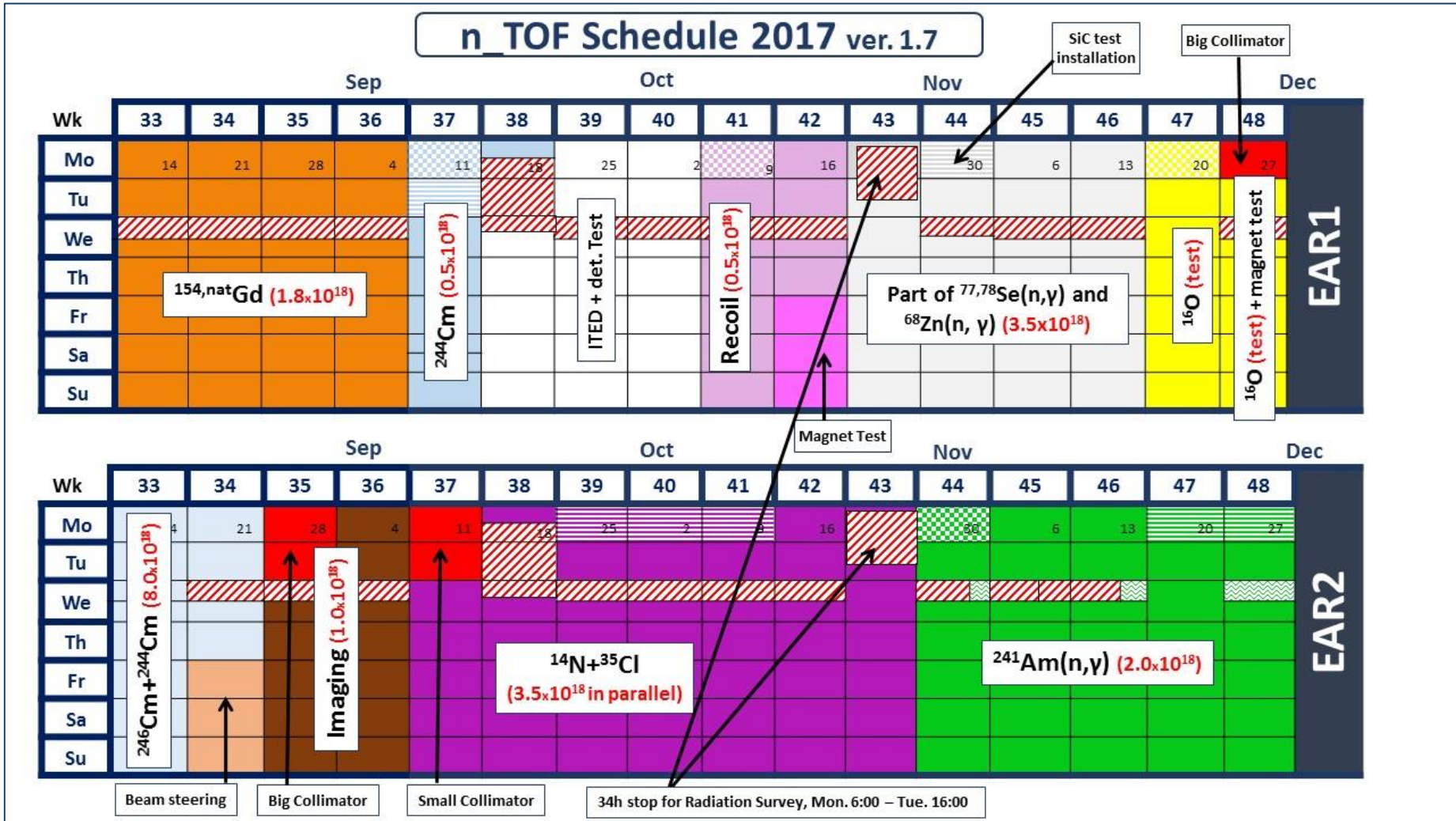


# n\_TOF Report

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CERN

- Last experiments in 2017
- n\_TOF safety: news
- Operation in 2018
- Draft planning 2018
- Conclusions



Injector MD

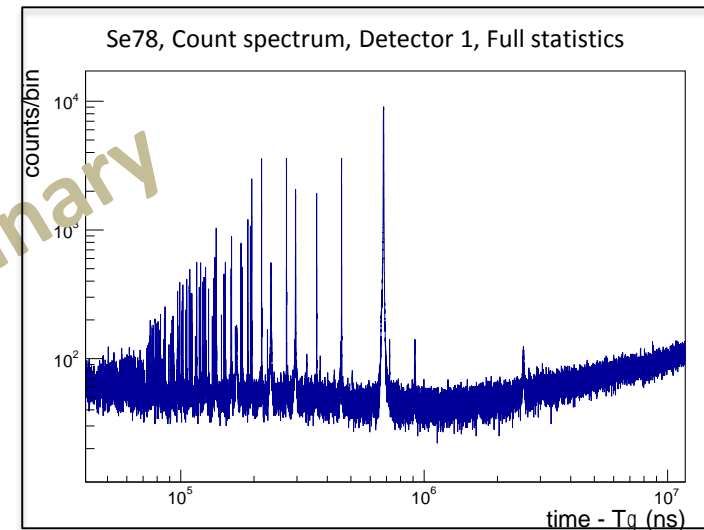
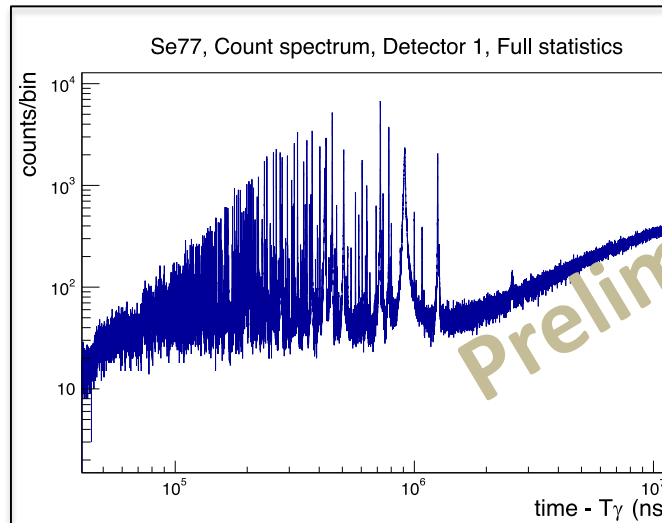


Detector installation



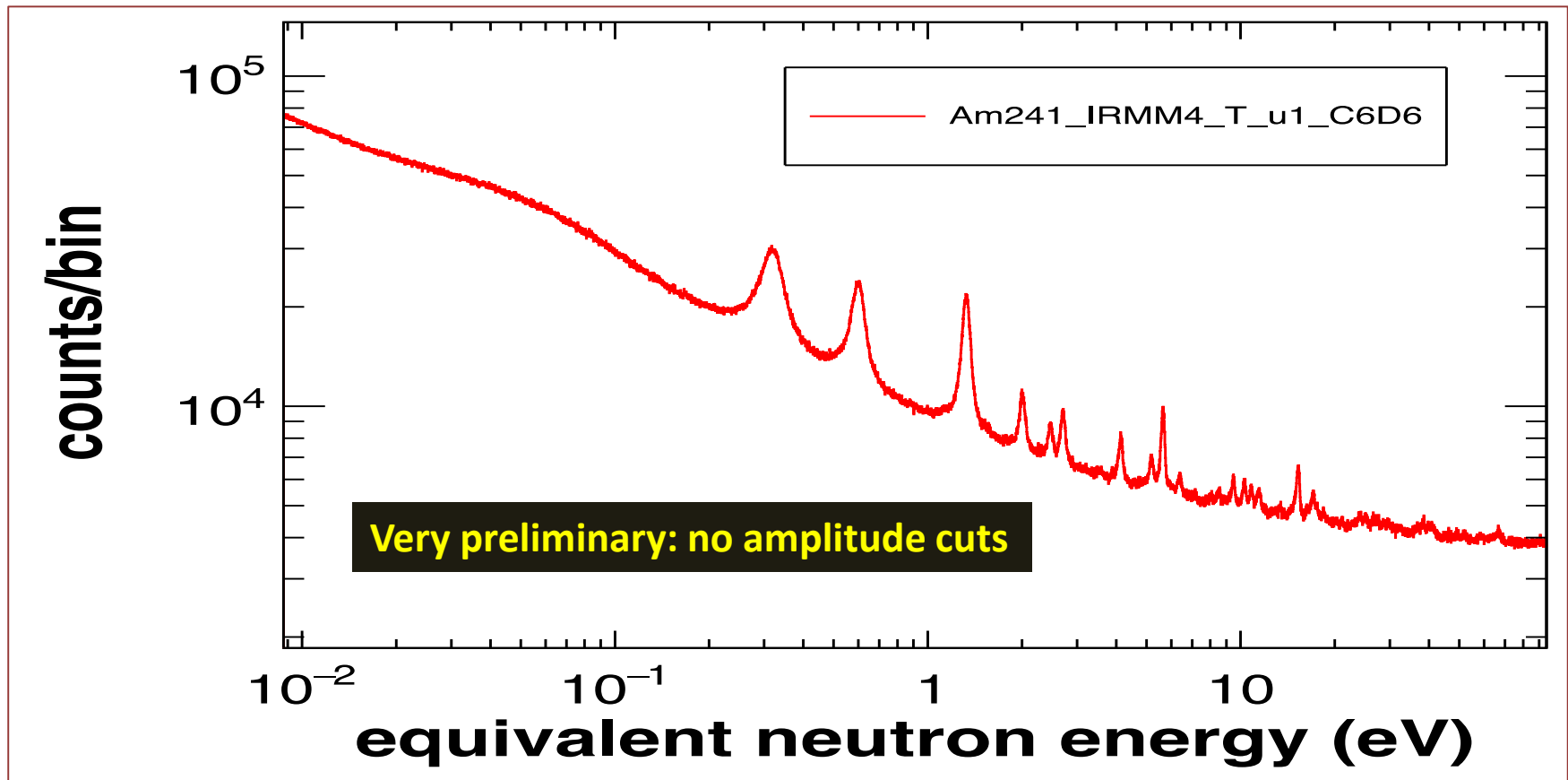
No full time beam due to activities in the other area

- $^{77}\text{Se}$ ,  $^{78}\text{Se}$  &  $^{68}\text{Zn}$  abundances produced in massive stars are most sensitive to nuclear reaction rate uncertainties of  $^{77}\text{Se}(n,\gamma)^{78}\text{Se}$ ,  $^{78}\text{Se}(n,\gamma)^{79}\text{Se}$ , and  $^{68}\text{Zn}(n,\gamma)^{69}\text{Zn}$ .
- Big uncertainties and discrepancies (10-50%) in the previous measurements of these reactions
- $^{77}\text{Se}$  and  $^{78}\text{Se}$  successfully measured in autumn 2017, remaining beam time planned in 2018.



**Motivation: re-measure the sample already measured in EAR1 in 2010 to:**

- Fully cover the thermal region (extended DAQ time-range)
- Highly improve the signal to (radioactive) noise ratio (EAR2 vs EAR1)



- EAR1 Sweeping magnet is a very old dipole and makes use of a DC power supply
- In the frame of the East area renovation, a study is being done to replace all DC power supplies by cycled power supplies for energy savings.
- Based on the EAR2 experience, we are investigating the possibility to replace the EAR1 magnet with a permanent one.



## Several advantages

- No power supply needed
- No external network such as electrical cabling and demineralized water.
- No operational cost.
- New magnet

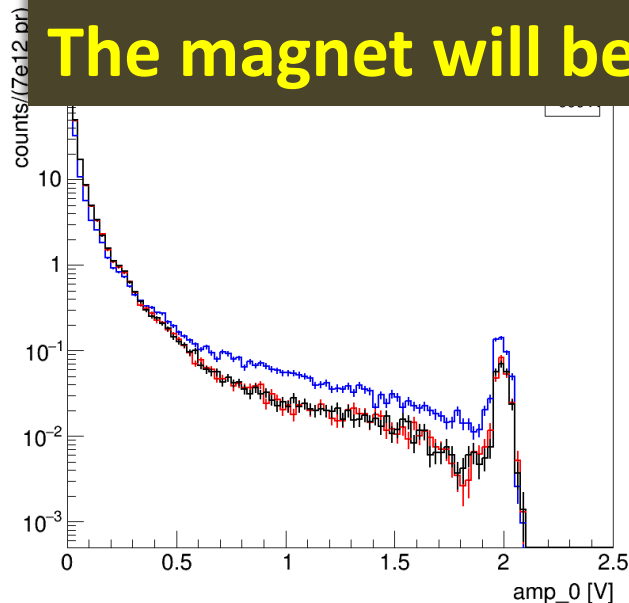


**The actual design studies are based on a permanent magnet field of 0.6 Tm**

- FLUKA simulations including the whole beam line and the response from different detectors show that a magnet field of 0.6 Tm is perfectly ok.
- We have performed tests at 0, 0.6, 1.2 Tm with a number of detectors and validated the simulation results

## Effect on the noise

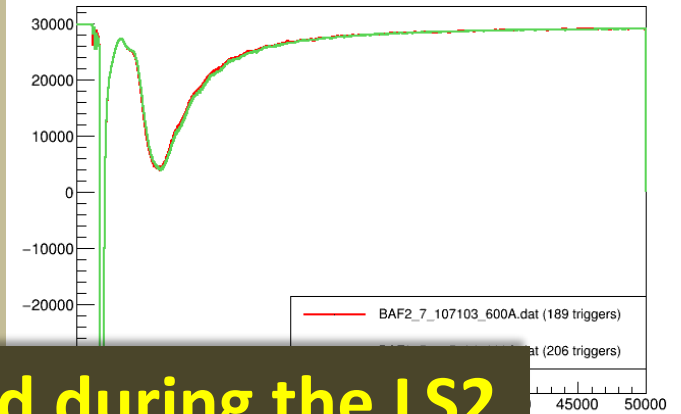
C6D6 #4.



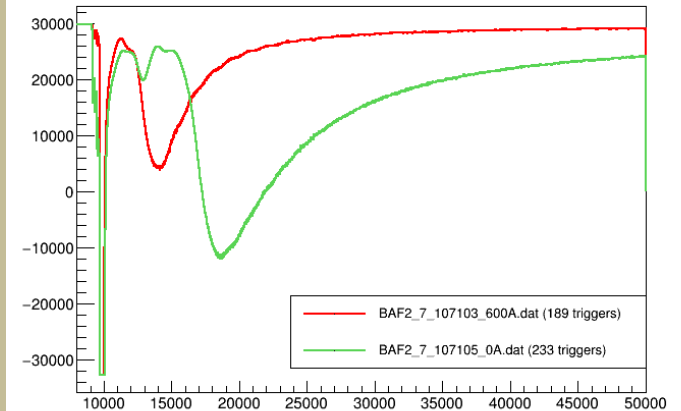
**The magnet will be replaced during the LS2**

## Effect on the G-flash

D\_BAF2\_7\_107103\_283\_0



D\_BAF2\_7\_107103\_283\_0



Available courses and their current status

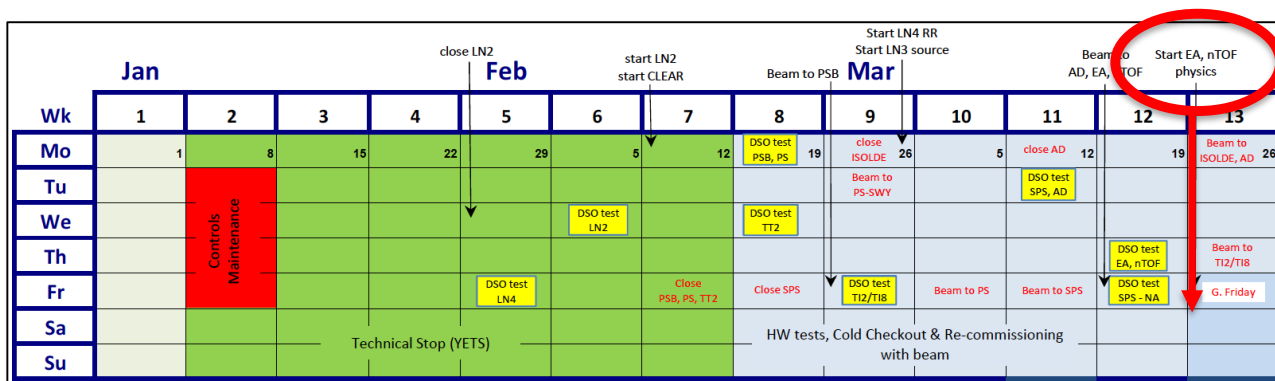
Available courses and their current status	Course description
Go AD - Target Area	✓
Go ALICE (Level 4 I)	✗
Go ALICE - Shift Leader in Matters of Safety (SLiMoS)	✗
Go ATLAS - Calo Shifters	✗
Go ATLAS (Level 4 A)	✗
Go ATLAS - Muon Shifters	✗
Go ATLAS - Run Control & Trigger	✗
Go ATLAS - Trigger Shifter	✗
Go CERN - Beam Facilities	✓
Go CHARM	✗
Go Chemical Safety - Awareness	✗
Go CMS (Former CMS - Level 4 C)	✗
Go Computer Security	✓
Go Cryogenic Safety - Awareness	✗
Go Electrical Safety - Awareness	✓
Go GLiMoS (Group Leader in Matter of Safety)	!
Go IMPACT - alarms level 3	✗
Go IMPACT - Fire Permit	✗
Go IMPACT - Fundamentals	✓
Go ISOLDE and CERN-MEDICIS	✗
Go ISOLDE - B26 - Chemical Store	✓
Go ISOLDE - B26 - Nanoparticles	✓
Go ISOLDE - Experimental Hall - Radiation Protection - Fundamentals	✓
Go ISOLDE - Target Area	✓
Go IRRAD	✗
Go LHC - Machine	✗
Go LHCb (Level 4 B)	✗
Go LHCb - Underground - Guide	✗
Go LHCb - Underground - Installation Phase	✗
Go n_TOF Experimental Areas	✗
Go n_TOF Experimental Areas	✗
Go Radiation Protection - Awareness	✓
Go Radiation Protection - Controlled Area - Refresher	✓
Go Radiation Protection - Supervised Area	✓
Go Radioactive Equipment - Traceability - TREC	✗
Go Road Traffic - Bike Riding	✓
Go Safety at CERN	✓

- As of December 2017 the new online course "n\_TOF Experimental Areas" is available on CERN's application SIR
- This online course is provided for people who need to access the n\_TOF experimental areas. The aim of this course is to present the hazards and risks existing in the n\_TOF facility, the responsibilities and expected behaviour of everyone accessing the area and the right behaviour in the event of an emergency.
- From March 1<sup>st</sup> 2018, onwards this new online course will be mandatory for people accessing the n\_TOF areas "ntof-exp".

As of start of operation in 2018, the RP group will organise a 30 minutes practical n\_TOF course for each team responsible for the installation and operation of an experiment

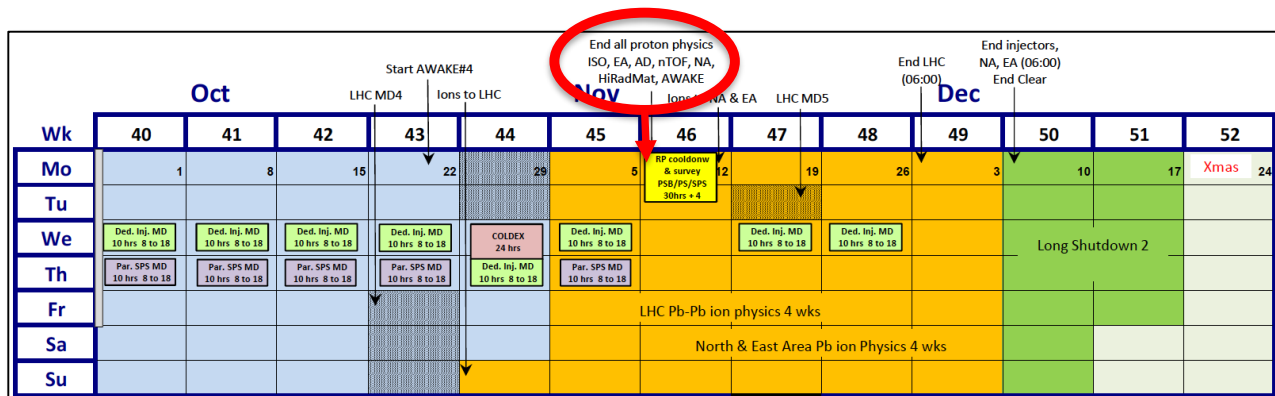


Q1



⋮

Q4



**32 weeks of operation**  
**Extrapolation from 2017 => P.O.T. ~ 2.2 x 10<sup>19</sup> (to be confirmed by the PS)**

Proposal	INTC	Comment	Status
$^{68}\text{Zn}$ (n,g) (cont. from 2017)	INTC-P-509	Astrophysics	Approved
$^{12}\text{C}$ (n,p)	INTC-P-488	Basic nuclear physics	Approved
$^{230}\text{Th}$ (n,f)	INTC-P-493	Basic nuclear physics & nuclear technologies	Approved
$^{235}\text{U}$ (n,f)	INTC-P-507	Basic nuclear physics	Approved

Proposal	INTC	Comment	Status
$^{231}\text{Pa}(n,f)$	INTC-P-513	Nuclear technologies	Approved
$^{241}\text{Am}(n,f)$	INTC-P-492	Nuclear technologies	Approved
$^{230}\text{Th}(n,f)$	INTC-P-493	Basic nuclear physics & nuclear technologies	Approved
$^{53}\text{Mn}(n,g)$	INTC-P-408	Basic nuclear physics & Astrophysics	Approved

- Data analysis going on the experiments performed in 2017
- Shutdown activities: standard maintenance activities -> well on track to be ready for the 2018 start-up
- New Safety Course to access the n\_TOF experimental areas
- Quite a number of experiments to be planned and performed before the LS2