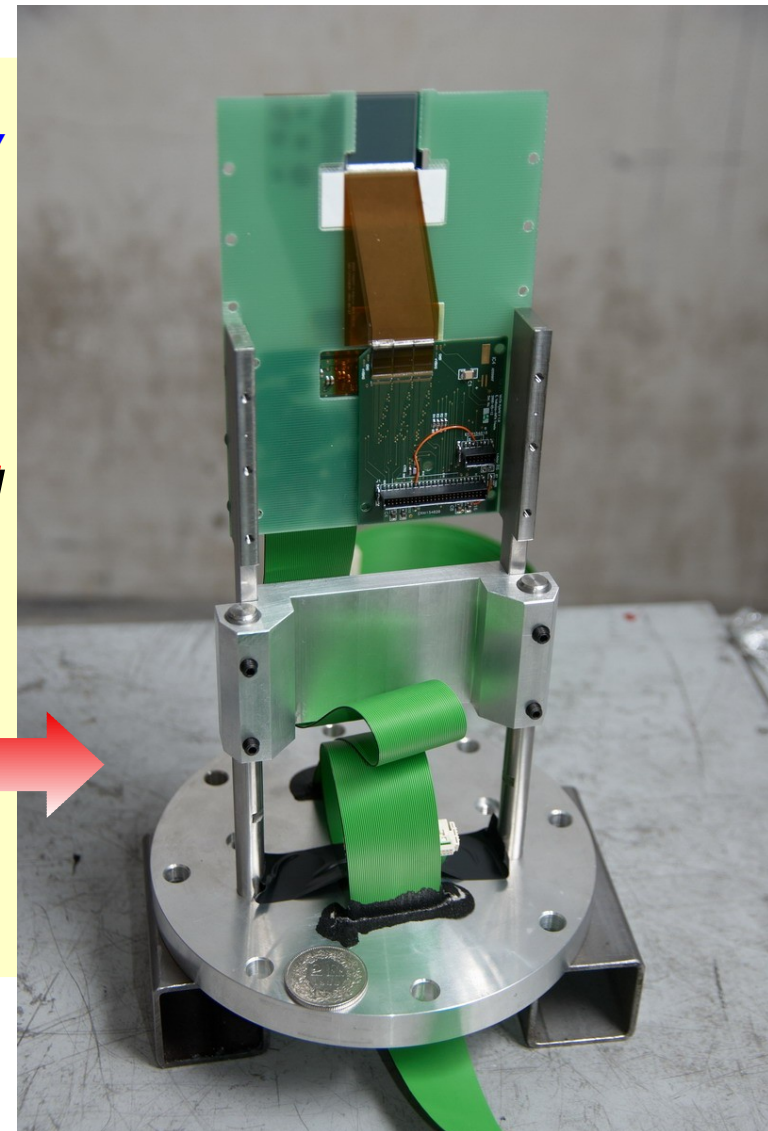**Crystal**

RP movement

Roman pot + champignon

The prototype

✔ **1 FBK detector readout by 6 VA1TA ASICs**
✔ **1 FR4 board for the support of the detector**
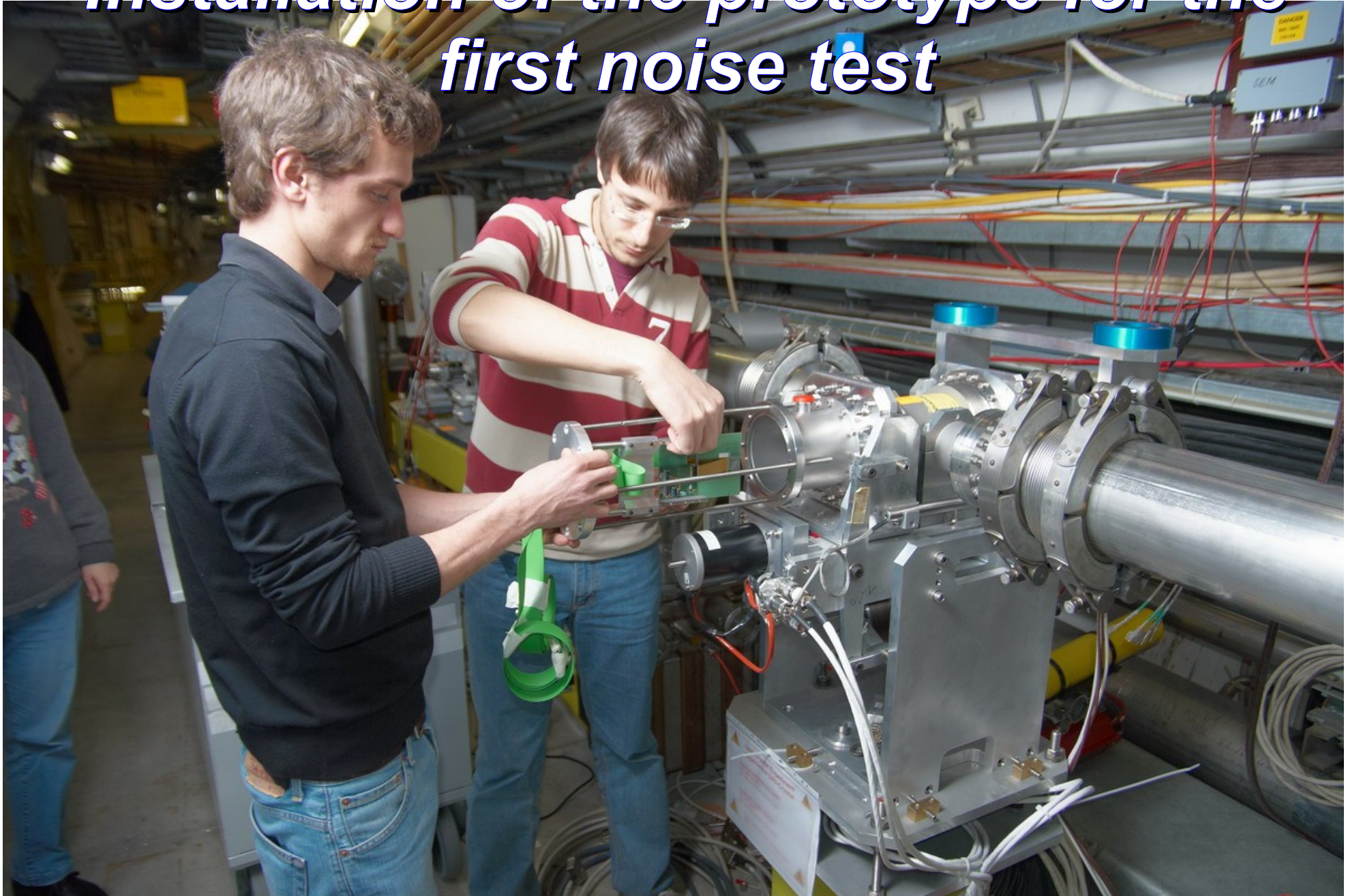✔ **upilex fanouts for the connection between the silicon and the ASICs**
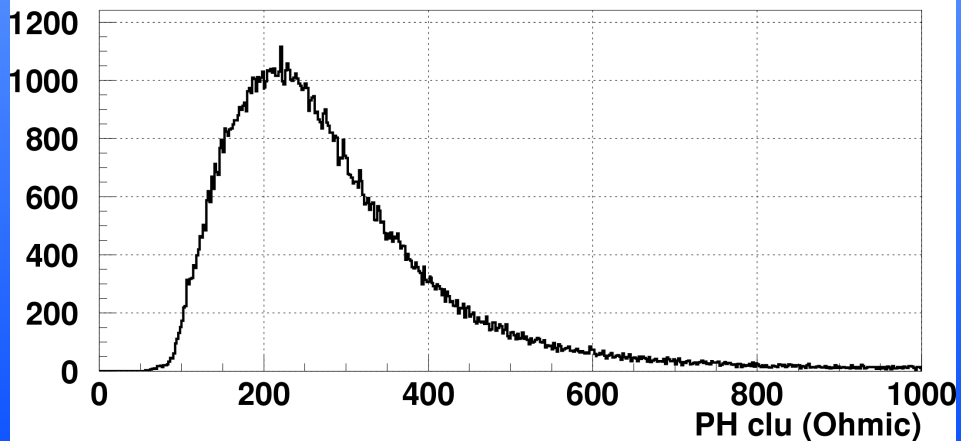
JUNCTION
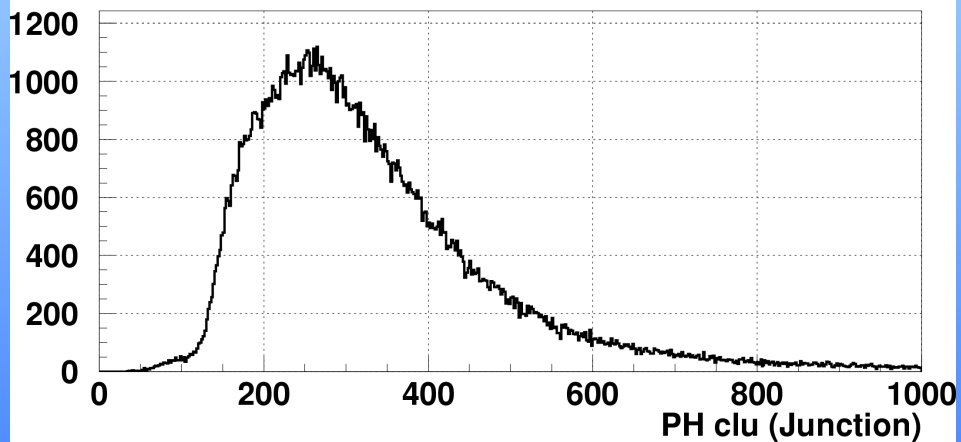### (HORIZONTAL)

OHMIC
(VERTICAL)

Installation of the prototype for the first noise test

First results

Pulse height

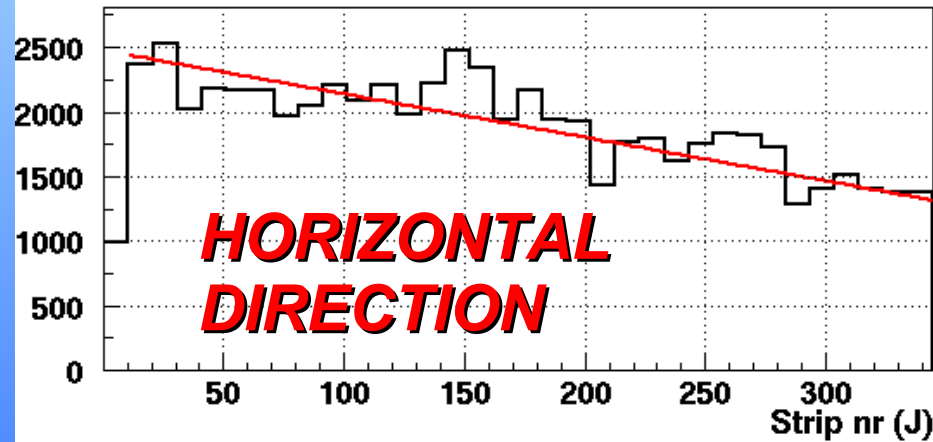Beam profile