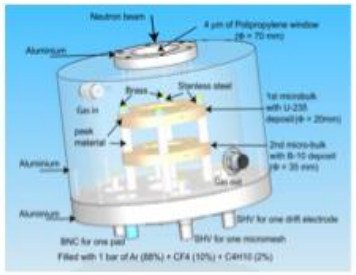
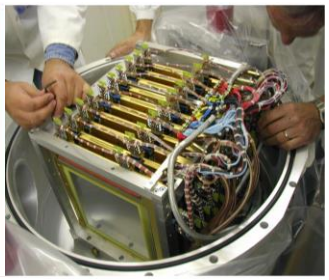
The n_TOF Collaboration,
http://www.cern.ch/nTOF

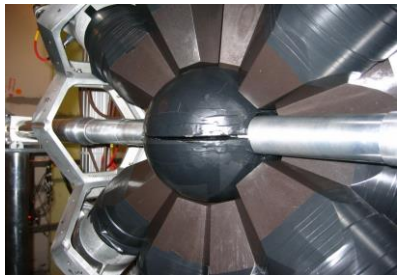
Status of n_TOF Facility

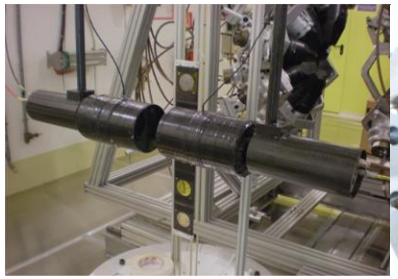
Enrico Chiaveri (EN/STI)

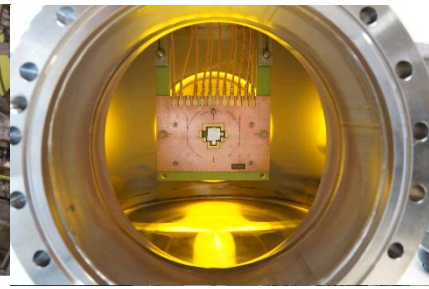
Spokesperson of n_TOF Collaboration











Outline

- **Status of the facility**
- **EAR1 beam line update**
- **EAR2 Project**
- **Conclusions**

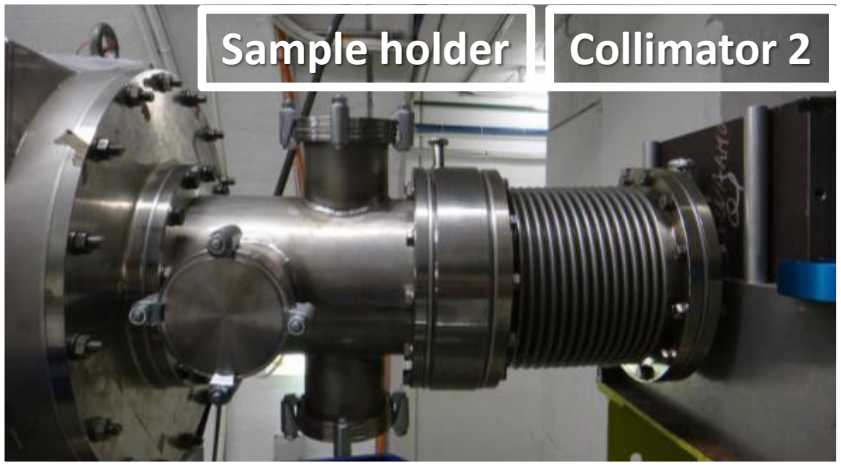
Status of the facility

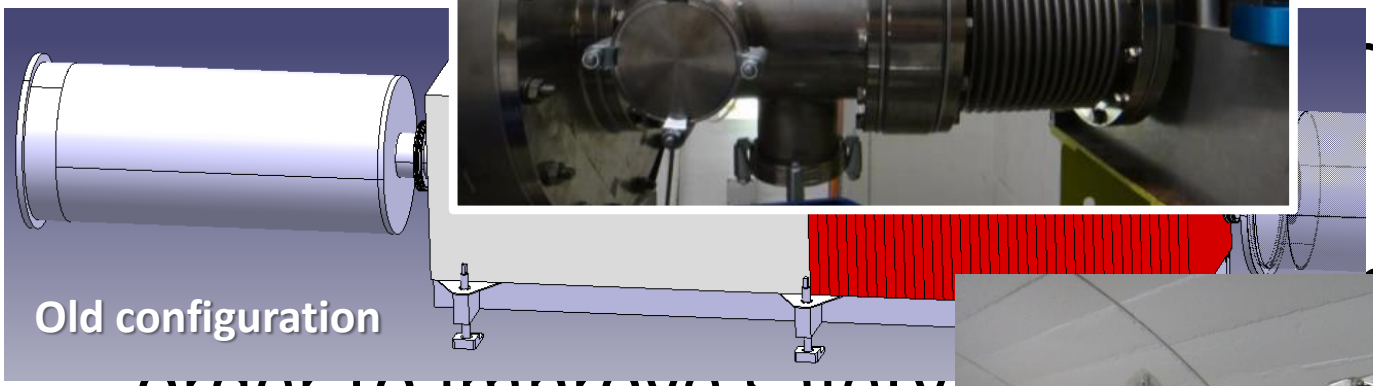
- During LS1 a large amount of activities have been carried out in all areas, from target, experimental areas and detectors development
- Beam started on target on the 25th July 2014

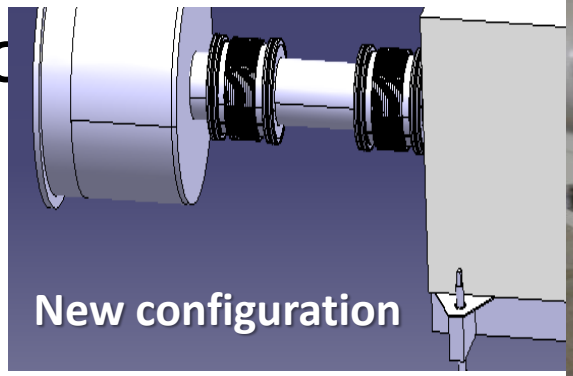
See F. Gunsing talk

EAR1 beamline update

- Collimato… …n order to gain ~8% …ron …order to improve safety conditio… sample …

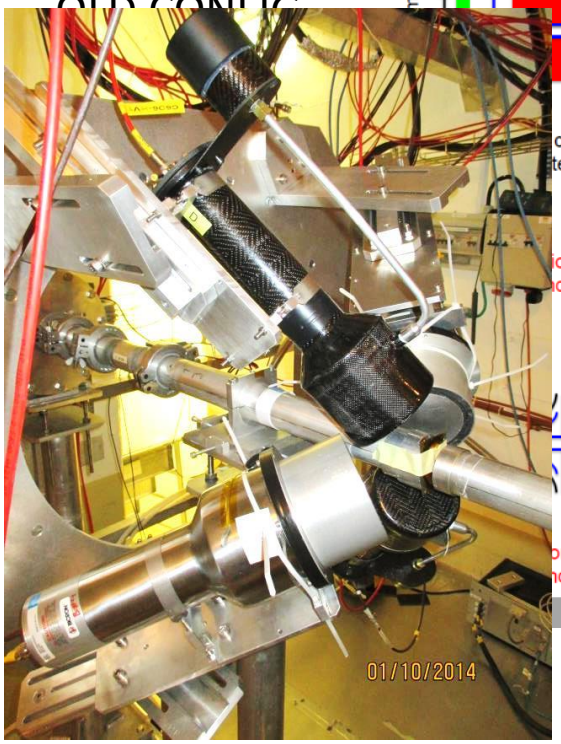


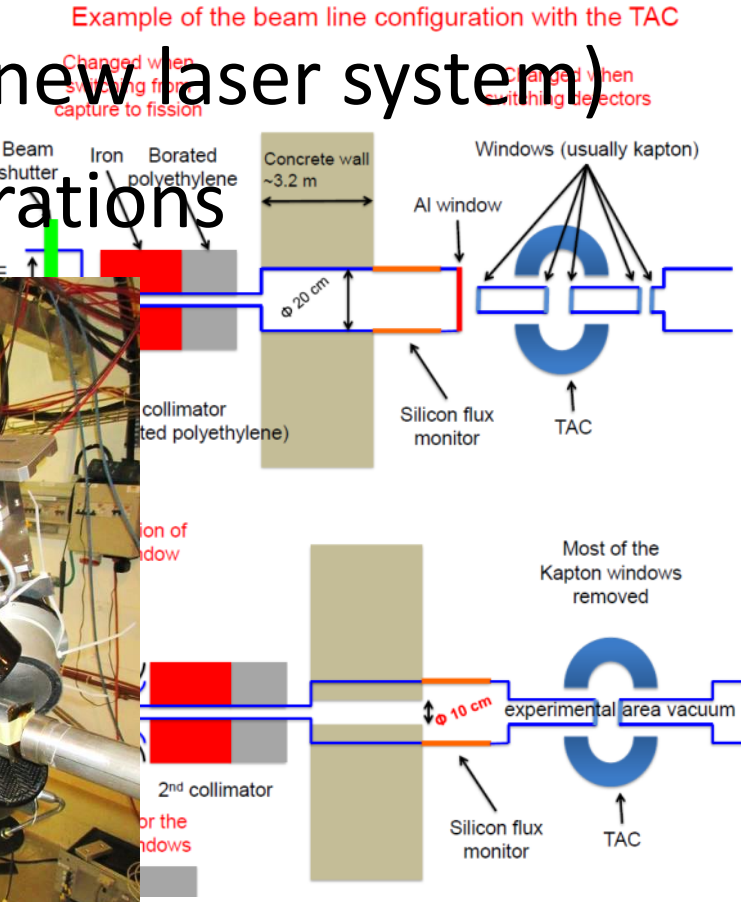




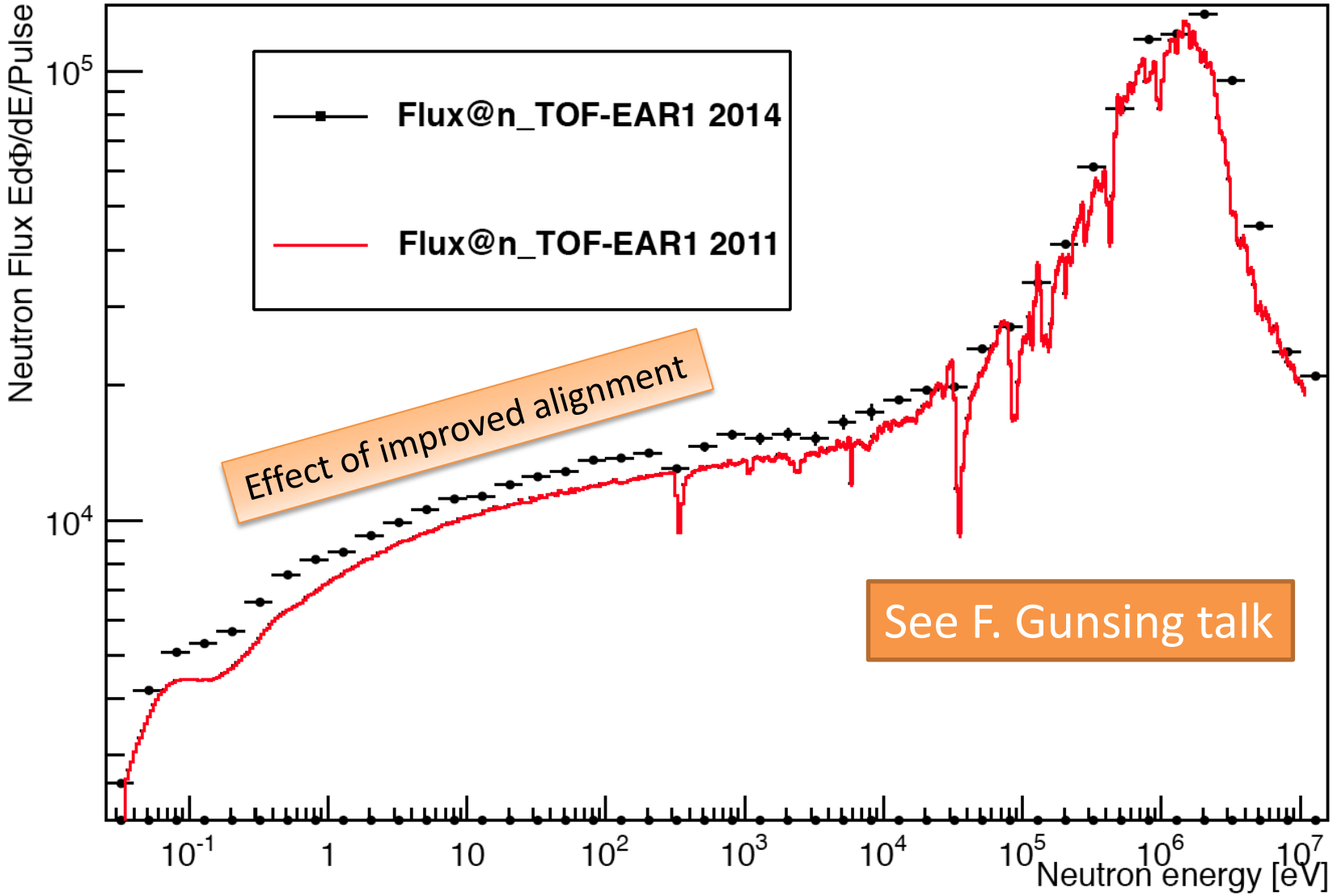
EAR1 update

- Background improvement in the EAR1
- Alignment improvements (new laser system)
- New C_6D_6 detector configurations





EAR1 neutron fluence



EAR2 Project

- EAR2 Project has been successfully completed with first neutron beam received on July 25th

THE FIRST NEUTRON BEAM HITS EAR2

On 25 July 2014, about a year after construction work began, the Experimental Area 2 (EAR2) of CERN's neutron facility n_TOF recorded its first beam. Unique in many aspects, EAR2 will start its rich programme of experimental physics this autumn. >>

http://cds.cern.ch/journal/CERNBulletin/2014/34/News%20Articles/?ln=en

EAR2 Project road-map

- A draft document has been presented to INTC July 2011 meeting

INTC 6/7 2011 July meeting - Working Document

n_TOF Experimental Area 2 (EAR2) preliminary feasibility study

E. Chiaveri on behalf of n_TOF Collaborationγ

1. INTRODUCTION

The unique features of the n_TOF neutron beam are the very high instantaneous neutron flux, the excellent TOF resolution, the low intrinsic backgrounds and the wide range of neutron energies, from thermal to some GeV.

EAR2 Project road-map

- In September/October 2011 a final draft including budget, planning and personnel was released
- A final document was presented at the end of 2011 to the Collaboration board
- February 2012 final document presented to the INTC meeting

CERN-INTC-2012-029, INTC-O-015, *Proposal for n_TOF Experimental Area 2*
This design report details the second experimental area proposed by the n_TOF Collaboration, to be installed about 20 m from the spallation target at 90 degrees with respect to the proton beam axis providing higher instantaneous neutron flux. This can offer some entirely new capabilities, e.g. to study (n,xn) reactions, short-lived and/or small mass radioactive samples. The Committee thanked the authors for the remarkable work accomplished both in terms of technical quality as well as scientific justification provided. It was clear that the present and planned experimental areas were complementary and that the biggest strength will come from running the two areas in parallel, which will also make n_TOF unique in the world. In summary, the Committee **strongly endorsed** the scientific motivation to ask for CERN resources to build the infrastructure for the project.

EAR2 Project road-map

- February 2012 Research Board endorsement

5.1 P. Butler reported on the latest meeting of the INTC [2]. Two TDRs had been considered by the committee. The first concerned a second experimental area for nTOF, **EAR-2** [6], which would give a flight path of 20 m (compared to the 185 m of the existing experimental area), allowing a substantially higher neutron flux. The time-of-flight of thermal neutrons would be reduced by a factor of ten, increasing the signal-to-background ratio for radioactive samples, and the vertical flight path would reduce the γ-flash. R. Saban commented that the radiation protection issues of this layout have been addressed, with a beam dump in the roof of the building. The INTC considered that the present and planned experimental areas were complementary and that there would be added value from running the two facilities in parallel, making nTOF unique in the world. The committee strongly endorsed the scientific motivation to ask for CERN resources towards building the infrastructure for the project; the nTOF collaboration expects to contribute a significant proportion of the total required.

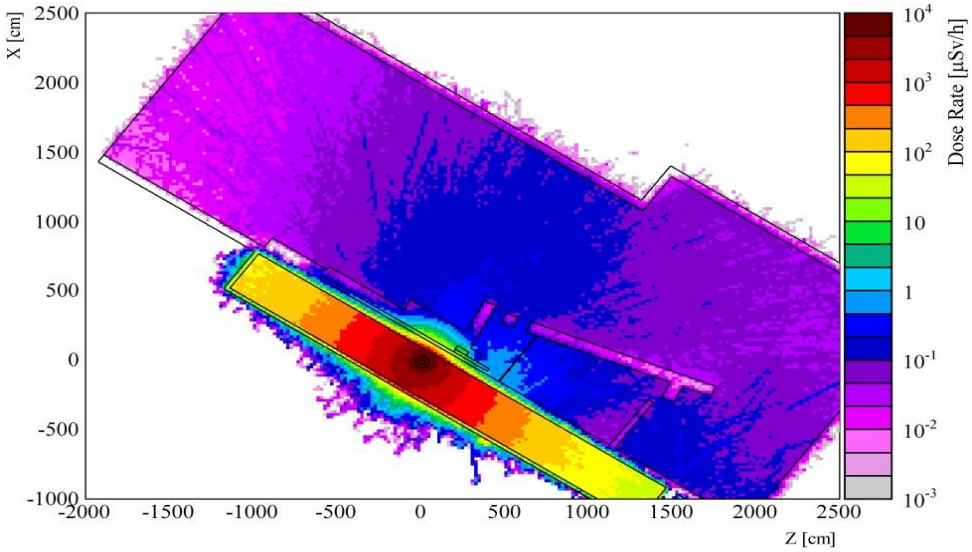

n_TOF target
We started from here in March 2012…
EAR-2 Study Group, 19 Mars 2012

EAR2 ground breaking ceremony


… and we arrived here in December 2013

EAR2 Project RP feedback

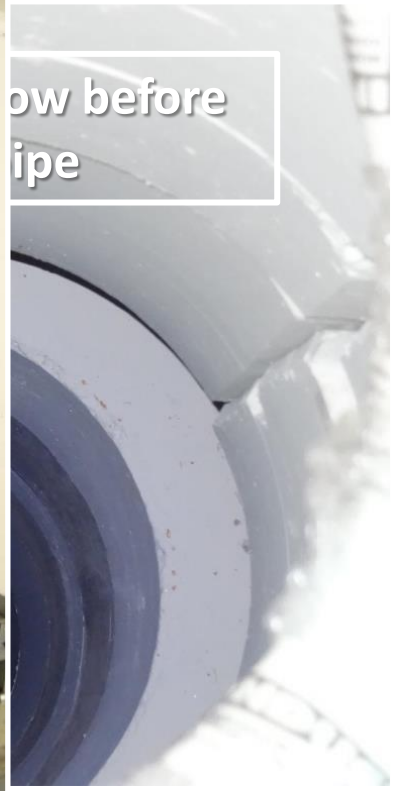
- Detailed FLUKA calculations have been performed in the design phase of the EAR2 facility
  - Critical area was the ISR8 one (TE/MSC & EN/STI shared area)



EAR2 Project RP feedback

- Extensive measurement campaign conducted since the startup of EAR2 (mobile and fixed monitors)
- Particular attention was given to the ISR8 area:
  - Maximum dose rate measured **equal to 0.2 µSv/h** (below the applicable limit for a non designated area)
  - RP fixed monitoring system ensures the classification of the ISR8 area

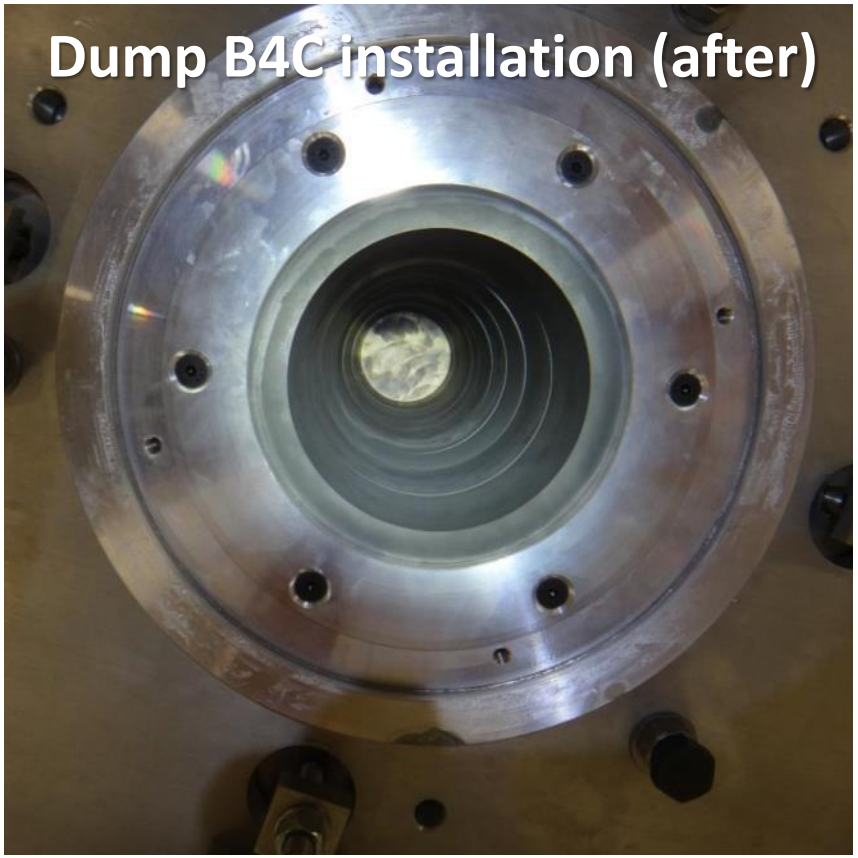
Selected pictures of EAR2 equipment



Selected pictures of EAR2 equipment

1. B-PE (5%) main body
2. B4C core

Selected pictures of EAR2 equipment



View of EAR2 completed

- The project has needed a strong endeavor by the project members…
- … strongly pushed by the spokesperson!


But it was worth it, the dream became reality!!!!!

Conclusions

- The update of EAR1 neutron beam line increase the neutron fluence in EAR1 by about 15%
- The preliminary results of neutron fluence on EAR2 show that the result are in line with the EAR2 proposal See F. Gunsing talk
- The radiation level in ISR area is in agreement with the simulation.