

n_TOF

First beam on 19th July

Javier Praena

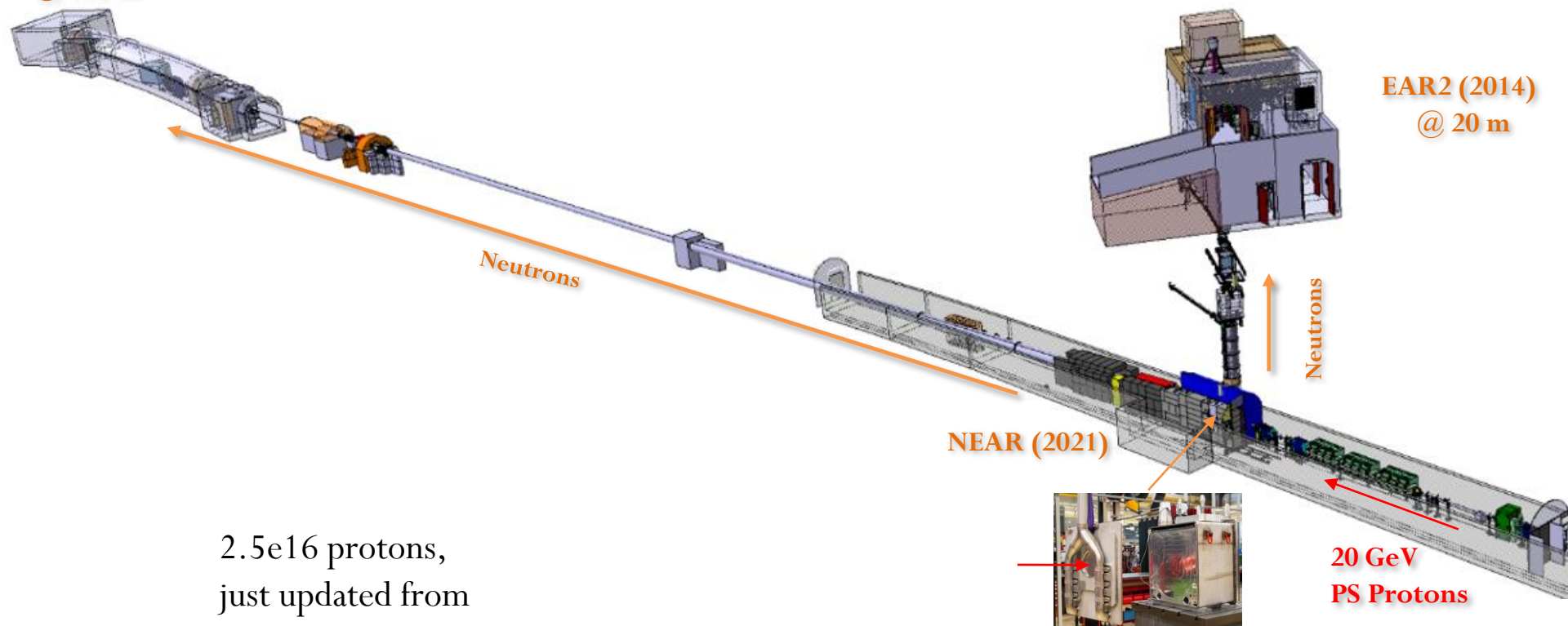
Universidad de Granada (Spain)
CERN Scientific Associate (EP/SME)
n_TOF Physics Coordinator



- Proton beam started at low intensity $2e12$ ppp to nominal $7e12$ ppp.
- Increasing the vertical dimensions on the proton beam.
- Excellent target performance with increasing intensity and change in the dimensions. Monitoring: temperature, N₂ flowing...
- Neutrons were detected in both experimental areas with different detectors.
- We are working on the alignment of the detectors to the beam:
 - timepix detectors

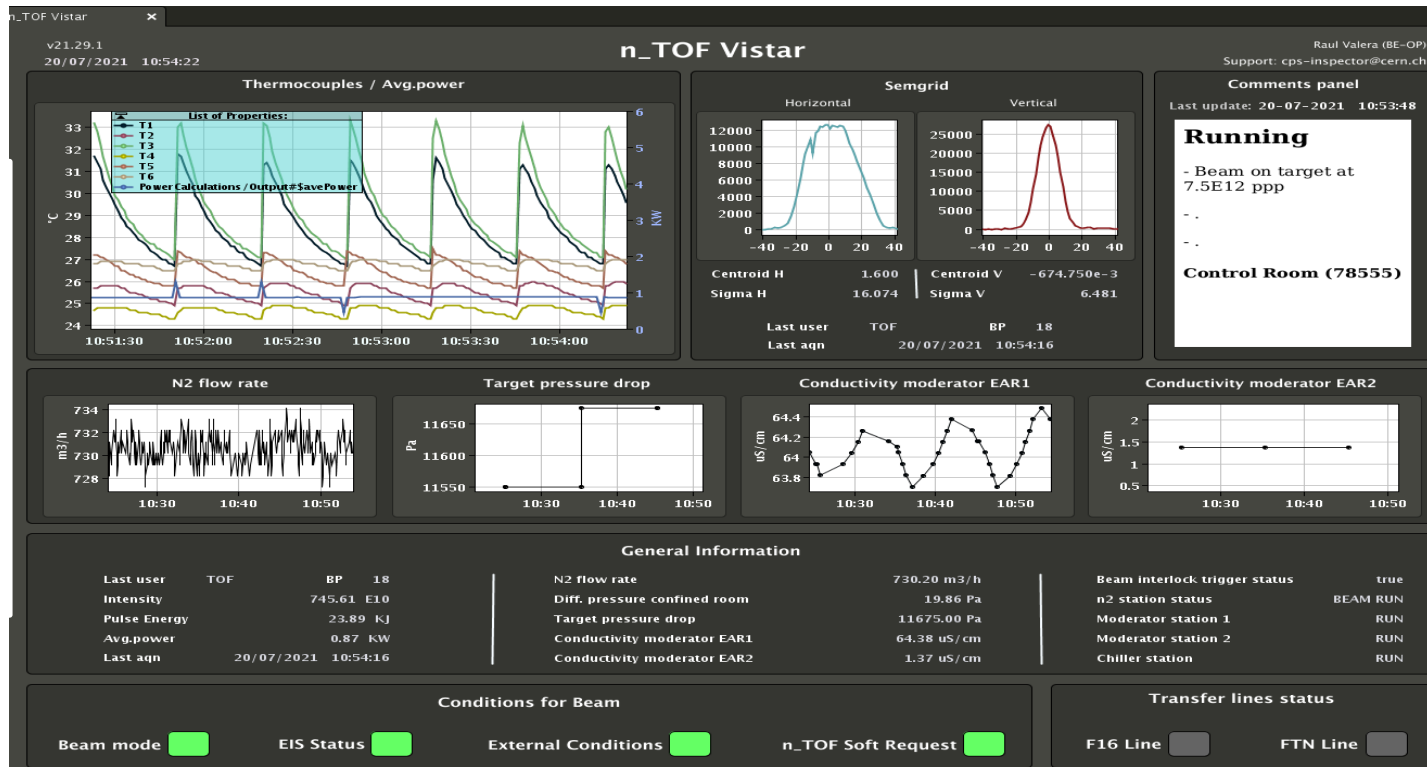
Commissioning: monitoring target and flux at EARs

EAR1 (2001)
@ 185 m

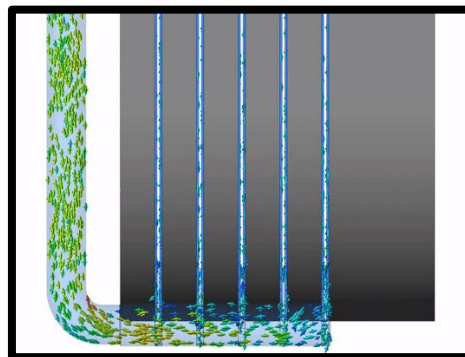


2.5e16 protons,
just updated from
Raffaele Esposito
to 3e16 protons

Commissioning: monitoring target and flux at EARs



Protons →

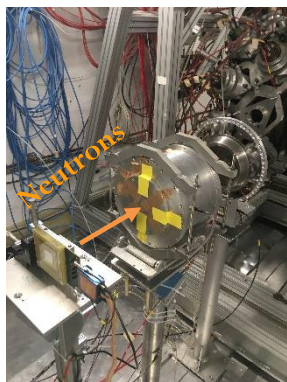
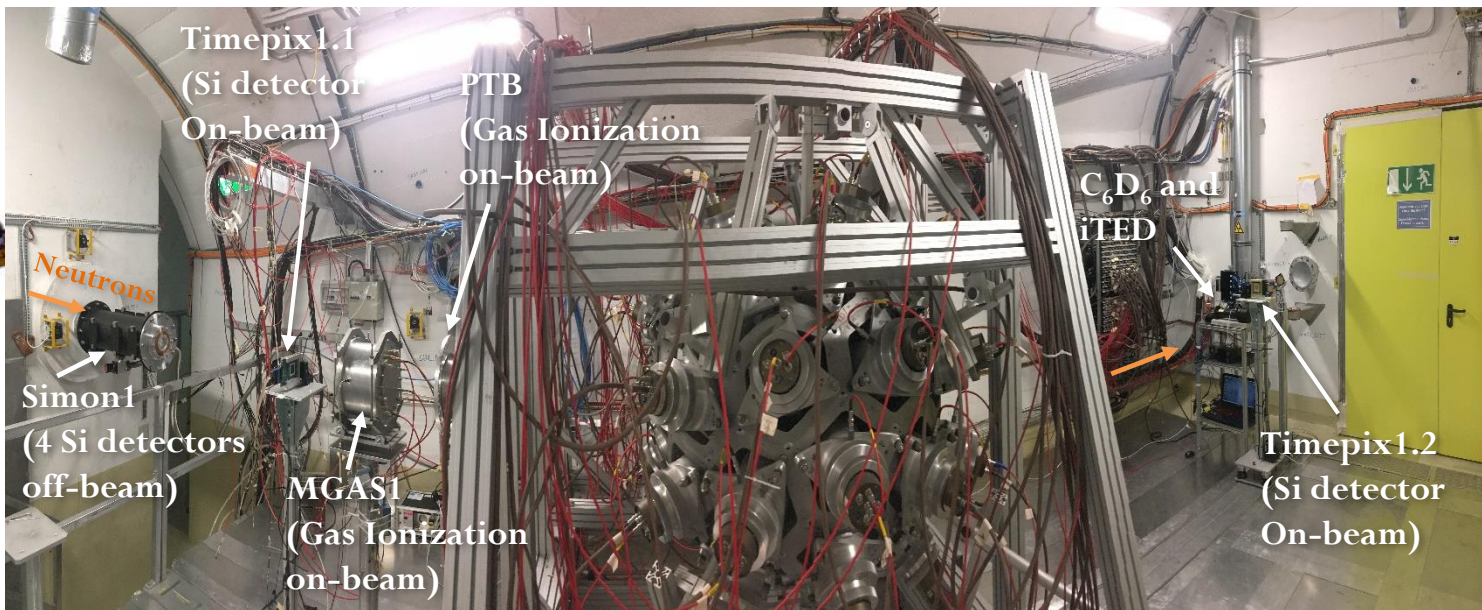
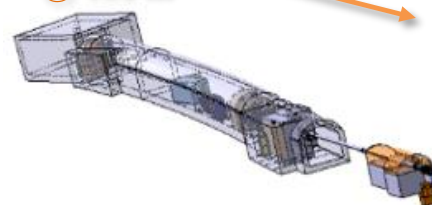


20 GeV PS Protons

R. Esposito, M. Calviani

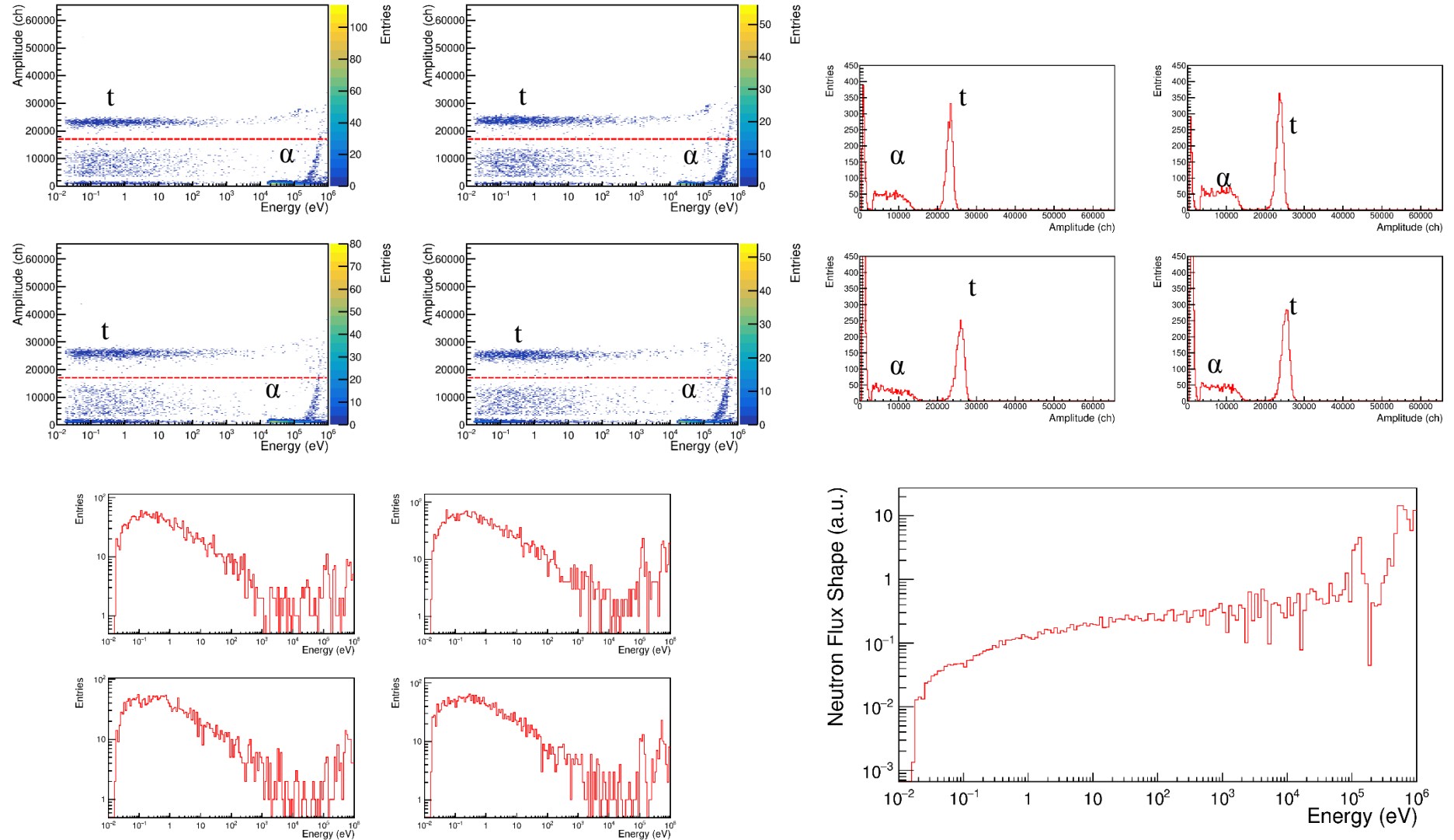
Commissioning: monitoring target and flux at EARs

EAR1
@ 185 m



20 GeV
PS Protons

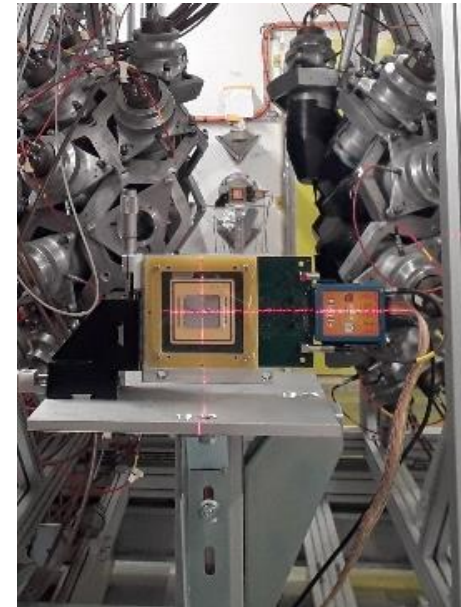
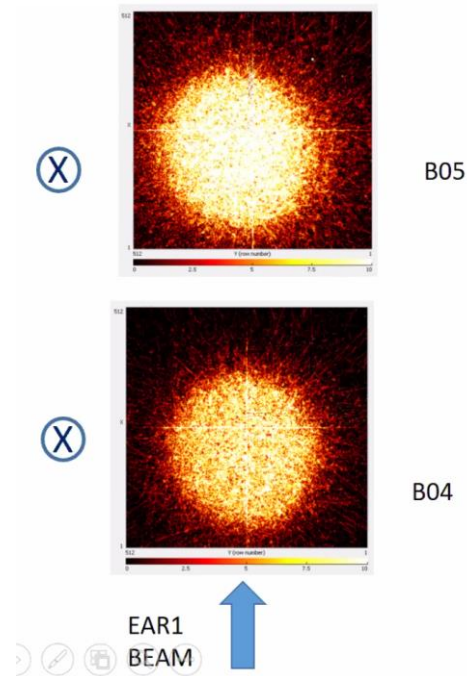
EAR1: Silicon Monitor based on ${}^6\text{Li}$ foil and 4 Si detectors (off-beam)



Counts as a function of neutron energy

Simone Amaducci

EAR1: Timepix for beam profile all energies



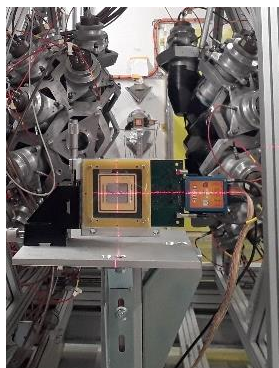
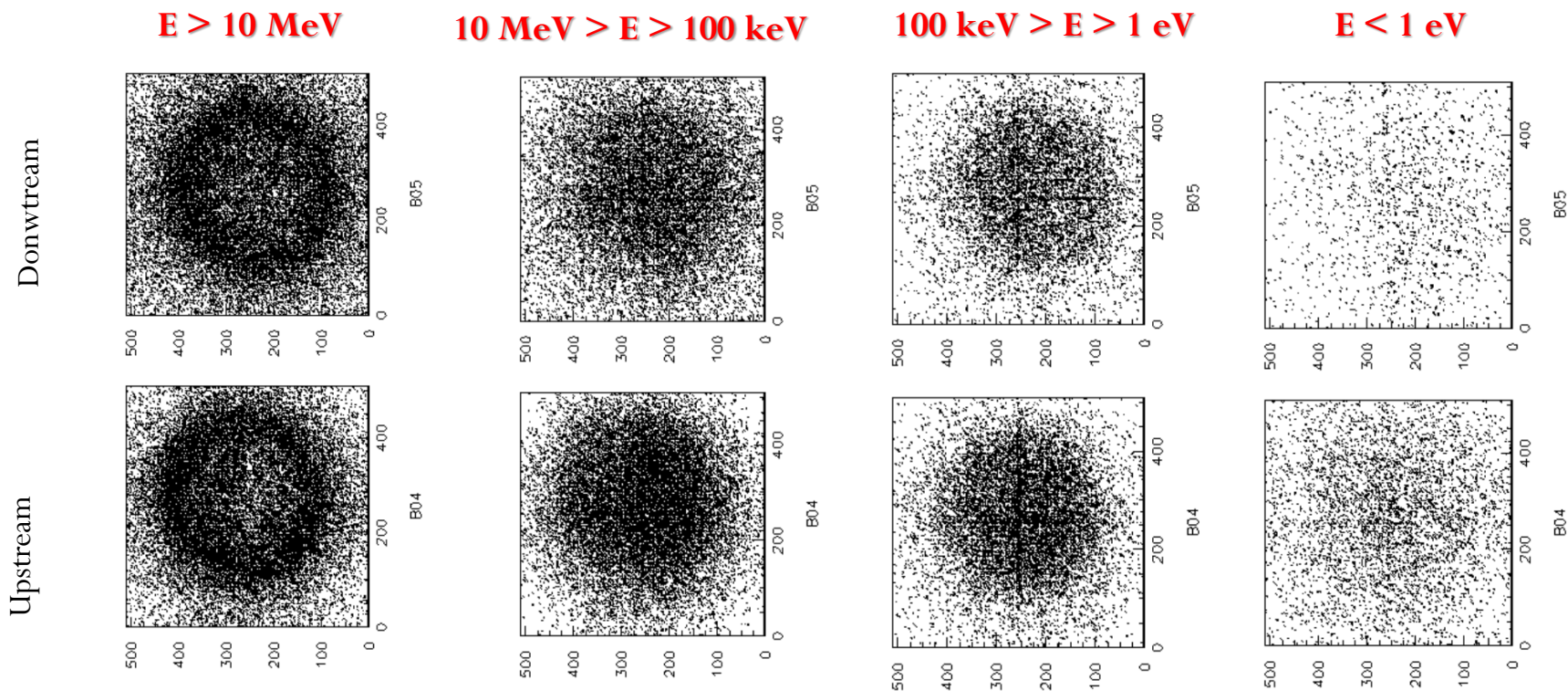
At the beginning both Timepix aligned respect to geometrical center provided by Survey.

The upstream lasers looks in the same position.

The Timepix showed a misalignment of the neutron beam of 3 mm on vertical.

Fabrizio Murtas

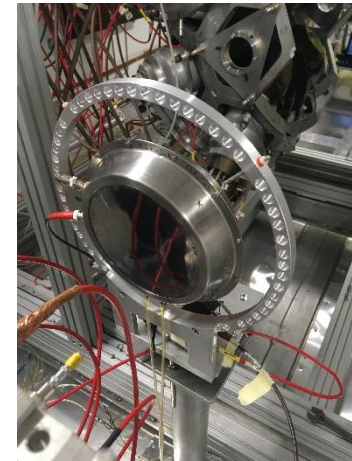
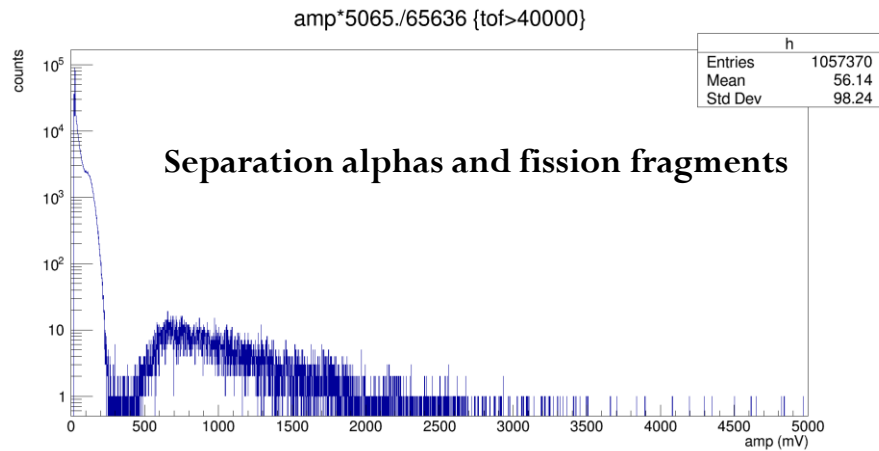
EAR1: Timepix for beam profile as a function of the energy



The sensibility of the detector is lower at low energies.

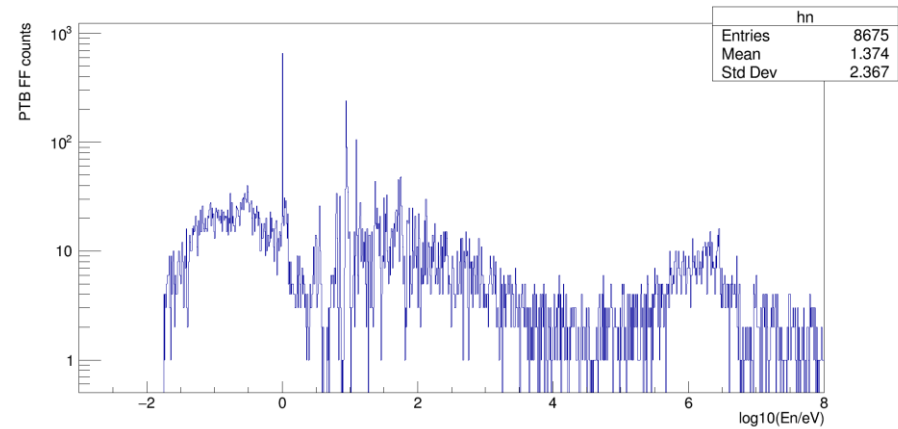
Fabrizio Murtas

EAR1: PTB, gas ionization ^{235}U -detector (on-beam)



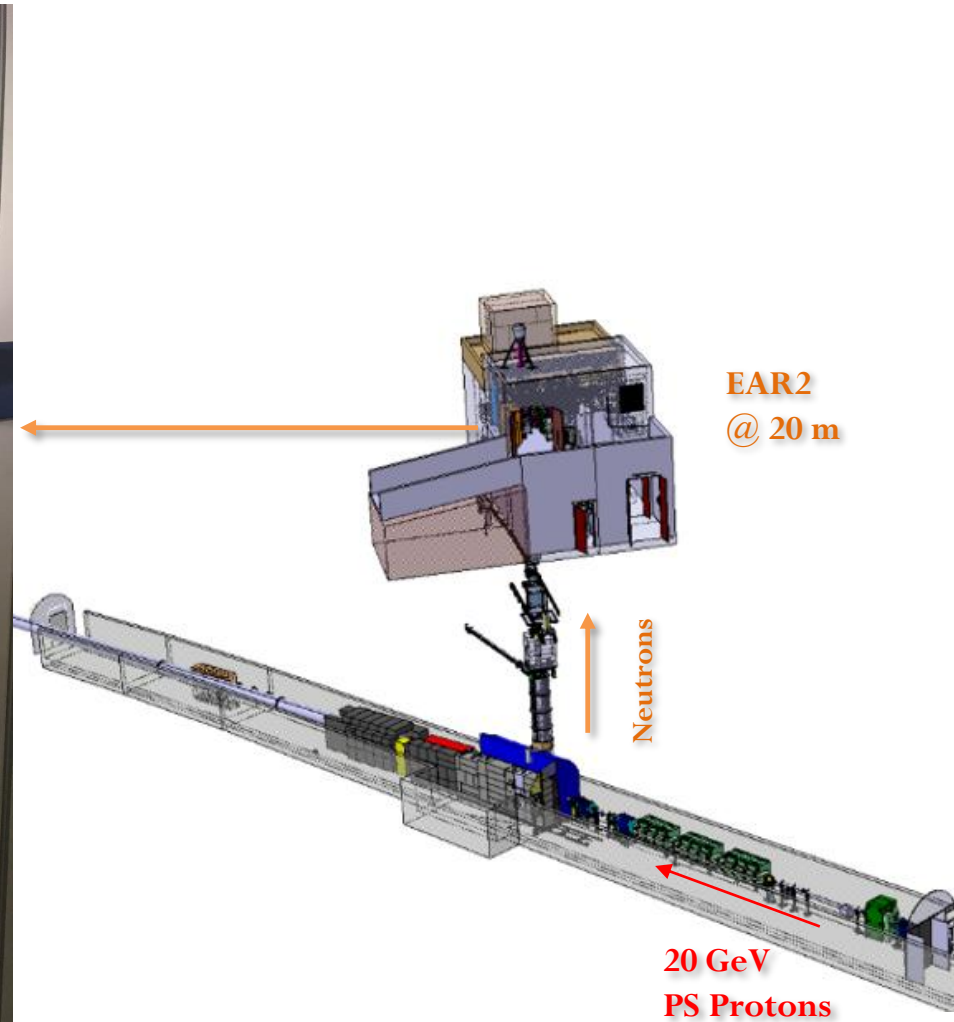
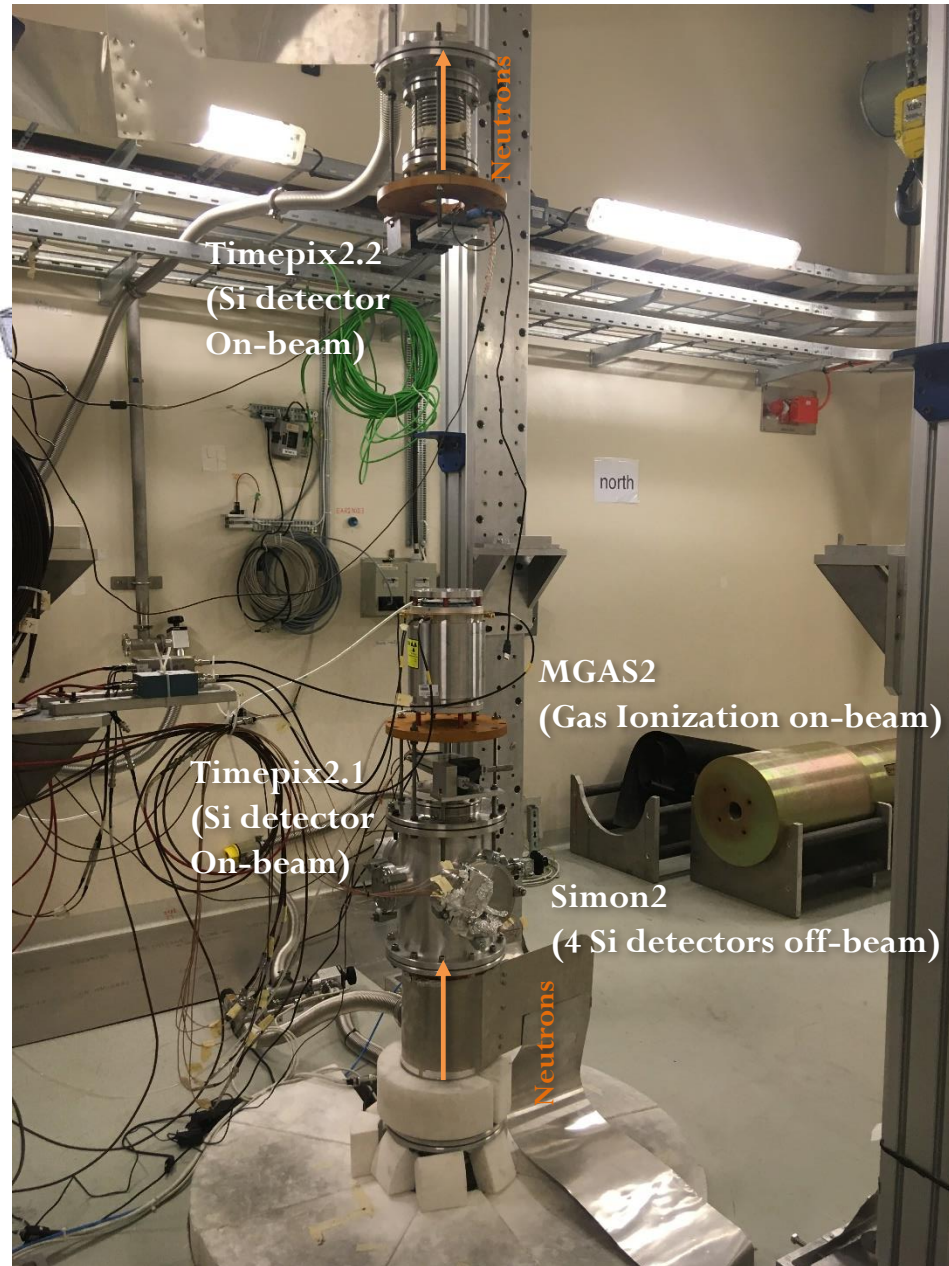
Preliminary flux shape.

$^{235}\text{U}(n,f)$ cross-section resonances can be noticed

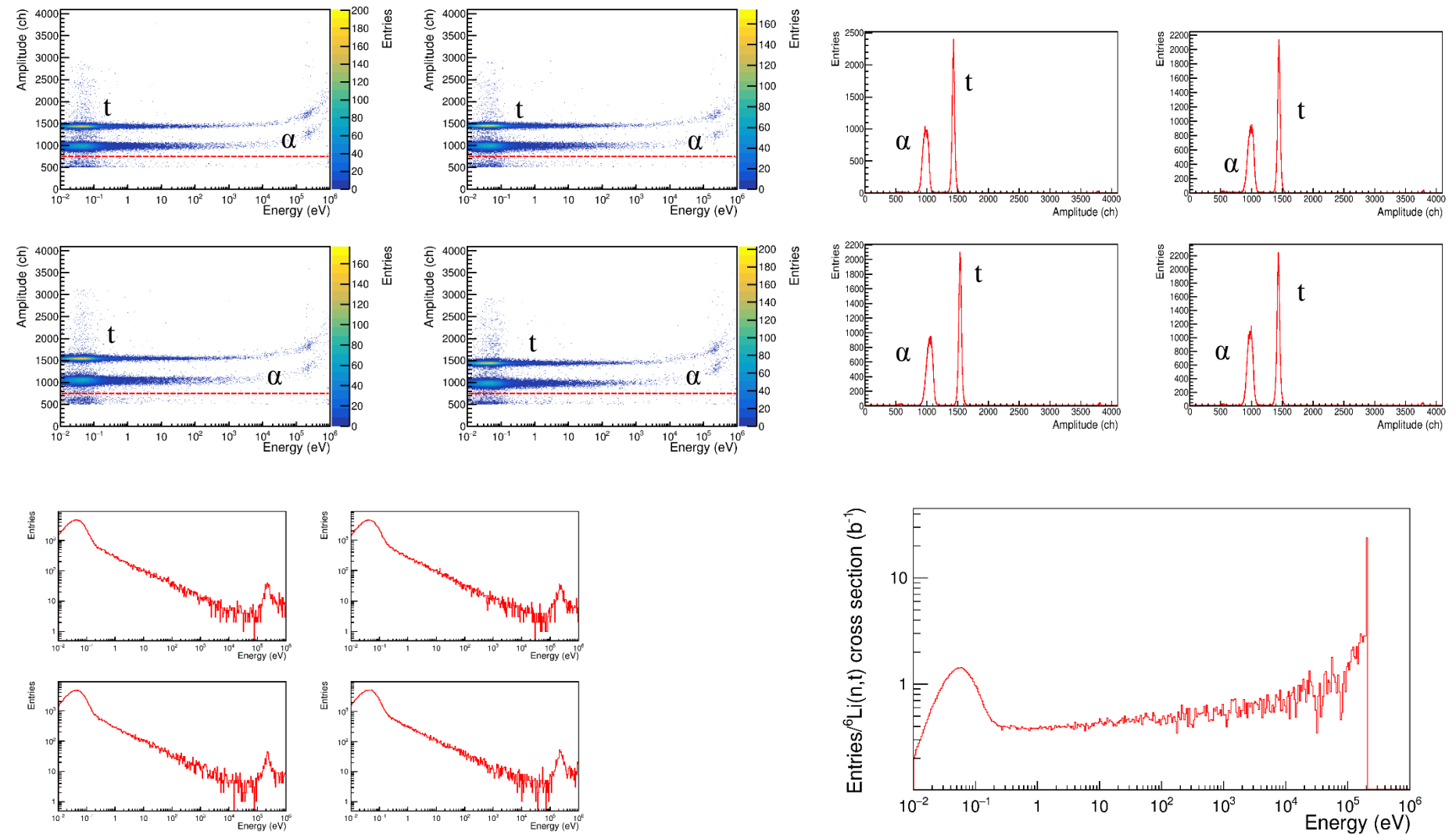


Michi Bacak

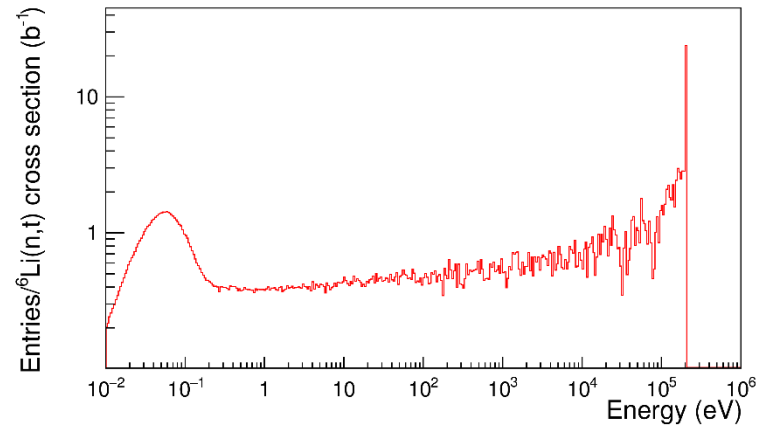
EAR2: detectors.



EAR2: Silicon Monitor based on ${}^6\text{Li}$ foil and 4 Si detectors (off-beam)

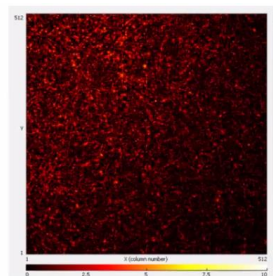


Counts as a function of neutron energy

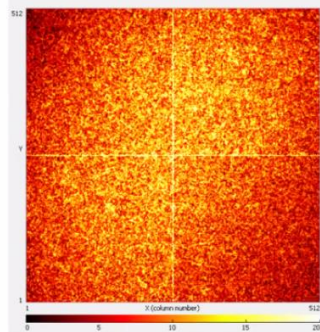


Simone Amaducci

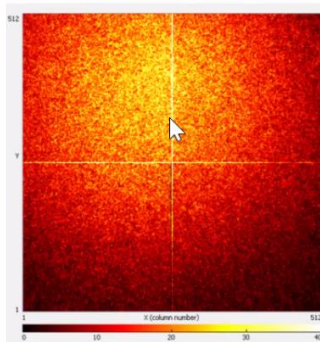
EAR2: Timepix for beam profile as a function of the energy



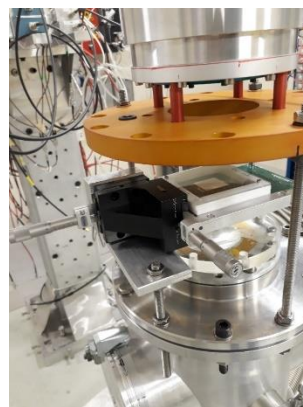
C05



L07



EAR2
BEAM



Beam profile all the neutron energies.

As a function of the neutron energy is on going

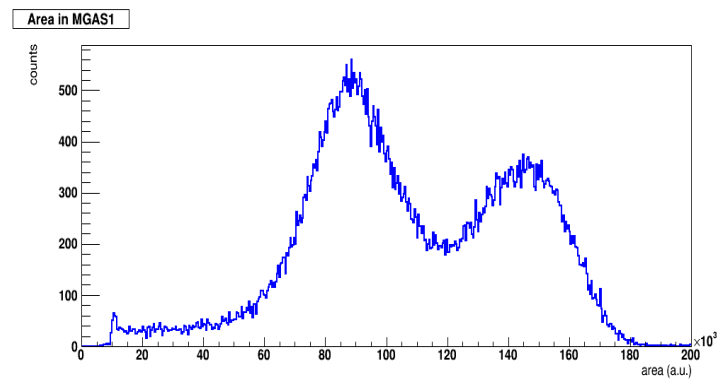
Two different locations at 3 m distance

EAR2
BEAM

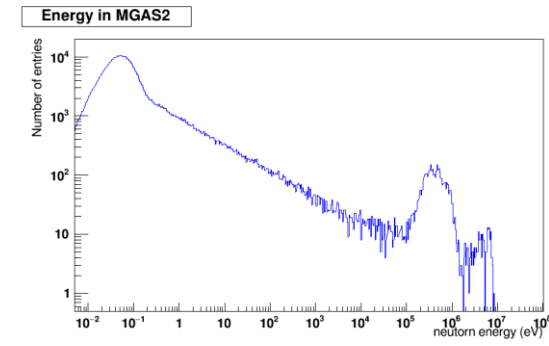
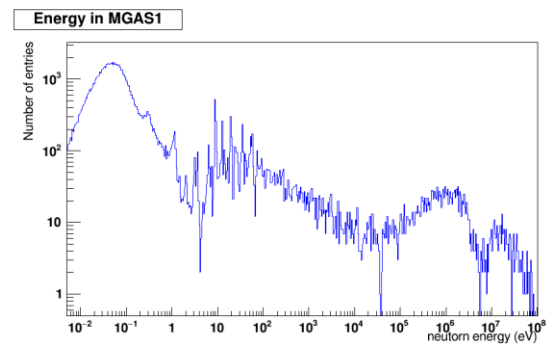
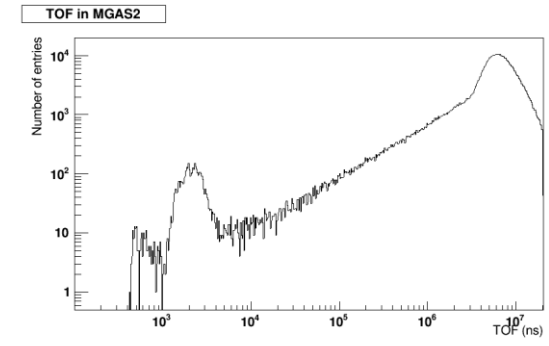
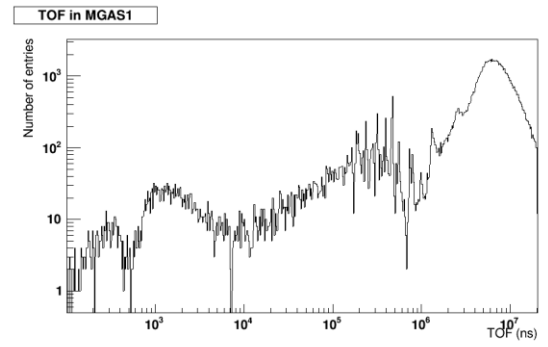
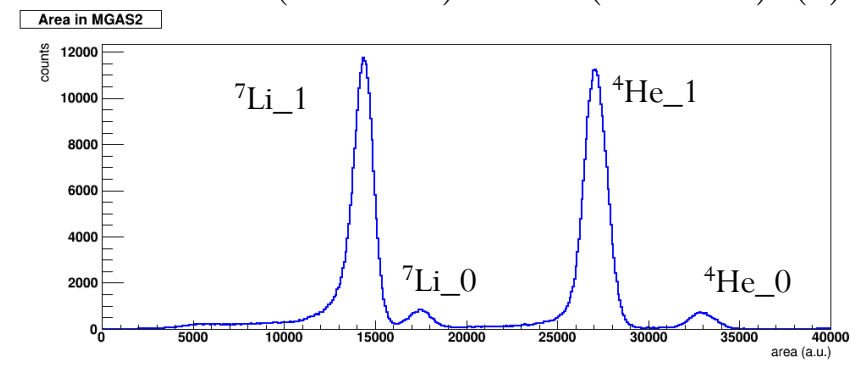
Fabrizio Murtas

EAR2: MGAS2, gas ionization ^{235}U -detector, ^{10}B -detector, (on-beam)

$n + ^{235}\text{U} \rightarrow$ Fission fragments (several MeV)



$n + ^{10}\text{B} \rightarrow ^7\text{Li} (0.8 \text{ MeV}) + ^4\text{He} (1.5 \text{ MeV}) (1)$
 $\rightarrow ^7\text{Li} (1.0 \text{ MeV}) + ^4\text{He} (1.8 \text{ MeV}) (0)$



Marta Sabaté, José A. Pavón

Javier Praena – U. Granada – CERN (EP/SME)



PS/SPS Meeting, 22/07/2021

- **New target performance are excellent.**
- **The monitoring of the target reacts perfectly to the change on proton beam dimensions and intensity.**
- **Neutron flux in the experimental areas are being monitorized with detectors off-beam and on-beam.**
- **Around $4e16$ protons has been already used.**
- **Major part of the pulses are at nominal intensity $7e12$ proton per pulses**

Thank you

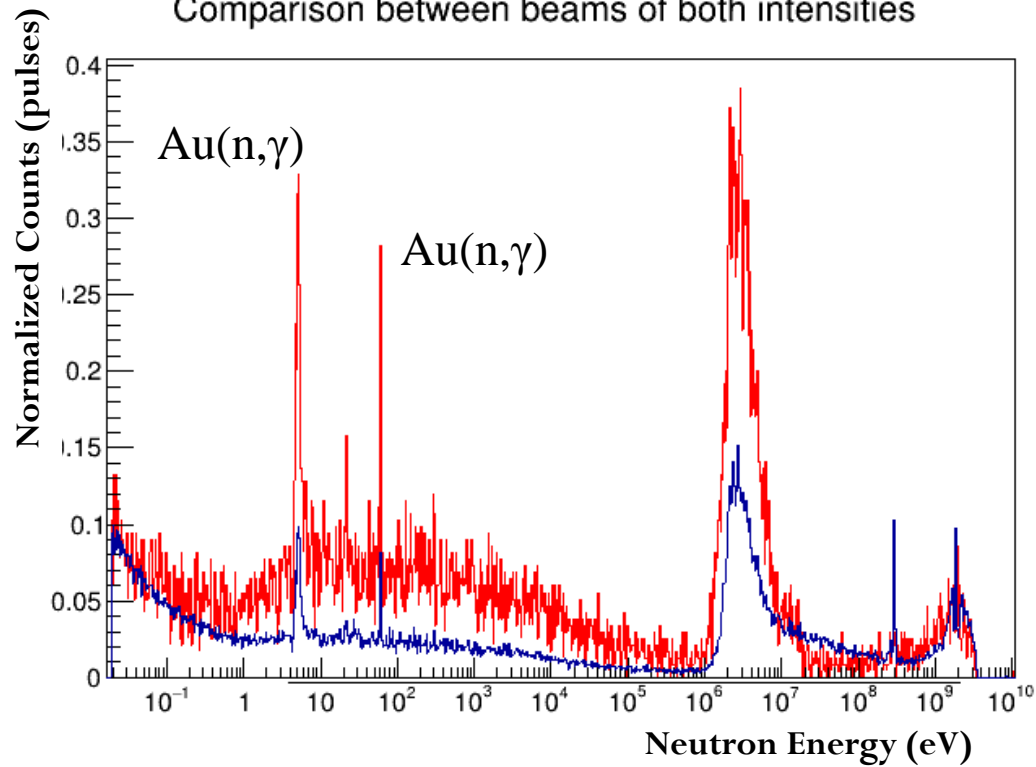
Javier Praena

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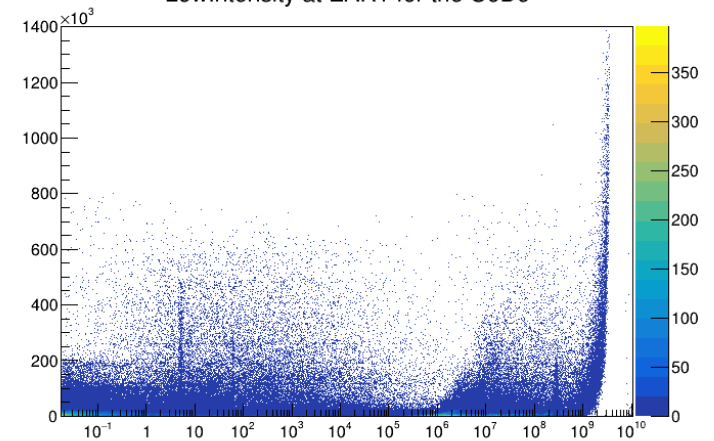


EAR1: C_6D_6 INFN in the iTED test (Au sample)

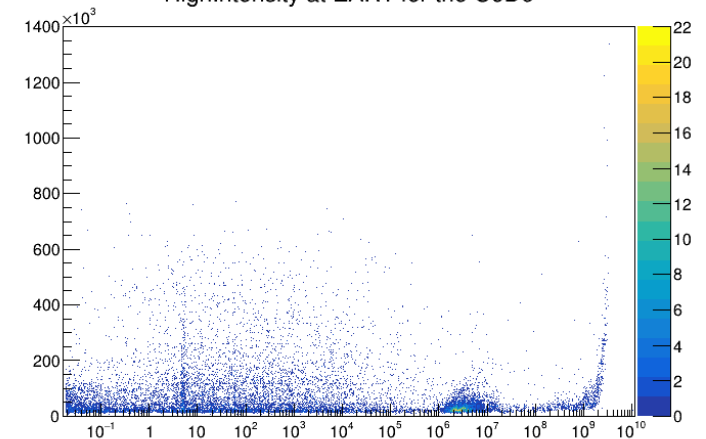
Comparison between beams of both intensities



LowIntensity at EAR1 for the C6D6



HighIntensity at EAR1 for the C6D6

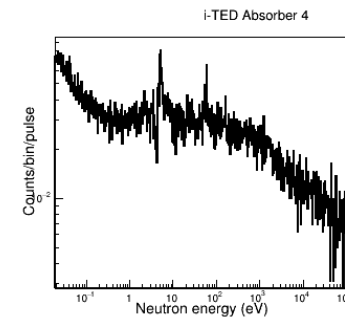
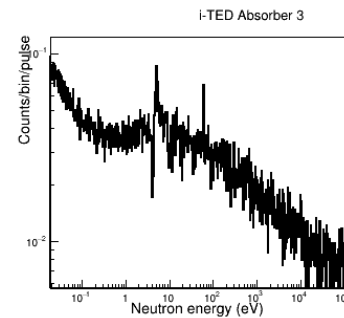
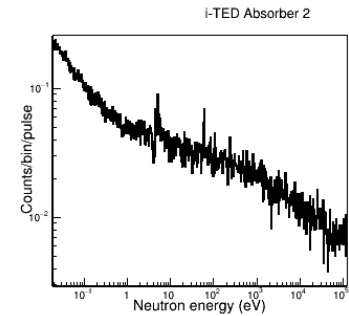
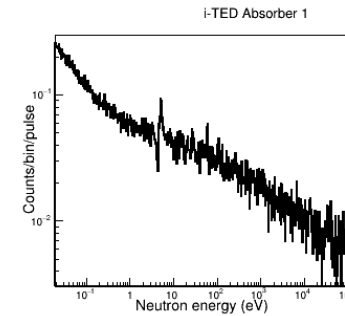
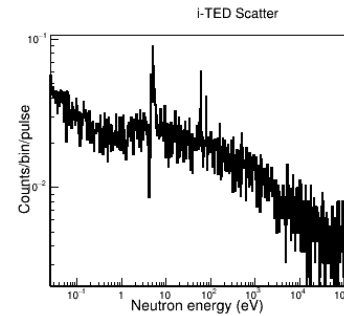
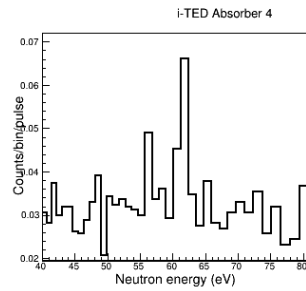
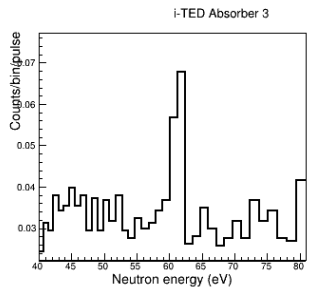
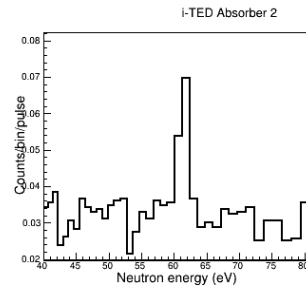
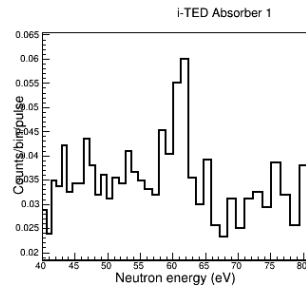
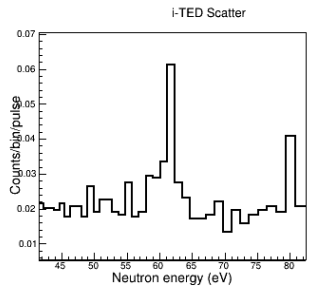


Gold resonances has been detected.

Other resonances under studied.

Francisco García Infantes, Adrià Casanovas

EAR1: iTED (Au sample)



Jorge Leredegui