n_TOF Report

Daniela Macina
n_TOF Run Coordinator
CERN

OUTLINE

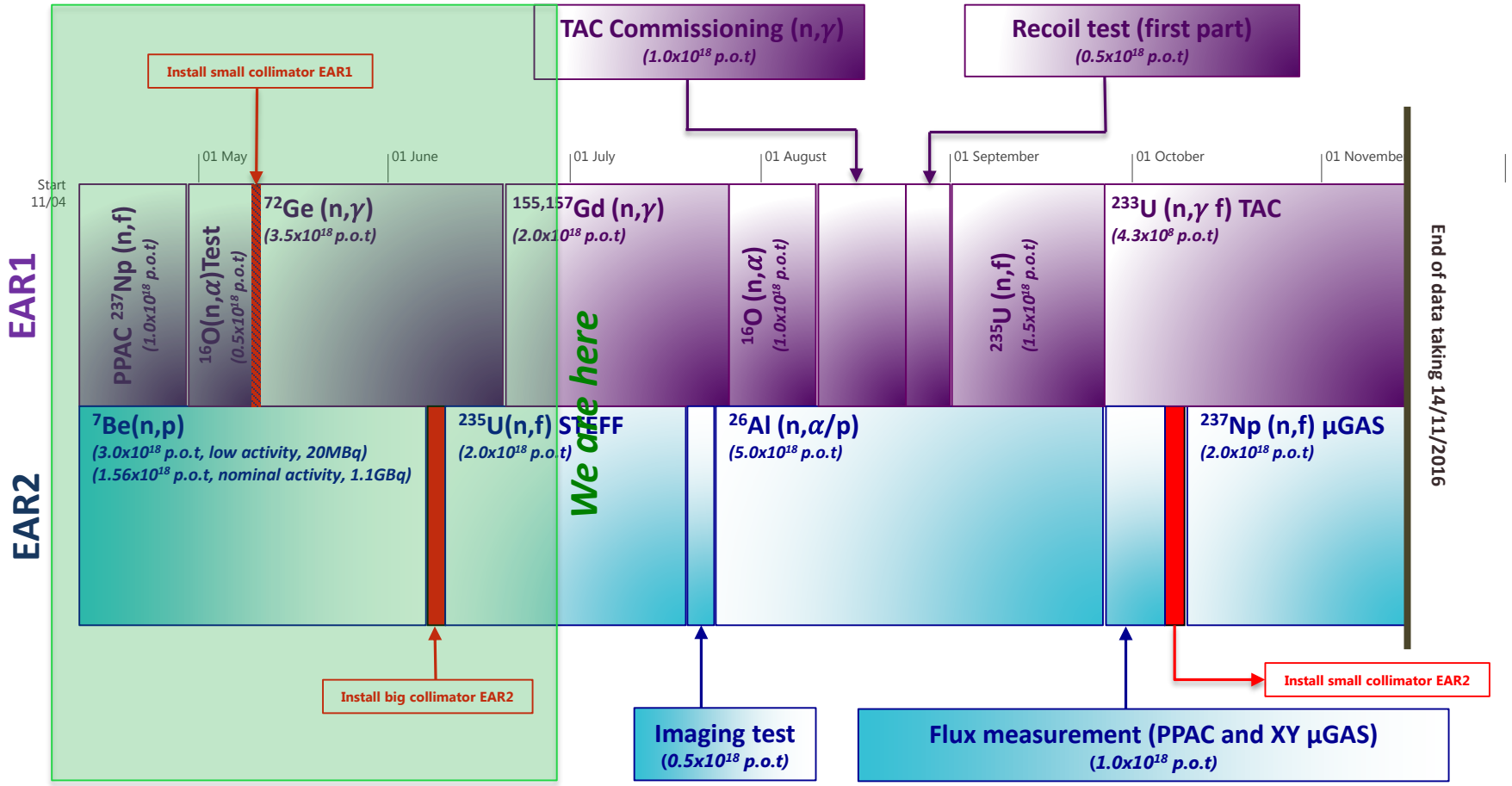
- Winter shutdown activities
- Planning of the measurements in 2016
- Proton delivery from PS
- Outlook of the measurements performed/being performed:
  - ^{237}Np (n,f), PPAC in EAR1
  - ^{16}O (n,f) in EAR1
  - ^{72}Ge, ^{155,157}Gd in EAR1
  - ^{7}Be (n,p) in EAR2 (see next talk)
  - ^{235}U (n,f), STEFF in EAR2
- Summary and conclusions

Winter Shutdown activities

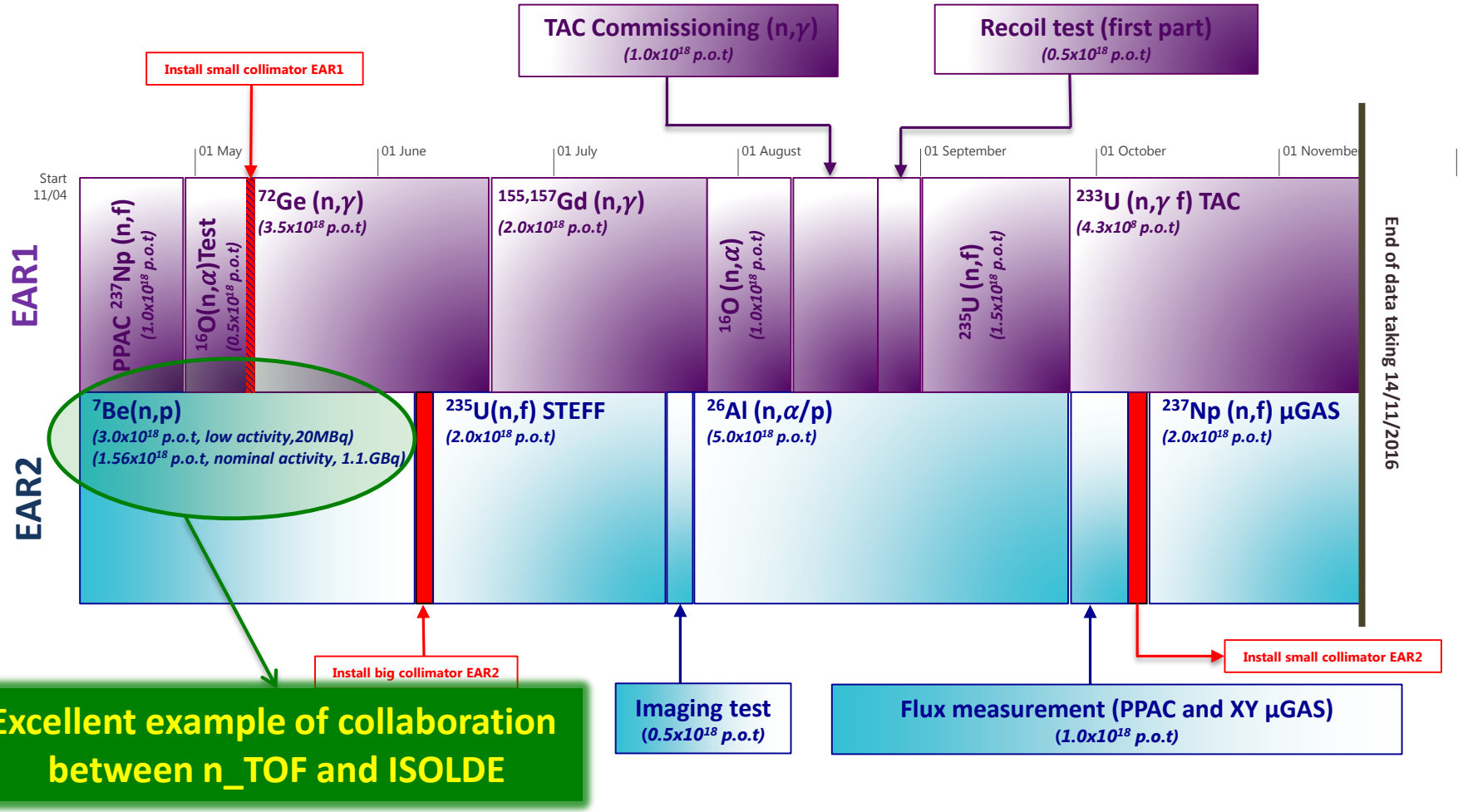
ADQ14DC-4C-VG-PCIe

- Bought additional 13 SP Devices cards (14 bits resolution) and associated hard disk drivers
- Faster data transfer to CASTOR:
  - Upgrade n_TOF experimental area routers from 1 to 10 Gbit
  - New transfer protocol
  - Software upgrade to include the MASTER Channel method to reduce the amount of data written on tape
- Few infrastructure upgrades and related monitoring

PLANNING 2016

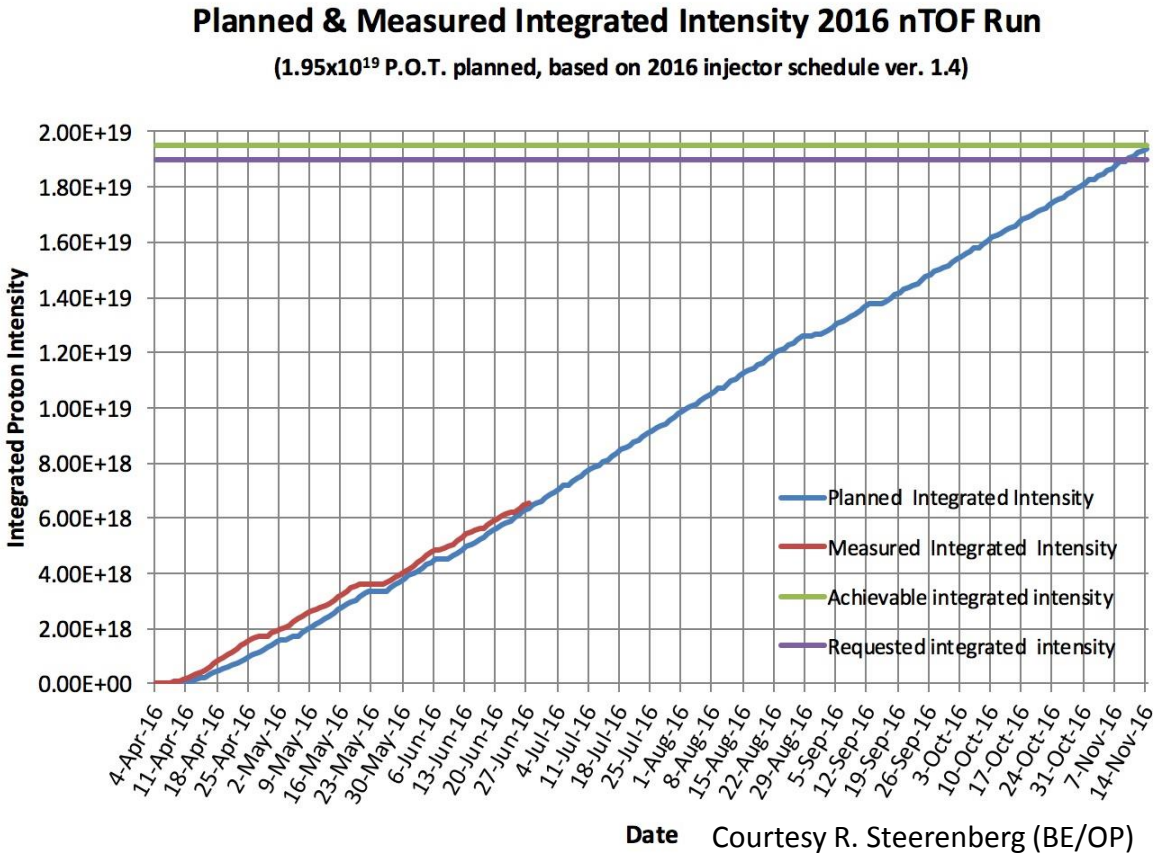


PLANNING 2016

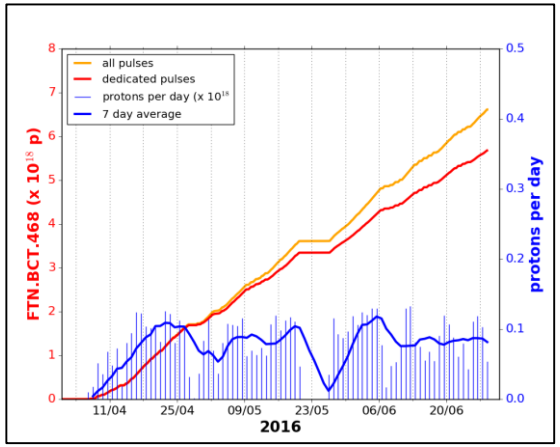


Excellent example of collaboration between n_TOF and ISOLDE

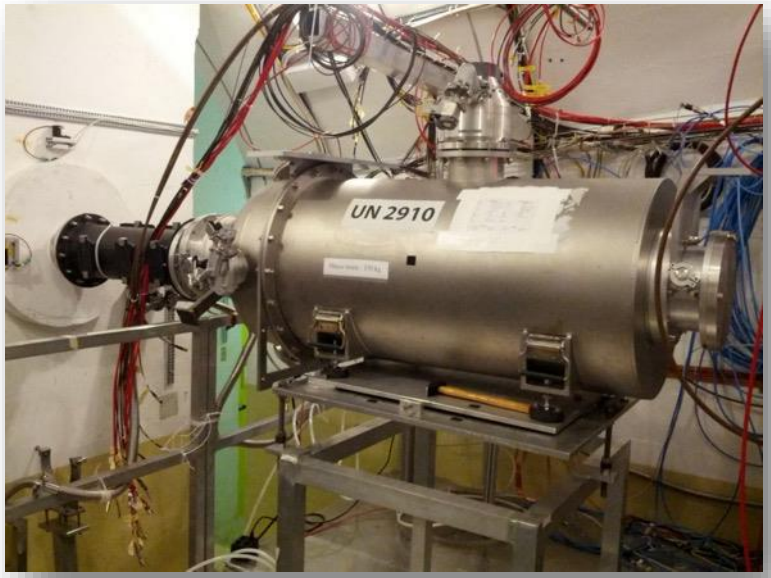
PROTON DELIVERY FROM PS

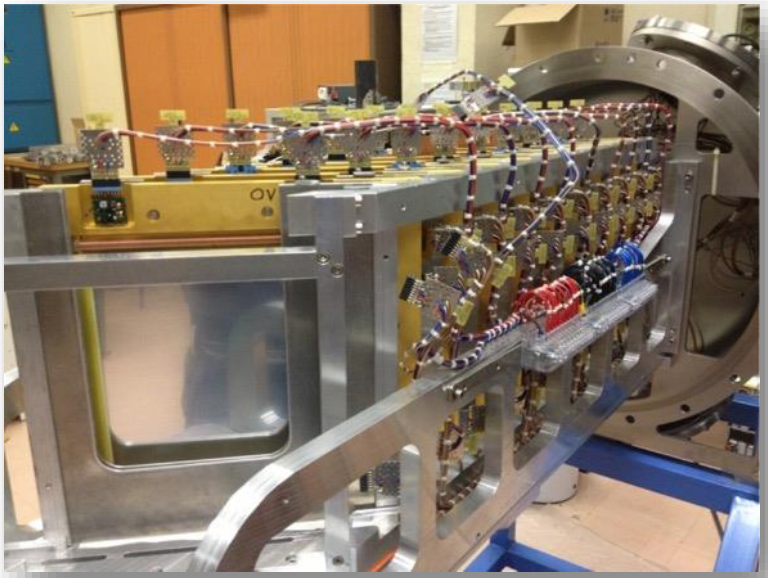


Courtesy R. Steerenberg (BE/OP)



PPAC ^{237}Np(n,f) at EAR1





Y. Chen

- Additional 1.5 x 10^{18} p.o.t in 2016 to reach the necessary statistics (loss of data in 2015 due to a problem with the driver of the old Acqiris digitizer cards)
- Significant improvements in the DAQ:
  - Master channel method
  - Higher transfer rate to CASTOR

  have allowed the data recording down to the thermal point to validate the method to calculate the measurement efficiency
- Data analysis on going

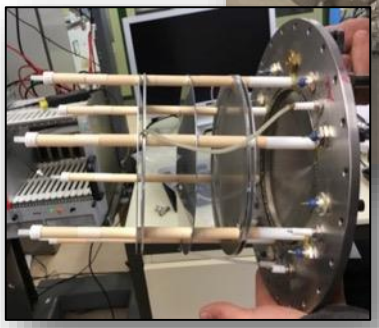
$^{16}O(n,\alpha)$ test

Motivation

- Test in view of the measurements of light isotopes (^{16}O,^{10}B,^{12}C,^{14}N,^{19}F) using gaseous targets.
- First stage experiment aims at the measurement of the $^{16}O(n,\alpha)$ cross section for 3 Mev $<E_n<$15 MeV

Set up

- Double ionization chamber with common cathode (the same used for the measurement at IRMM Van der Graaf in 2007)
- Chamber filled with 95%Kr+5%CO_2 at 2 bar overpressure
- Canberra 2006E proportional counter preamplifier (high gain, low noise)



F. Mingrone

$^{16}O(n,\alpha)$ test

Preliminary conclusions

First time gaseous targets are measured at n_TOF (most of the available data come from electrostatic accelerators)

Detector:

- Working in the low energy region, blinded by γ-flash at high energy (lot of material in beam in particular the stainless steel window)

Electronics:

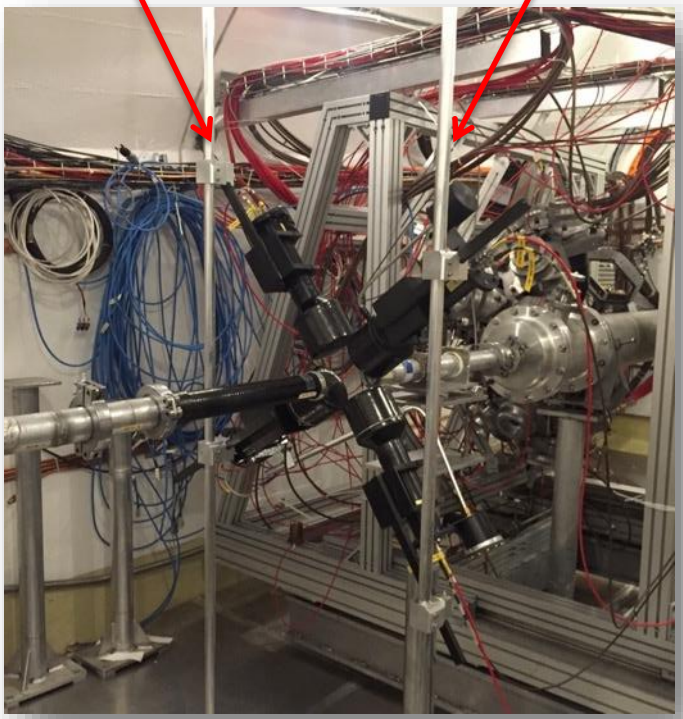
- Good behavior of the Canberra 2006E (high gain because of few MeV α, but not saturated by the γ-flash)

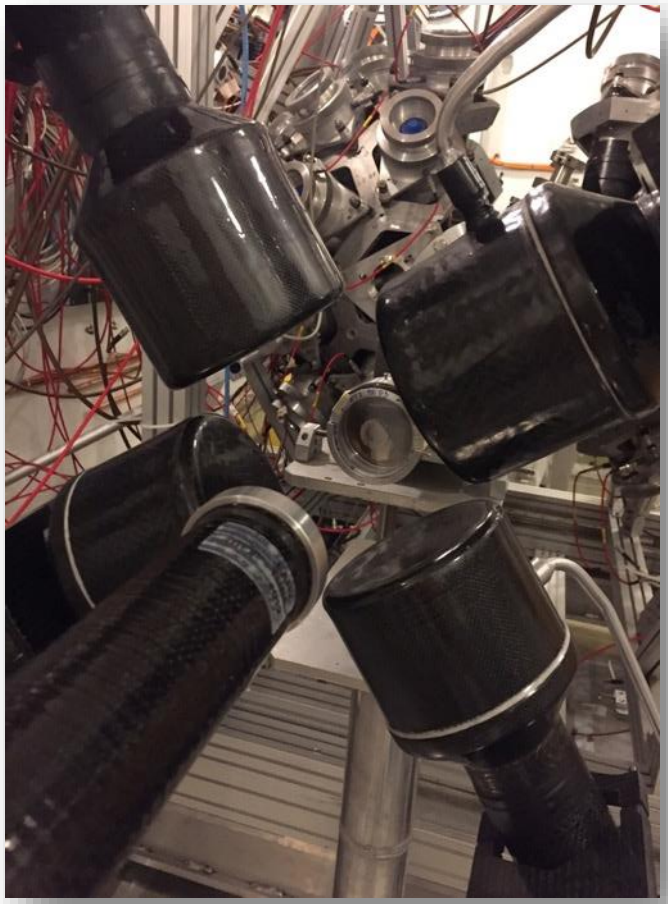
NEXT STEP

- Optimize the detector design
- Reduce material in beam
- Study of the gas mixture

^{72}Ge(n,γ) and ^{155,157}Gd(n,γ)

New support structure with less material close to the beam

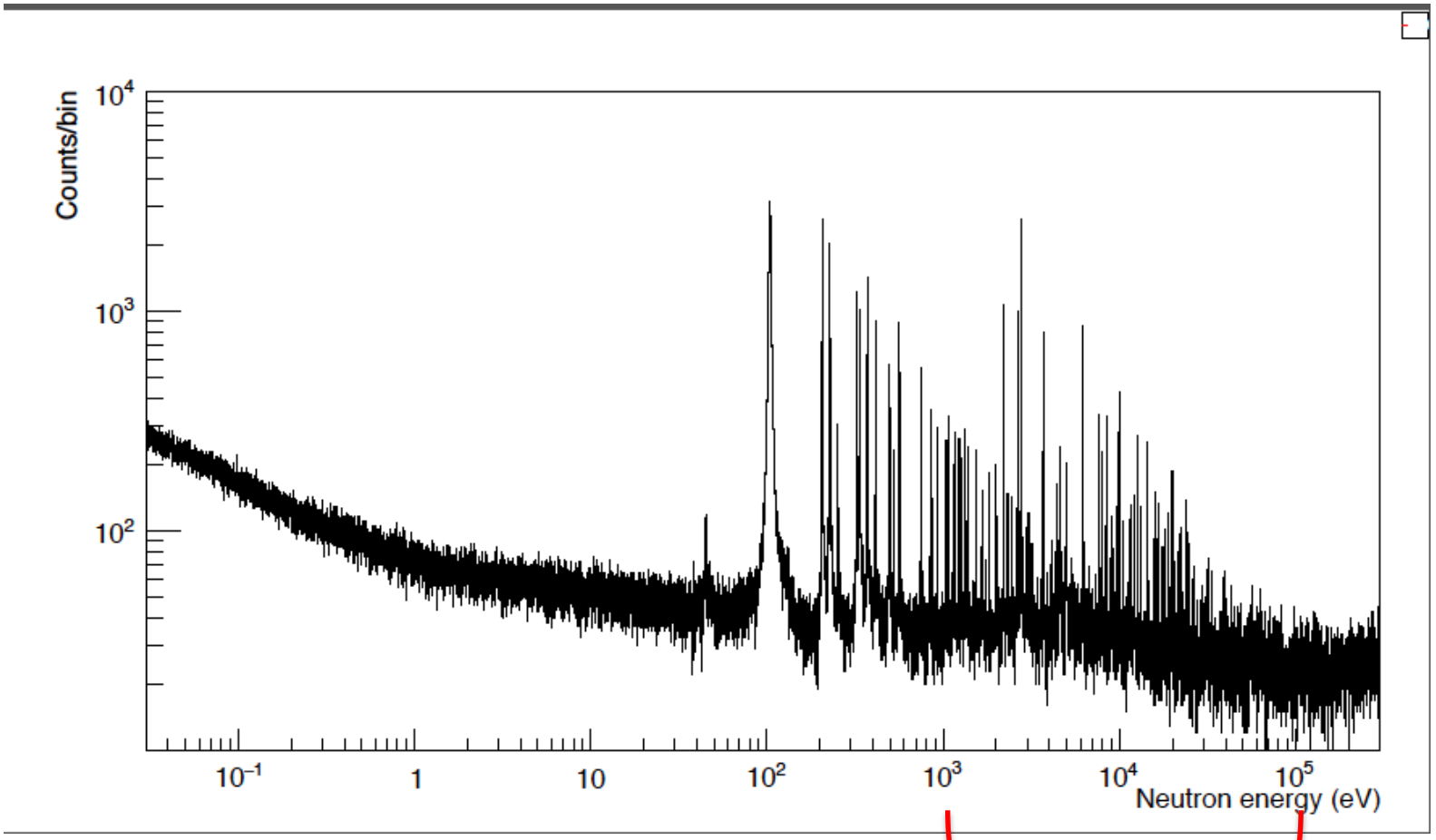




Data taking on going

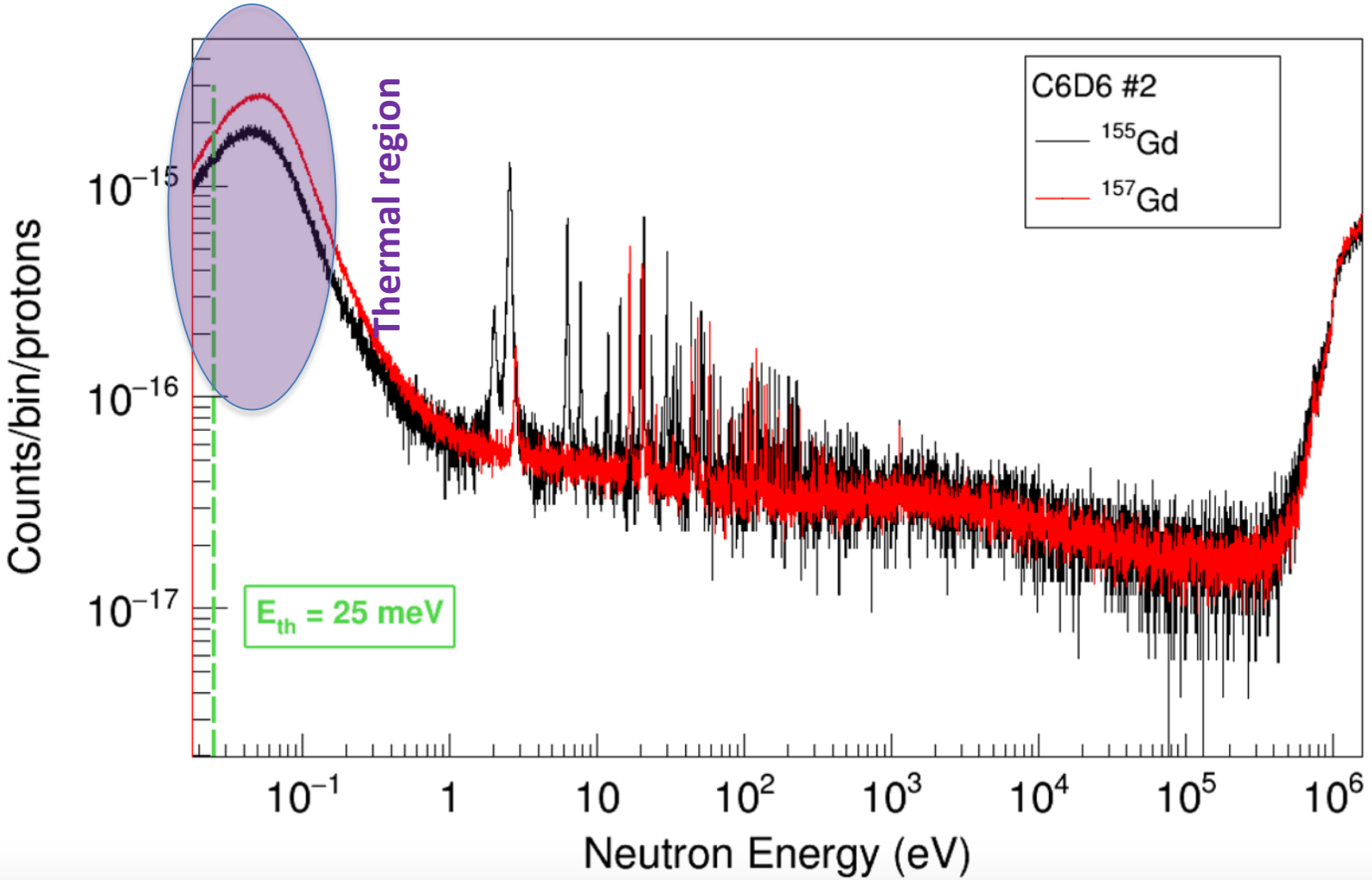
^{72}Ge(n,γ) : first data

C. Lederer



Region of interest for astrophysics

^{155,157}Gd(n,γ) : first data

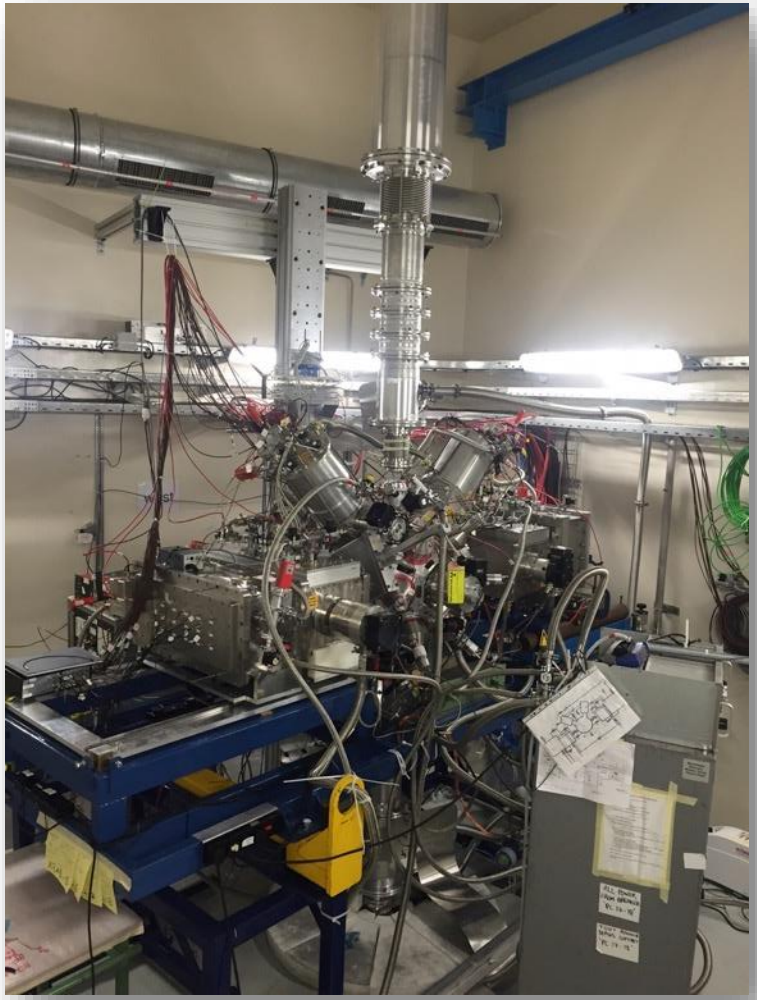


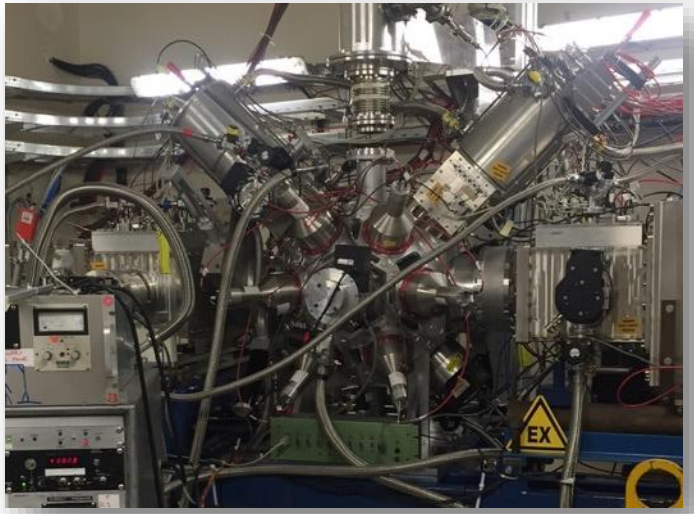
M. Mastromarco, F. Mingrone

Installation big collimator in EAR2

O. Aberle

STEFF in EAR2, with big collimator

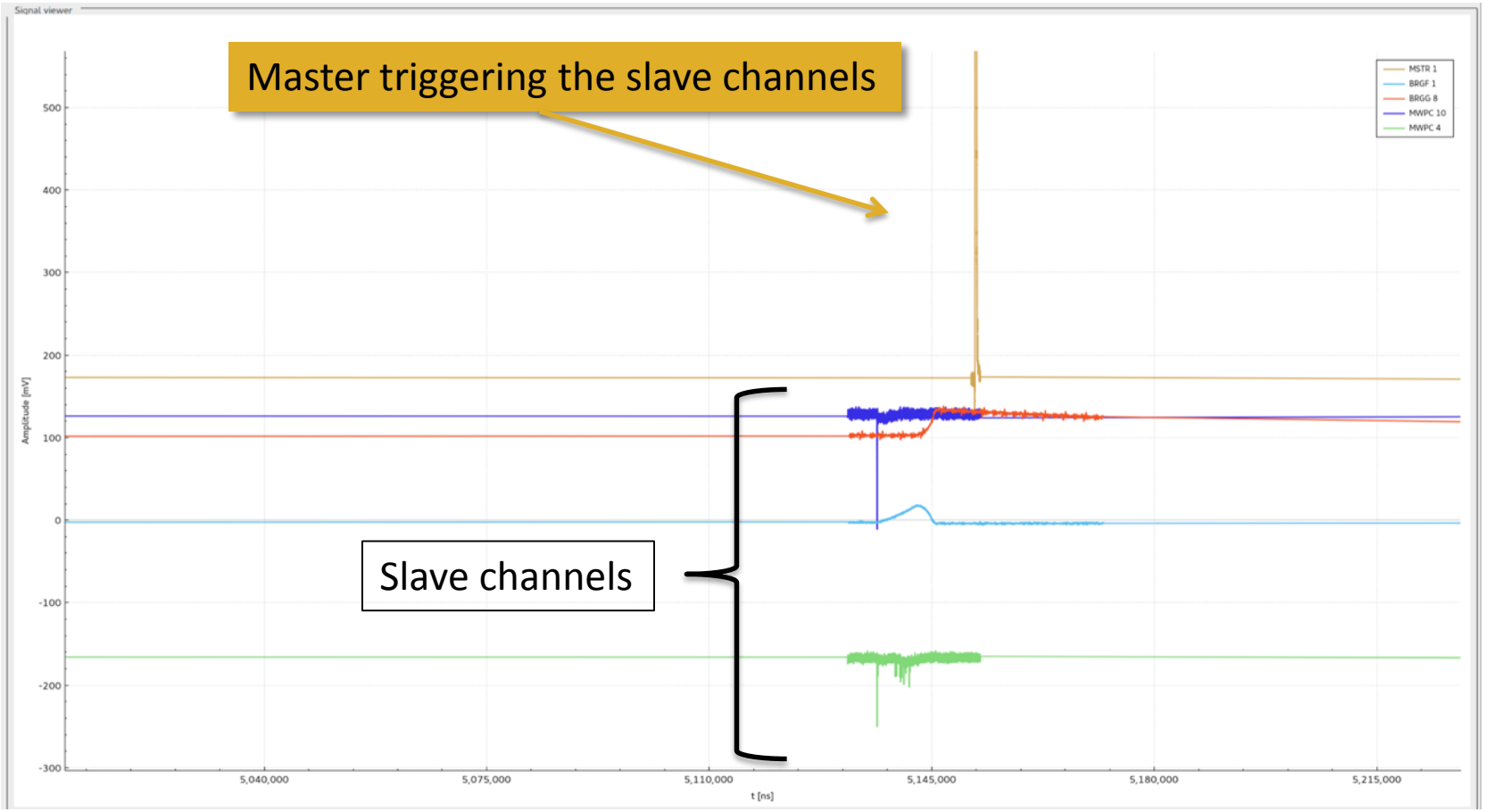




Target: thin layer of ^{235}U deposited on an Al support of 0.75 µm thickness

Master channel method

Data rate: 70 channels giving about 800-1000 MB data per bunch, reduced by a factor 100 with the Master Channel Method



J. Ryan

Summary and conclusions

- Data taking running smoothly
- A lot of action in the experimental areas, in particular in EAR2 for the change of the collimator and the installation of STEFF
- Planning adapted to accommodate the ^{7}Be data taking with both the low and nominal target activity
- Data taking according to planning so far