LOUVAIN 2019: info generali

- ✓ Fondi assegnati a Pavia:
  - Per pagare il fascio…….. 14 k€

- ✓ Louvain conferma che possiamo chiedere fascio in ottobre-novembre: 718 €/h + IVA

- ✓ Possibile sconto grazie all'intervento di Giacomo Bruno

Q1: First of all, I would like to ask if a "trigger signal" will be available in the control room. And in case yes of which type it is.

- There is no trigger signal in the neutron beam line

Q2: The second question I would like to pose is: which is the minimum flux you can maintain in a stable configuration at the target? Vice versa, which is the maximum flux?
Q3: The third question would be: I remember there was a formula to calculate the beam spot as a function of the distance from the target. Is still valid and where we can find it?
Q4: The next one would be: which will be the delivered dose/h of irradiation at a certain flux? And could it be available?

- The flux depends on the distance between your device and our beam target. In attachment you can find the plot of the beam homogeneity in function of this distance.

-When you have determined your position, the flux at a distance $\boldsymbol{D}$ is given by the formula :
$number\ of\ neutrons/cm^2s\ =\ 10^{14} \times beam\ current[\mu A]/(0.079 \times \boldsymbol{D}^{1.902})$ to be DOUBLE CHECKED!

-We can set the beam current from few nA up to 7µA on the target.

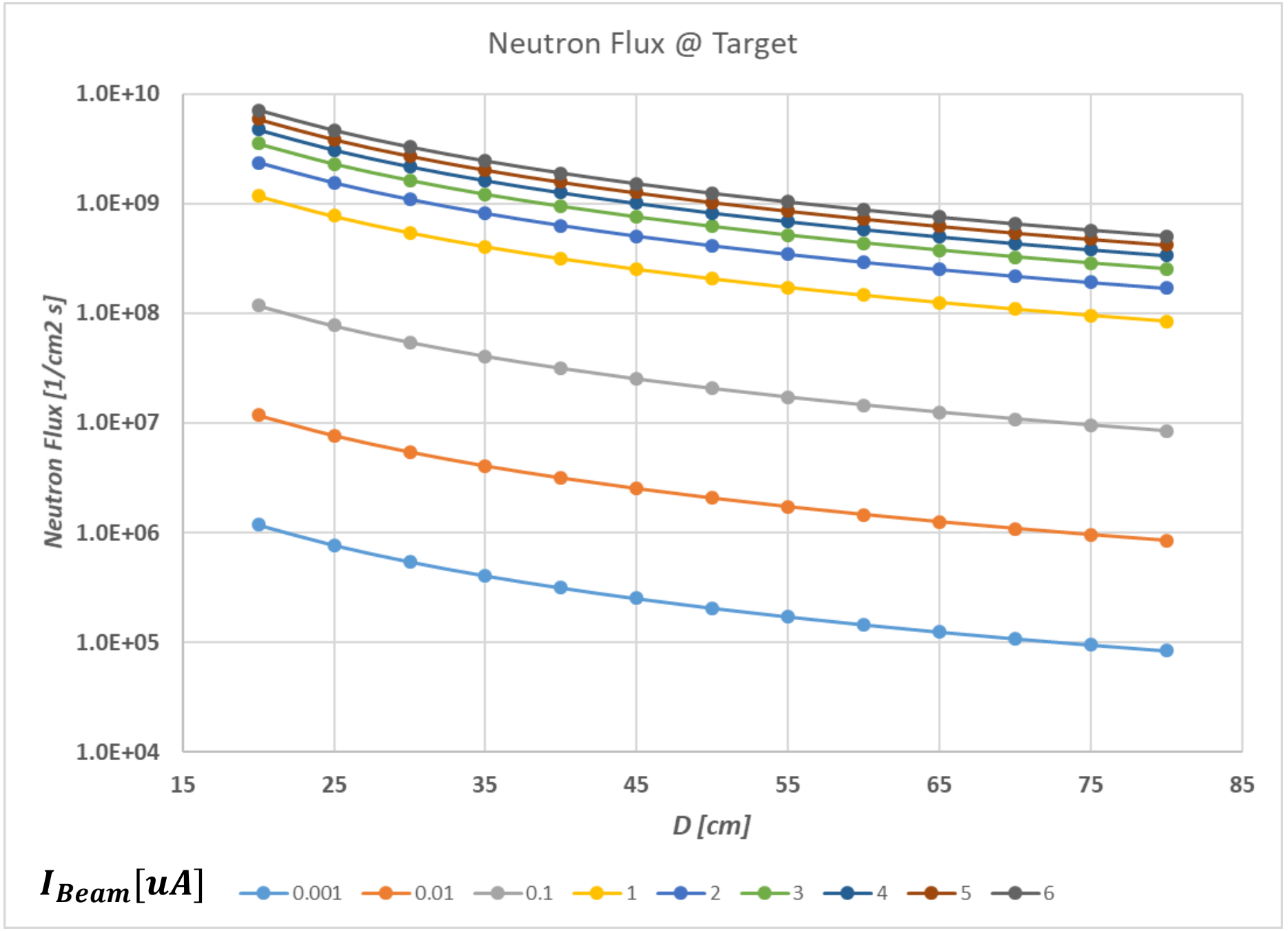

Beam spatial distribution
radius [cm]
distance [cm]
14,0
12,0
10,0
8,0
6,0
4,0
2,0
0,0
20
30
40
50
60
70
80
r 80% [cm]
r 70% [cm]

???

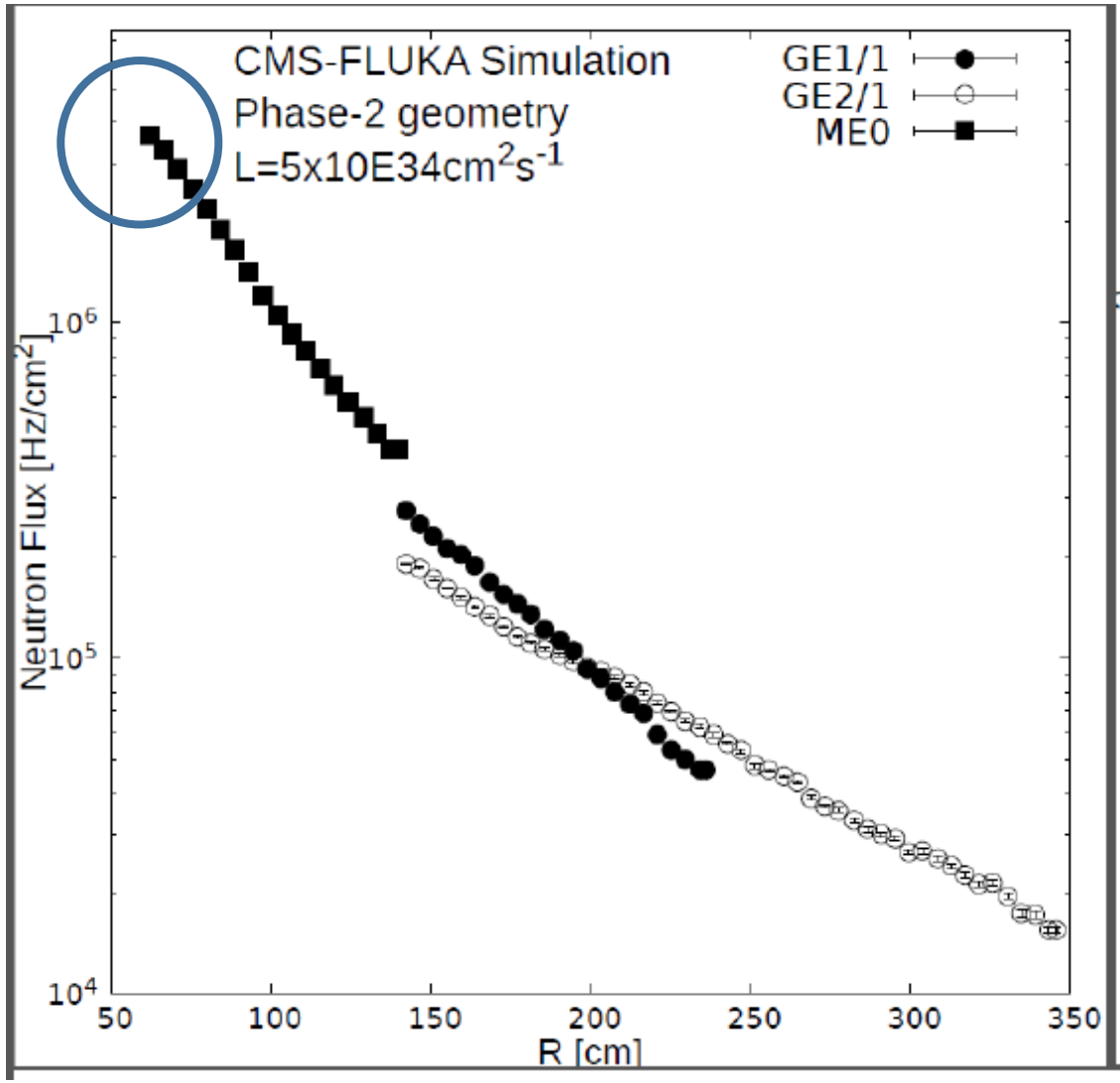
> **Q5**:Finally, I would like to ask: is it possible to quantify the background flux? Gamma in particular and charged one, if present?

-The background was measured few years ago

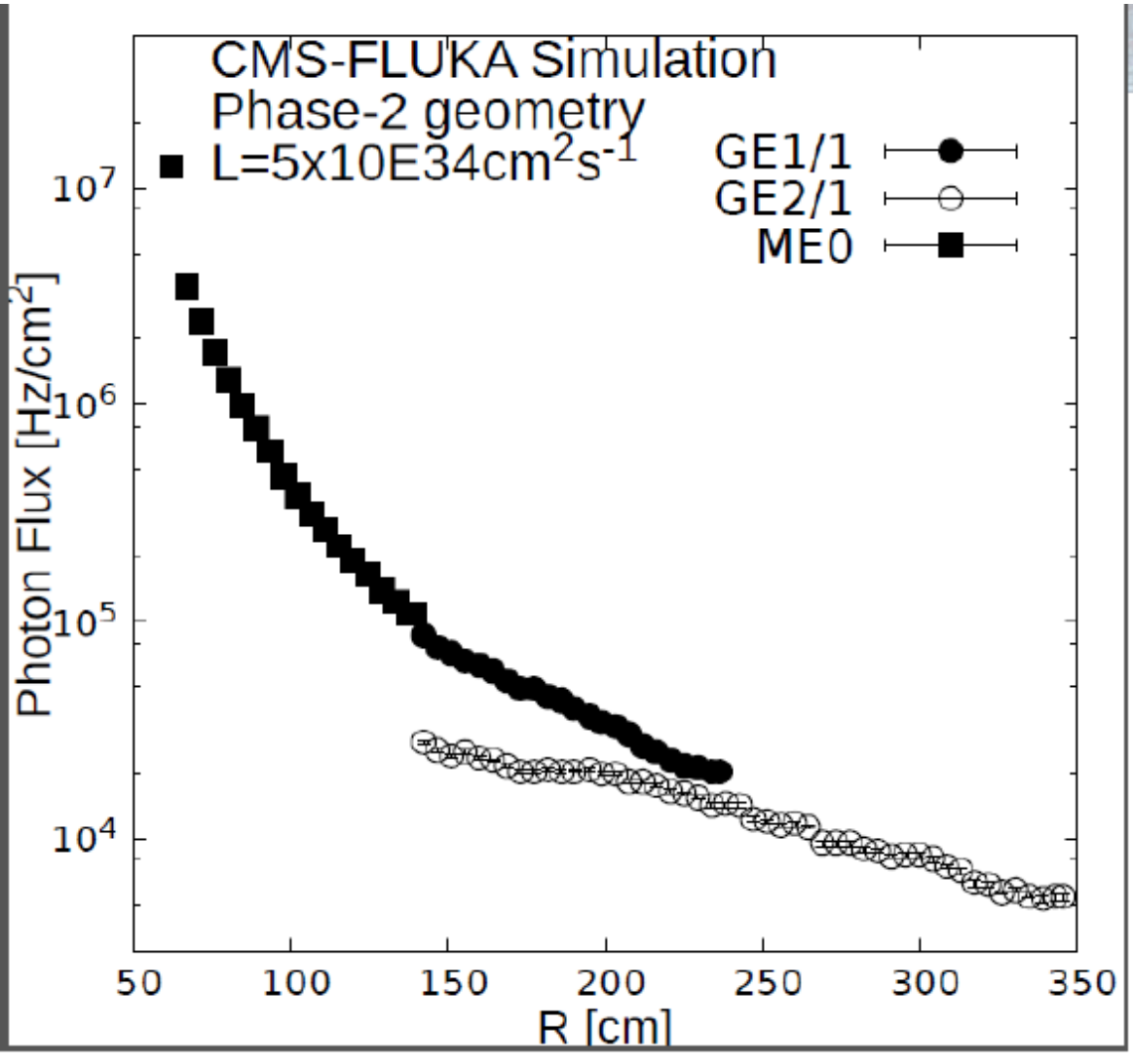
Particle	Fraction	Mean E [MeV]	Max E [MeV]
Neutron	1	16.56	50
Proton	1.5×10^{-4}	12.61	25
Electron	1.6×10^{-4}	1.57	6
Gamma	2.4×10^{-2}	1.93	10


Neutron Flux @ Target
1.0E+10
1.0E+09
1.0E+08
1.0E+07
1.0E+06
1.0E+05
1.0E+04
Neutron Flux [1/cm2 s]
15
25
35
45
55
65
75
85
D [cm]
$I_{Beam}[uA]$
0.001
0.01
0.1
1
2
3
4
5
6

CMS n-max 5 $\times 10^6$ Hz/cm^2



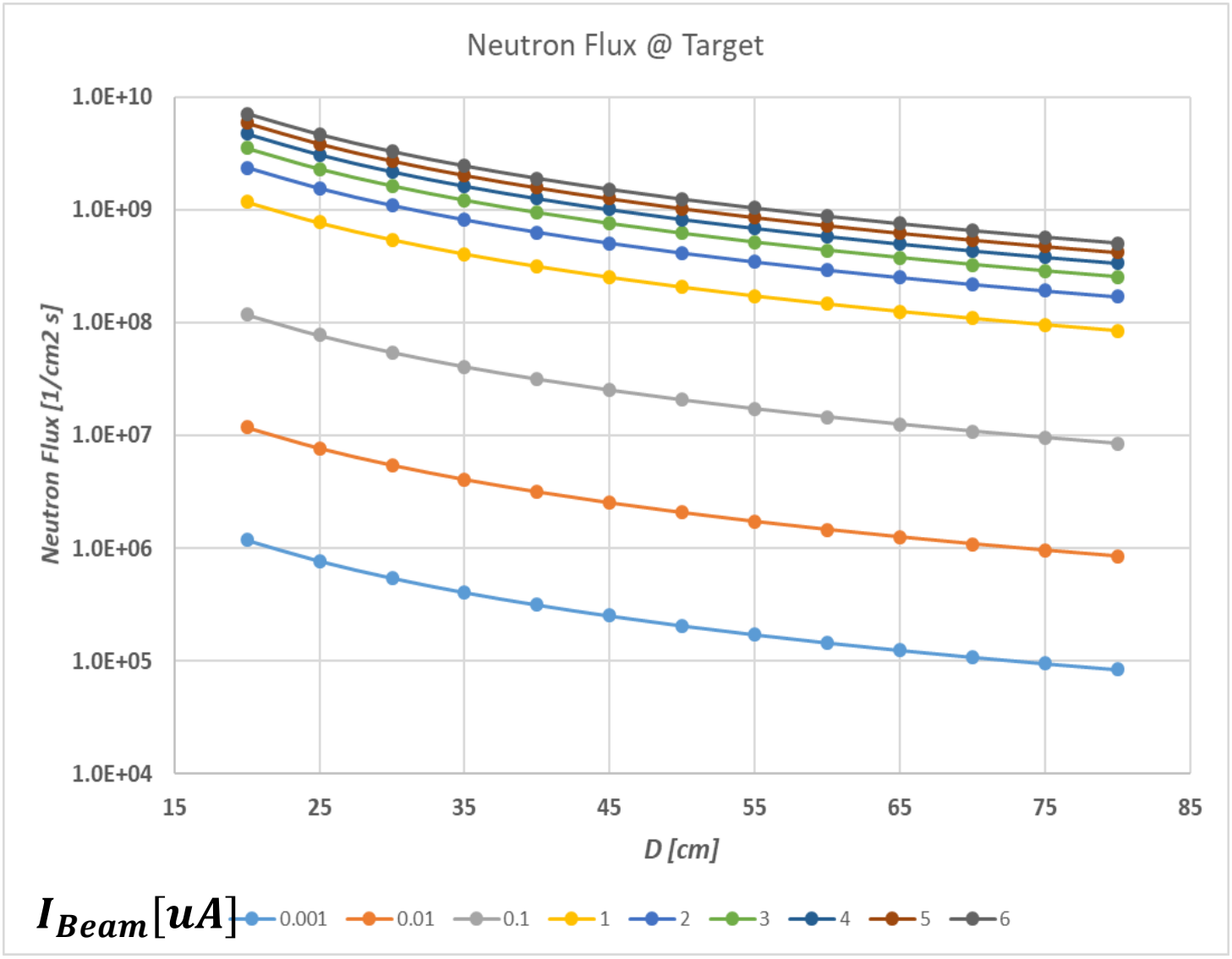
CMS Photons-max 2 $\times 10^7$ Hz/cm^2



From Phase 2 Background Twiki Page

At $I_{beam} = 85nA$ (as in 2014) available current at Louvain we have @ 103 cm from the target:

A factor 1 ME0 neutrons
A factor 5×10^{-3} ME0 gamma



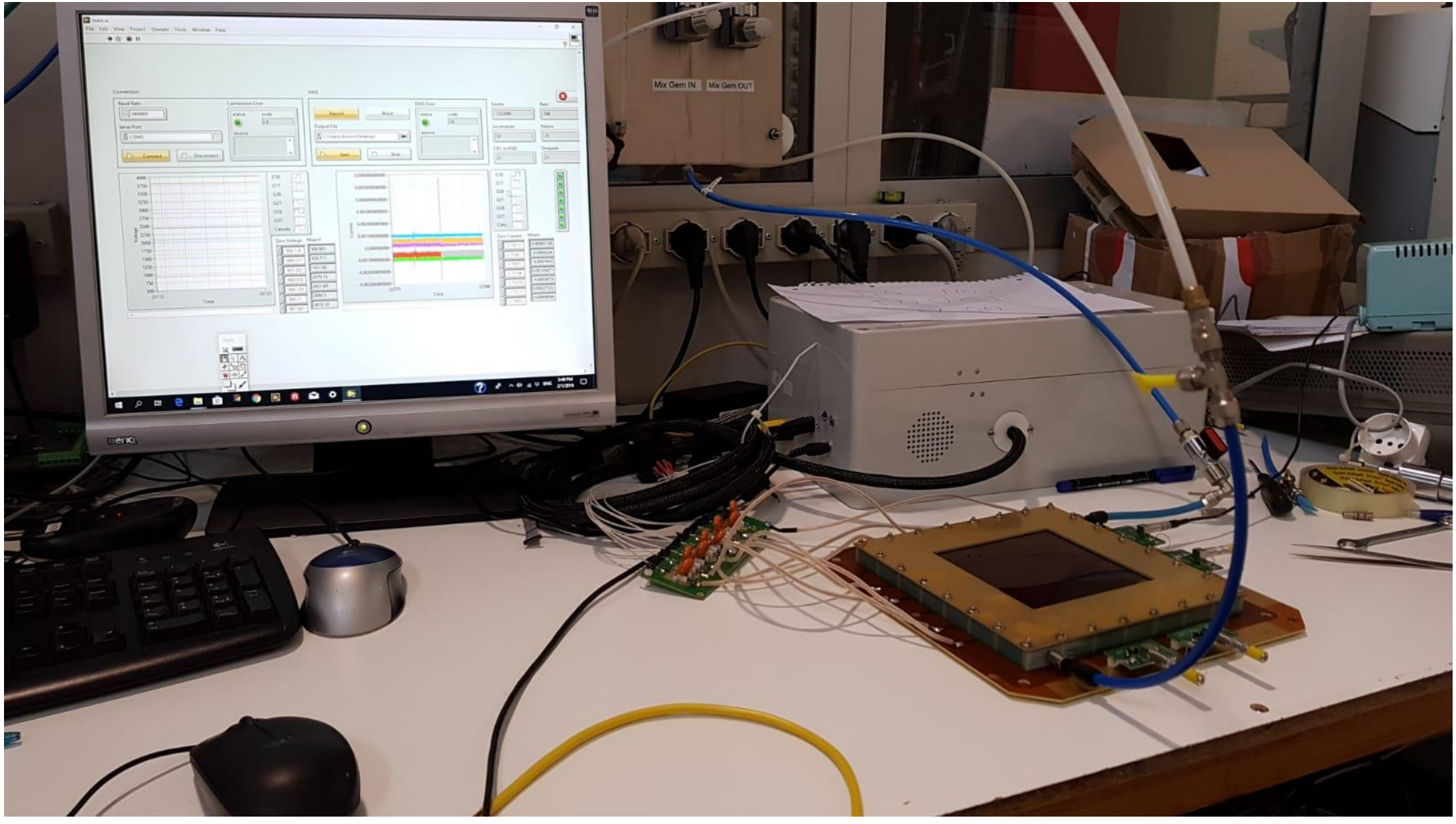
LOUVAIN 2019:

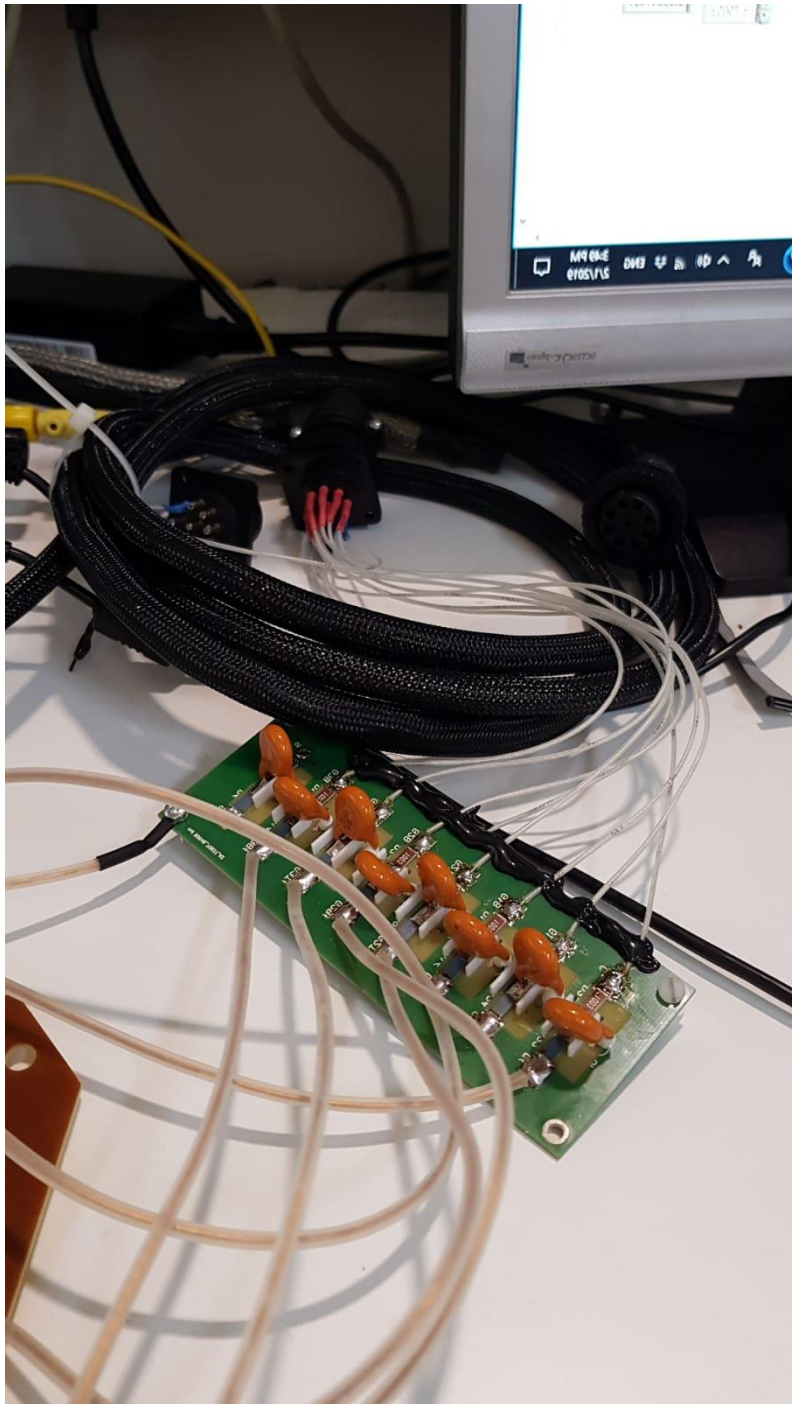
Cosa abbiamo?

- ✓ Nuova GEM 10 cm x 10 cm; strip X-Y (256 canali-256 canali) + Readout G3BOT
- ✓ Scheda adattatore Panasonic->ECL
- ✓ Preamplificatori:
  - Schede RPC
  - Schede RPC semplificate (Pedroni)
  - VFAT3+Mosaic? (Bari)
  - Gastone ? (Bari)

Cosa vogliamo misurare?

- ➢ Corrente: Keithley a 1 Hz o 'modulo Napoli'
- ➢ Rate: test in corso. Forse schede RPC non adatte (poca amplificazione?)
- ➢ Scariche con antenna: Continua la messa a punto


Mix Gem IN
Mix Gem OUT
BenQ



Il modulo è quella scatola grigia ... l'ingresso e l'uscita sono i tipici Amphenol tondi (utilizzati anche per GE1/1). Poi c'è anche un filtro di alta tensione che andrebbe schermato.

Se decidiamo di utilizzarlo, occorre rivedere la distribuzione dell'HV. Occorrerebbe un cavo HV multipolare con un connettore Radial da una parte per il modulo A1515 e un connettore Amphenol dall'altra parte per il pico. Poi un cavo HV multipolare con un connettore Amphenol da un aperte per il pico e dall'altra parte i cavi direttamente saldati sul filtro HV.

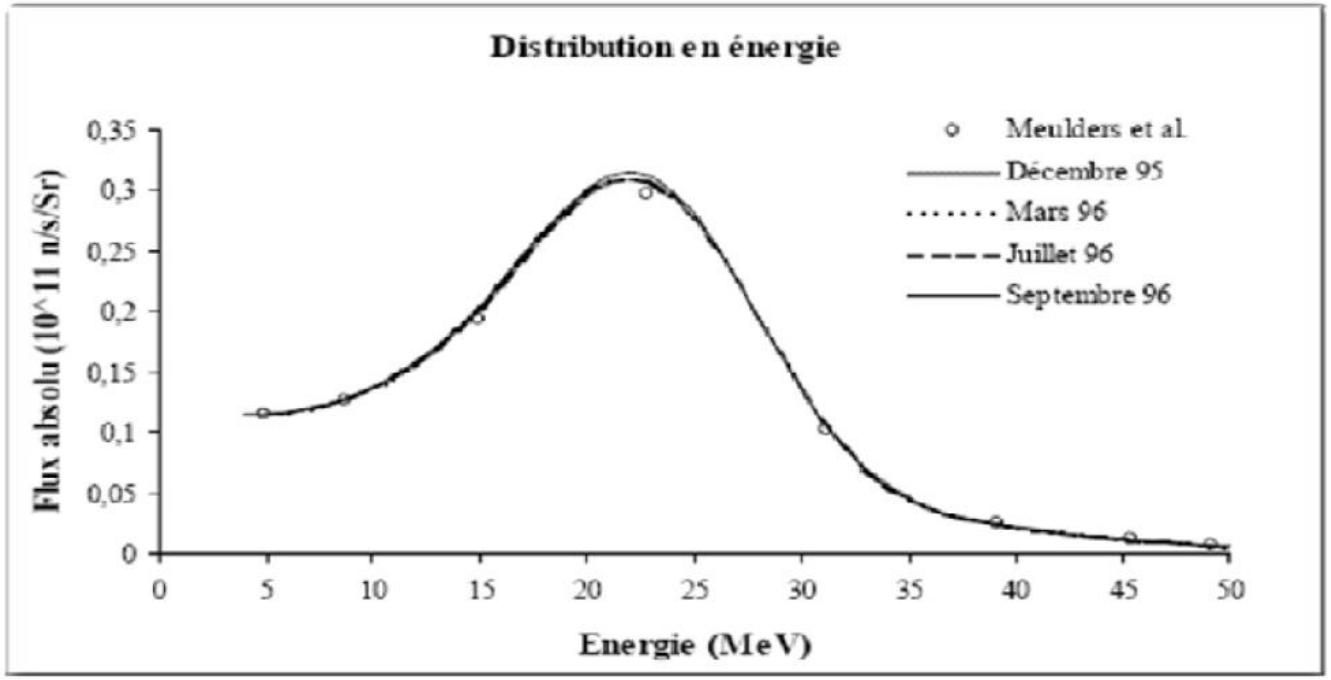
Ciccio

Louvain beam characteristics

(Ilaria)

Tutti i dettagli in:
http://hdl.handle.net/11571/1203320

Neutron spectrum



How to calculate the flux in the different positions:

$$\phi\left(\frac{n}{cm^2 s}\right) = \frac{10^{14} \times i\ (\mu A)}{3600\ s\ \times 0{,}079\ \times\ d(cm)^{1{,}902}}$$

i = beam current
d = distance from the end of the beam line

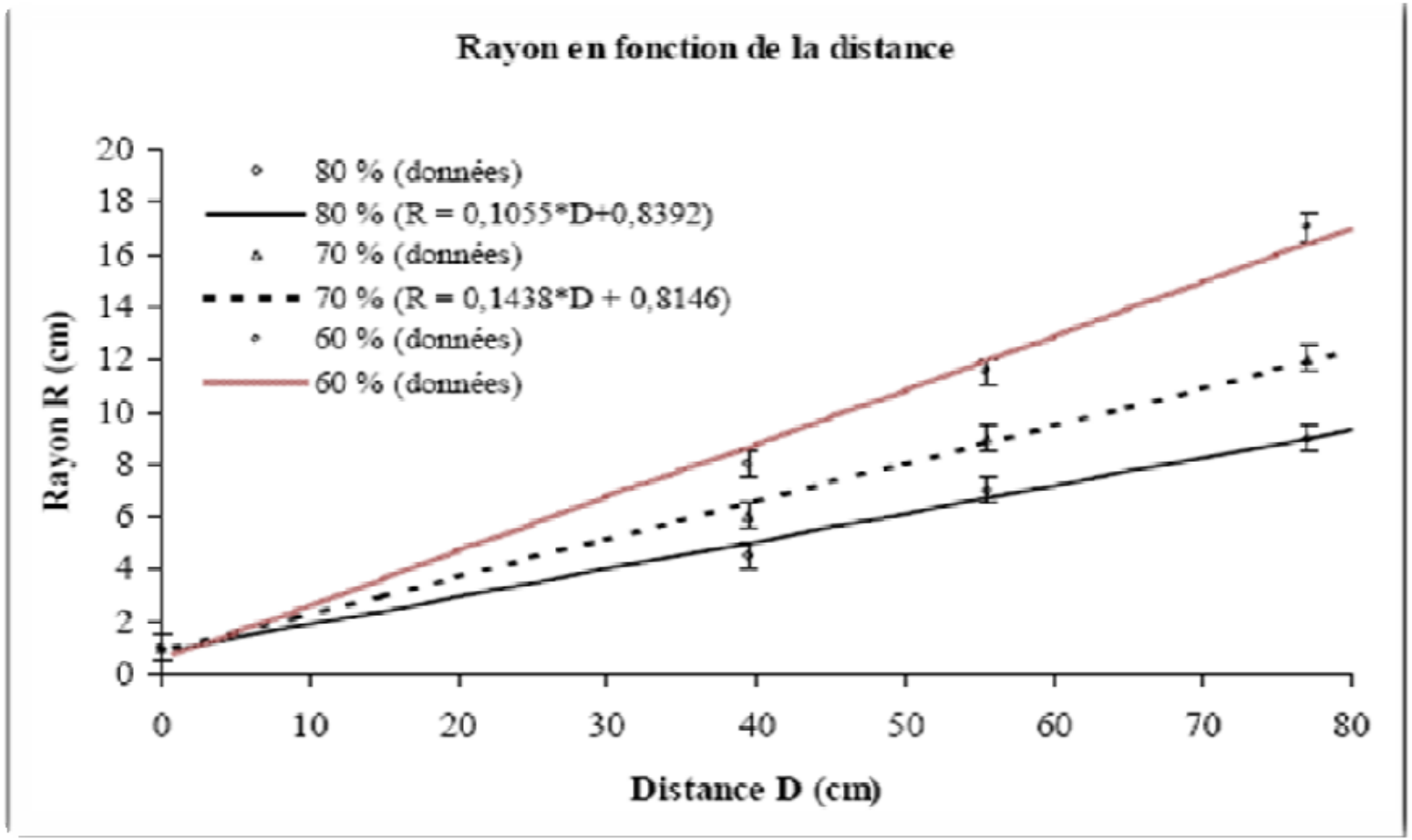
2014 fluxes

Beam Current (nA)	Flux (n/cm^2s)	Time (h)
85	4.44×10^6	6
200	1×10^7	1.5
2000	1×10^8	1.5

Beam composition

Particle	Fraction	Average Energy (MeV)	Maximum Energy (MeV
Neutron	1.0	16.56	50
Proton	1.5×10^{-4}	12.61	25
Electron	1.6×10^{-4}	1.57	6
Gamma	2.4×10^{-2}	1.93	10

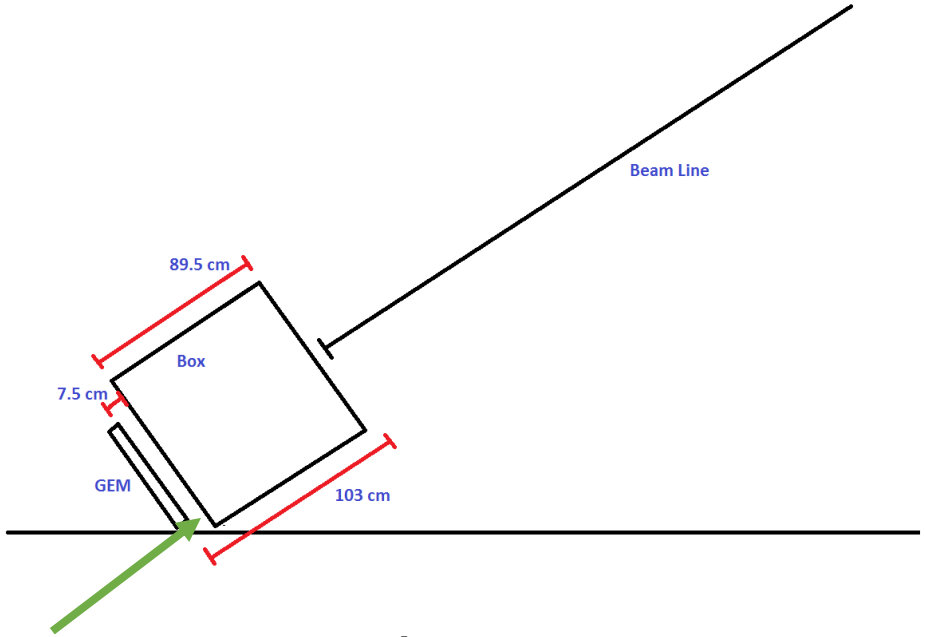
Beam uniformity



Neutron spatial distribution variation with the distance from the target

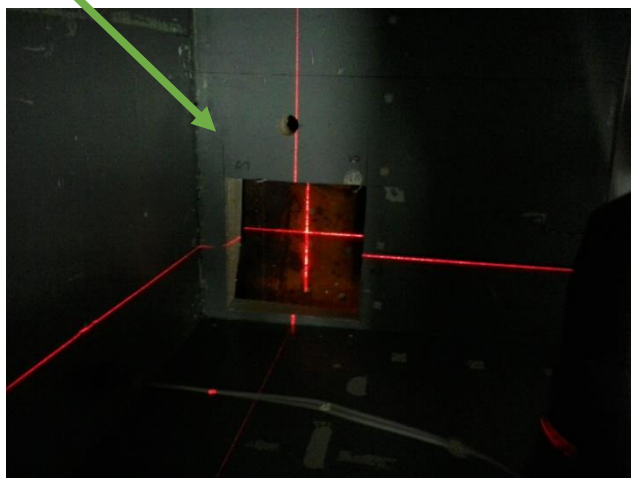
At a distance D of 103 cm, the uniformity in a surface with radius 10 cm is between 70 and 80 %

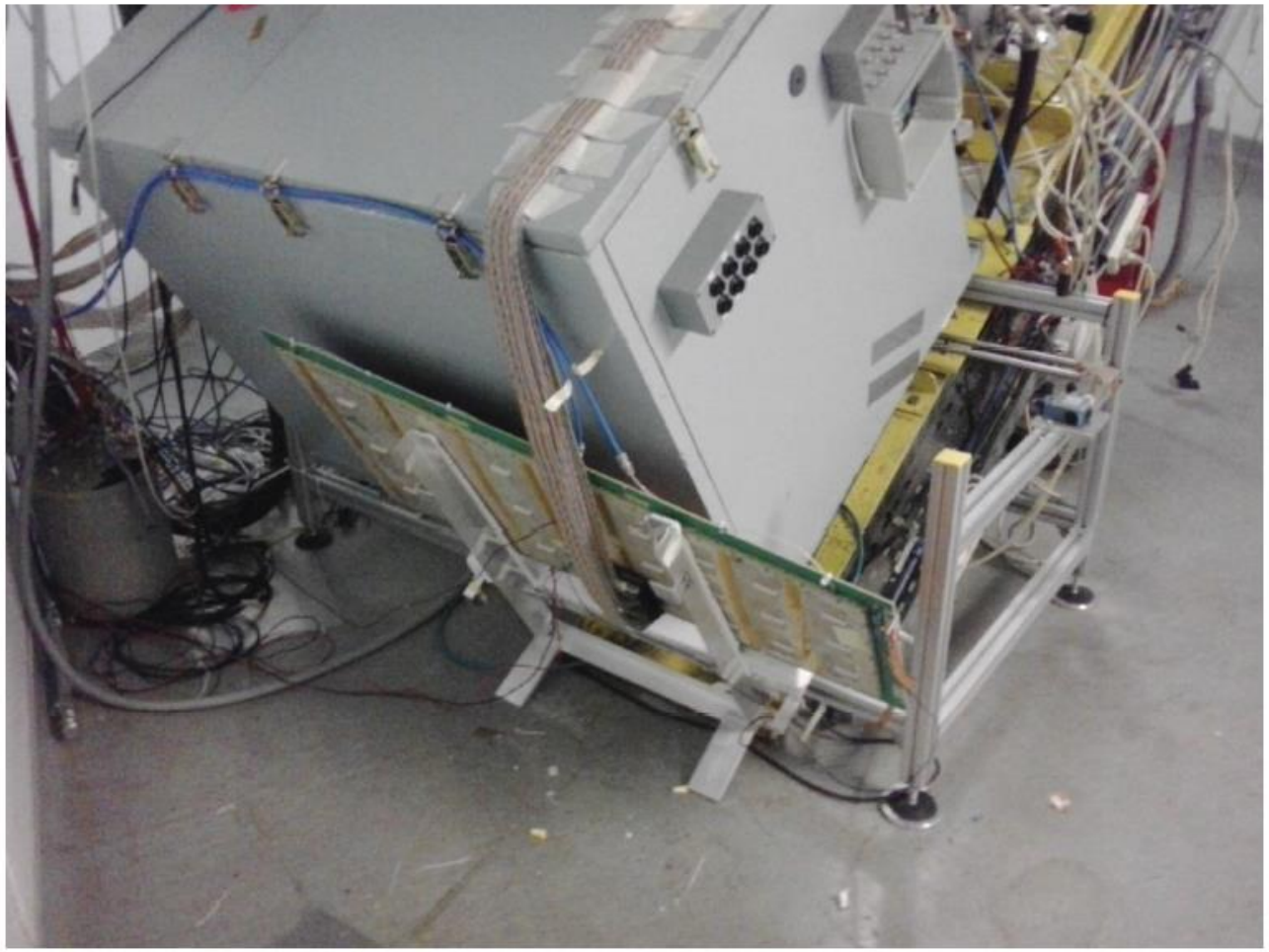
2014 installation



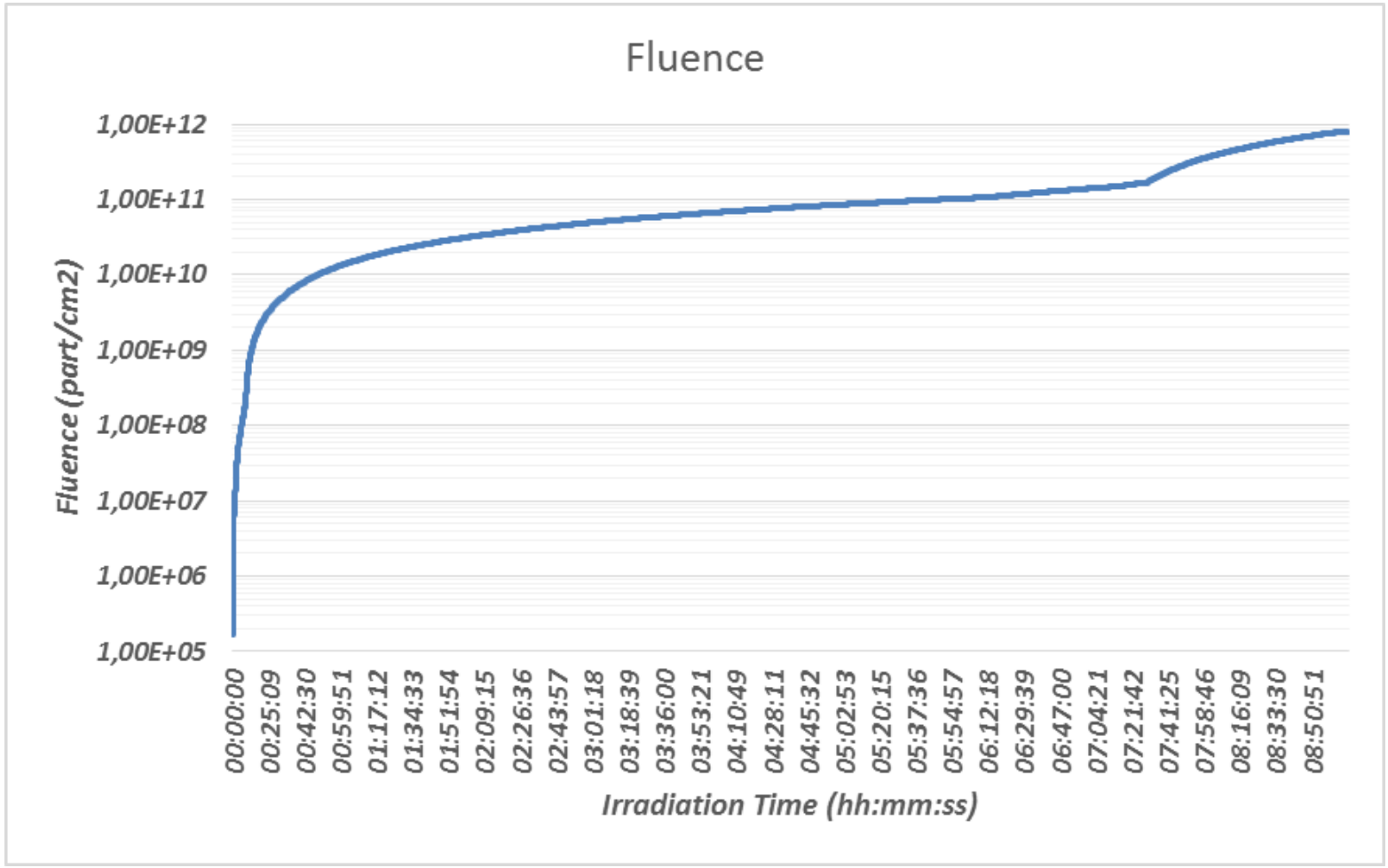
- Beam spot: ø 20 cm at the distance selected
- No temperature, humidity and pressure measurement in the facility

Empty Polistirene Box → Hole on the beam axis with size greater than 20 x 20 cm^2 in order to avoid contamination of the beam





Fluence and Dose 2014



Flux in the irradiation position:

$$\phi\left(\frac{n}{cm^2 s}\right) = \frac{10^{14} \times i\ (\mu A)}{3600\ s\ \times 0{,}079\ \times\ d(cm)^{1{,}902}}$$

i (μA)	ϕ (n/cm²s)
0,085	4,44 x 10^6
0,2	1 x 10^7
2	1 x 10^8

Accumulated Dose (in Si) =
1.2 kRad

Accumulated Fluence =
7.91 10^{11} part/cm^2