



Proton therapy facility at IFJ PAN in Krakow; Opportunity for complementary Nuclear Physics experiments

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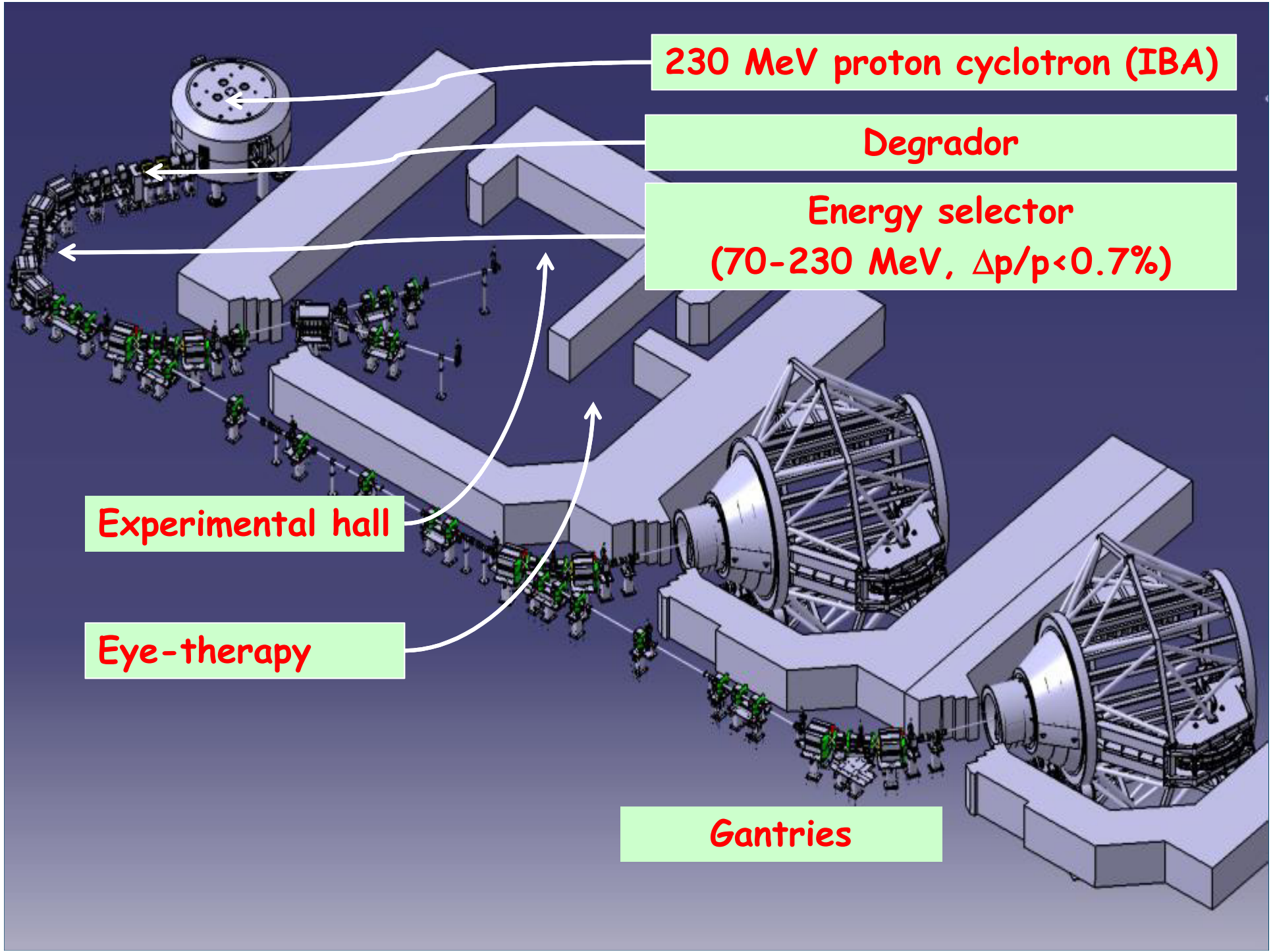
IFJ PAN Kraków



Cyclotron Center Bronowice



- Structural funds of EU
- Civil construction started in March 2011



230 MeV proton cyclotron (IBA)

Degrador

Energy selector
(70-230 MeV, $\Delta p/p < 0.7\%$)

Experimental hall

Eye-therapy

Gantries

Proteus C-235 cyclotron

Ion Beam Applications S.A. (IBA), Louvain-la-Neuve, Belgium



cyclotron:	isochronic, 4-sectors, CW
particles	protons
ion source:	PIG with hot cathod
proton energy:	230 MeV ($\beta = 0.596$, $\gamma = 1.245$), constant
energy dispersion:	$\Delta E/E < 0.7\%$
beam intensity:	600 nA (4×10^{12} p/s) - 0.1 nA (6×10^8 p/s)
Emittance:	horizontal - 11π mm mrad,



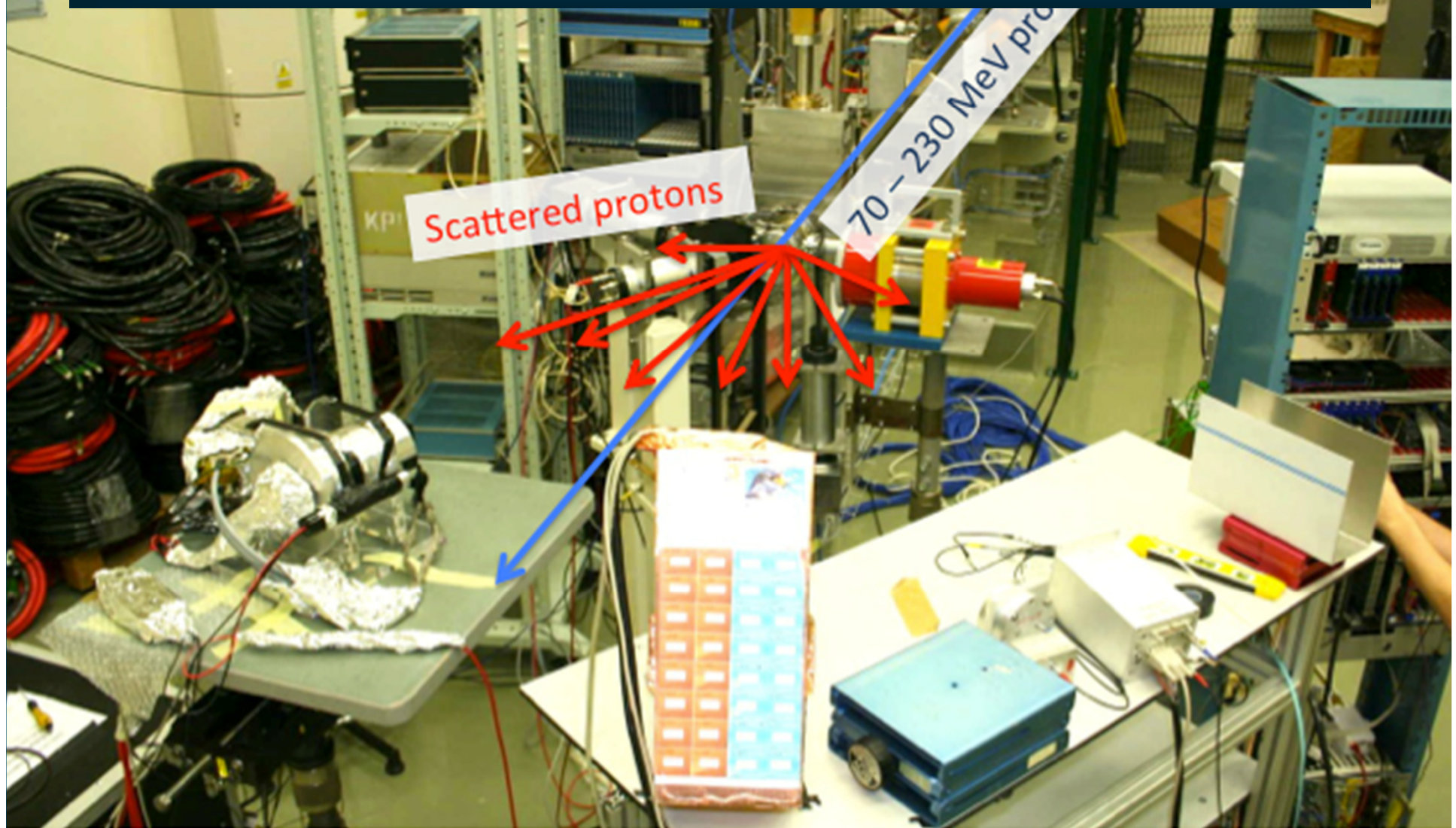
diameter 434 cm
height: 210 cm

Energy selector

- energy range 70-230 MeV
- time to change energy < 10 s
- $dp/p < 0.7\%$
- scanning beam

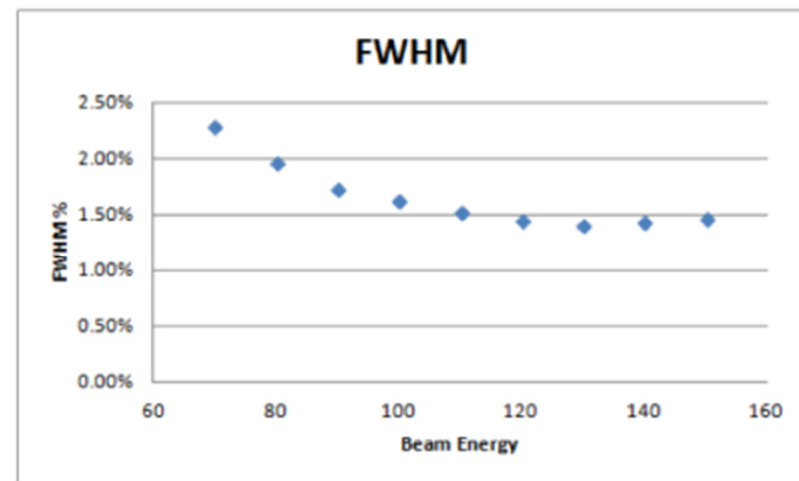
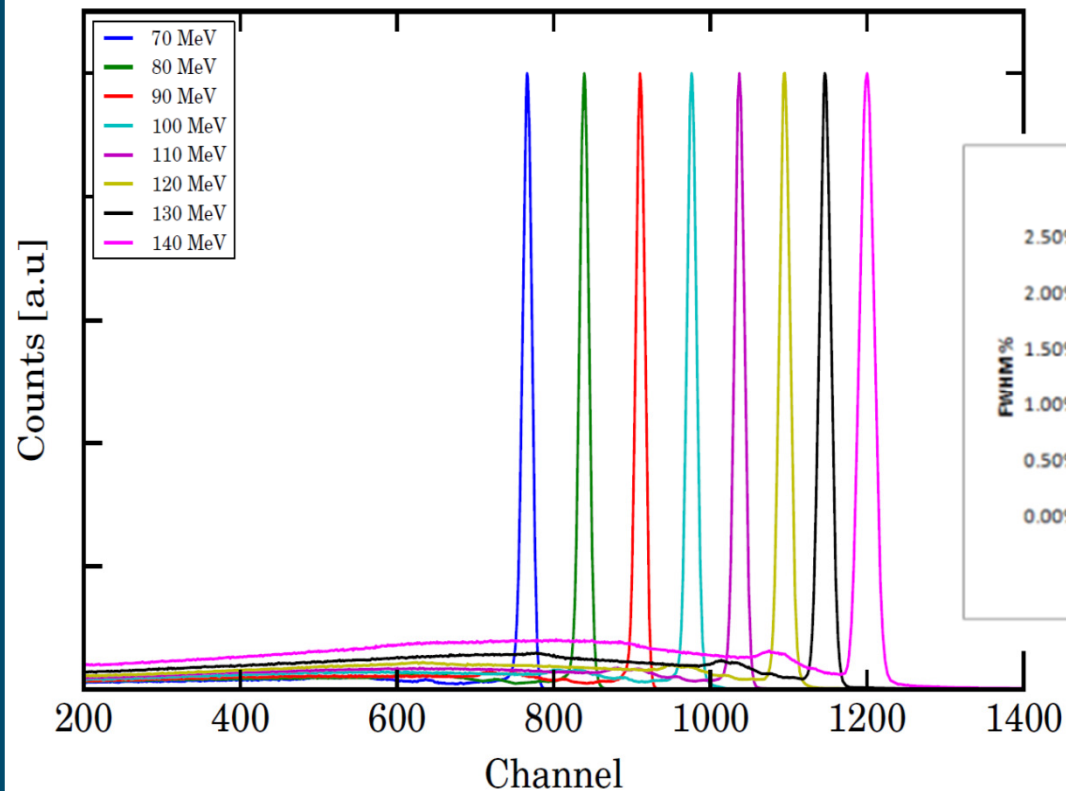


Experimental hall (March 2013)



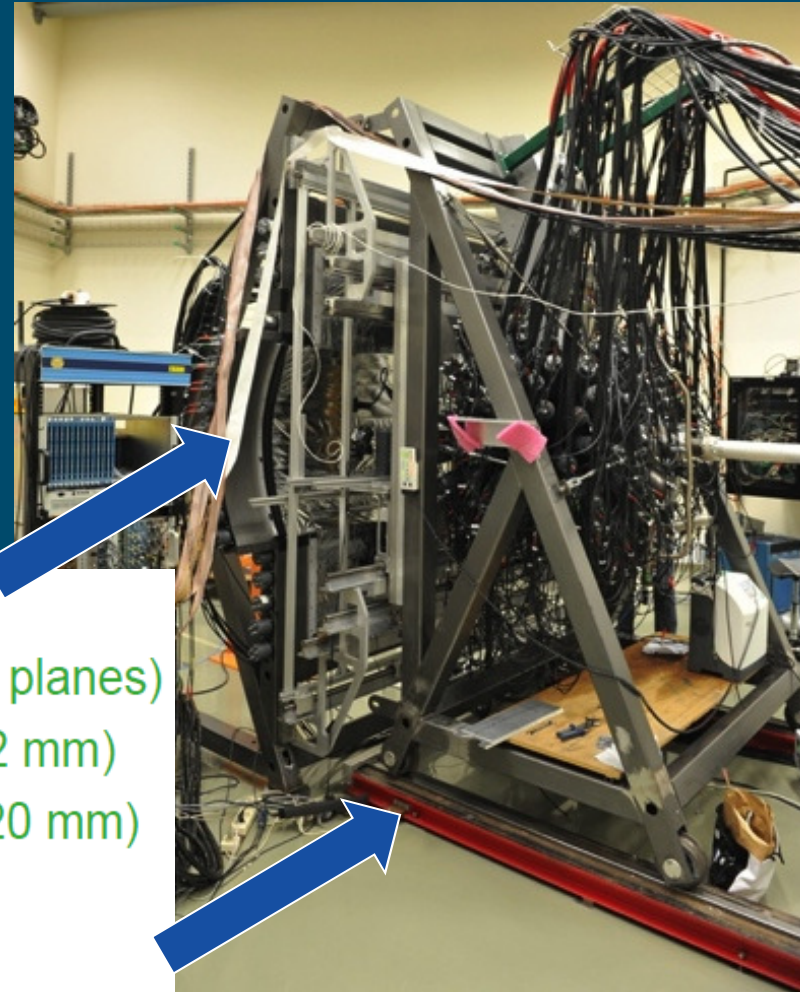
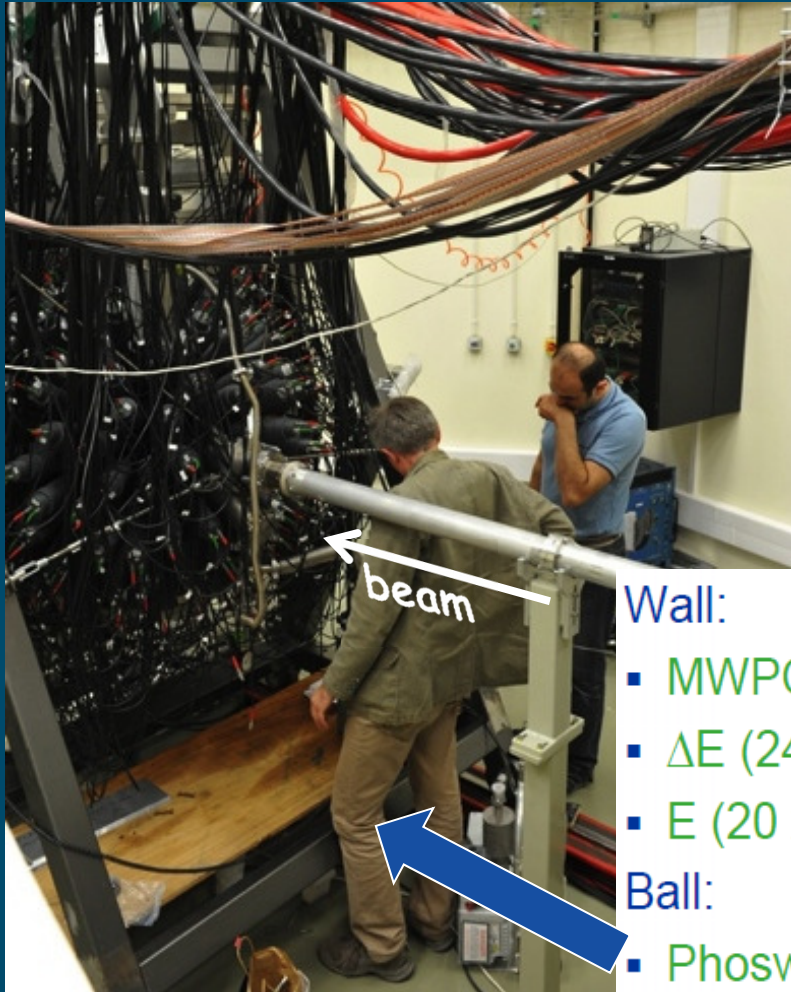
Tests of various LaBr_3 detectors irradiated with protons
(CALIFA and PARIS)

First proton spectra from the Ti(p,p') reaction



2" x 2" x 2" LaBr₃:Ce crystal
at 5 deg. relatively to the beam axis

BINA (KVI Groningen)



Wall:

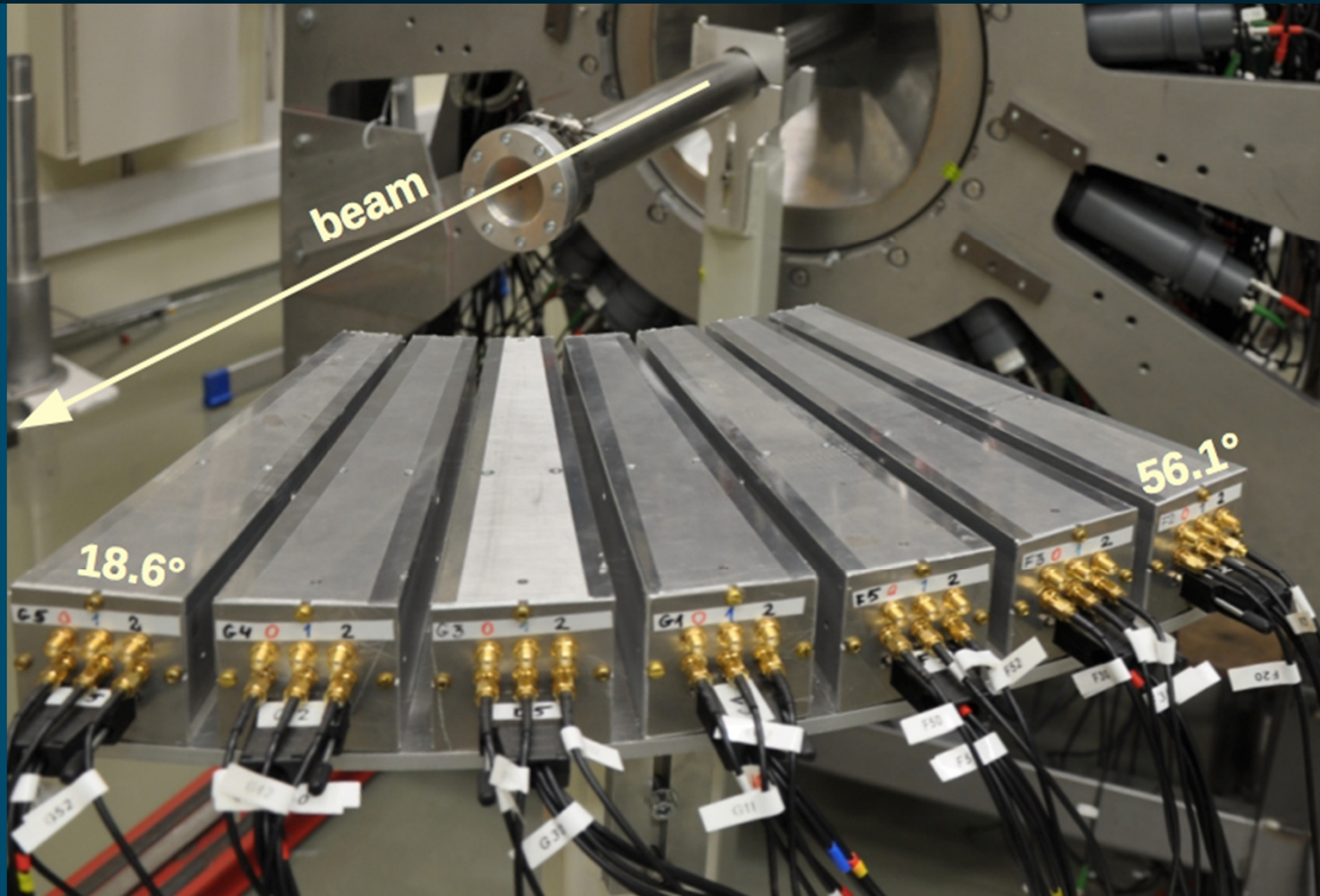
- MWPC (3 planes)
- ΔE (24 x 2 mm)
- E (20 x 120 mm)

Ball:

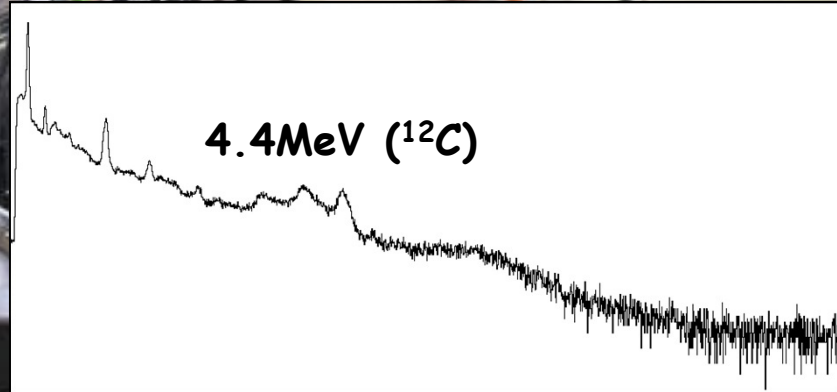
- Phoswich
(149 x 90/30 mm)

study of the dynamics of few-body systems $d(p, ppn)$

KRATTA (Krakow Triple Telescope Array)



HECTOR(BaF) (INFN Milano)+ KRATTA

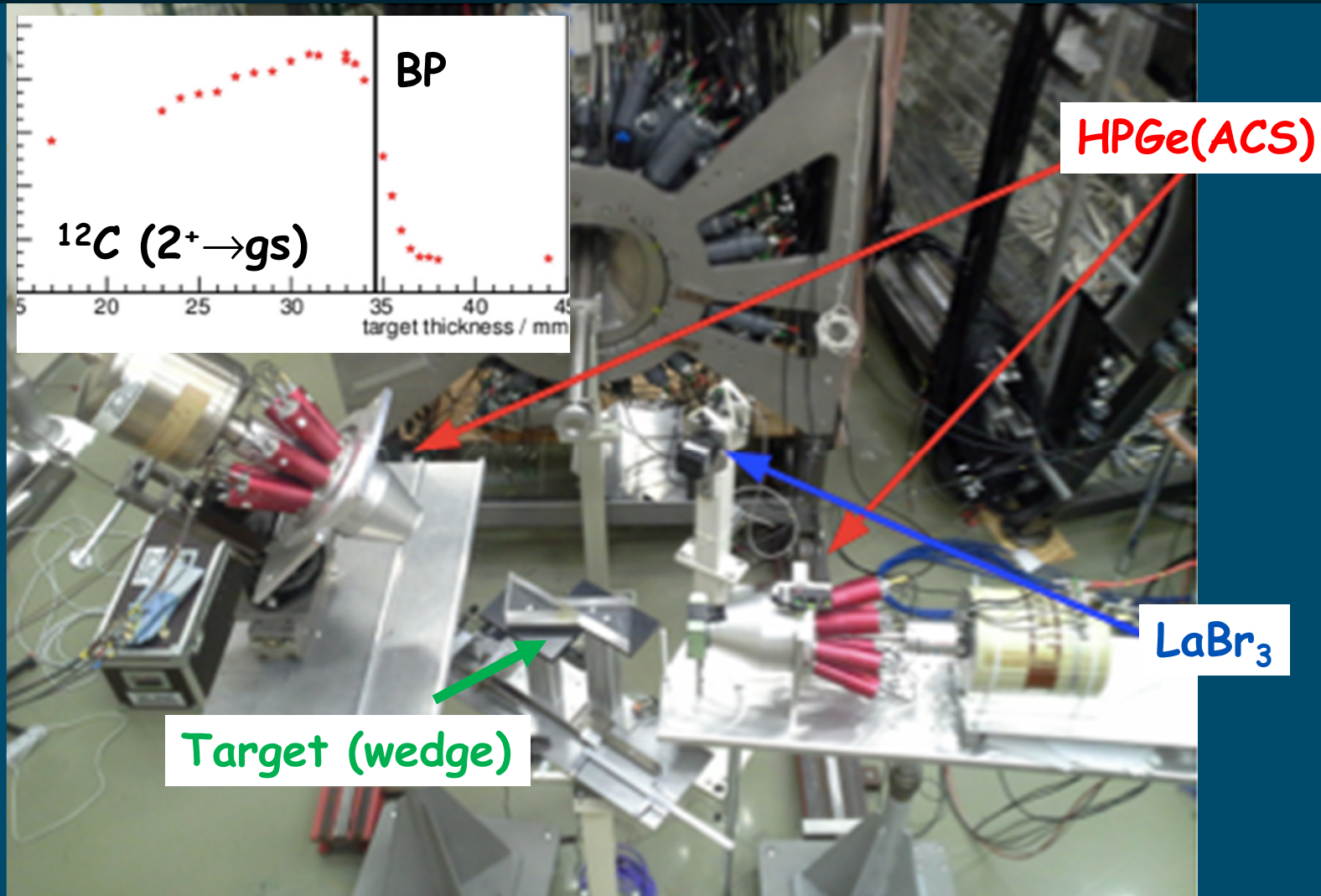


Gamma-particle coincidences

70 MeV , 150 MeV p on ^{12}C , ^{208}Pb

study collective modes excited by high-energy protons

High resolution gamma spectroscopy



Investigation of gamma emission in experimental modelling of hadron therapy

Large multipurpose reaction chamber



Equiped with a high vacuum (10^{-7} bar) system

Use as a particle detector test bench ?

