



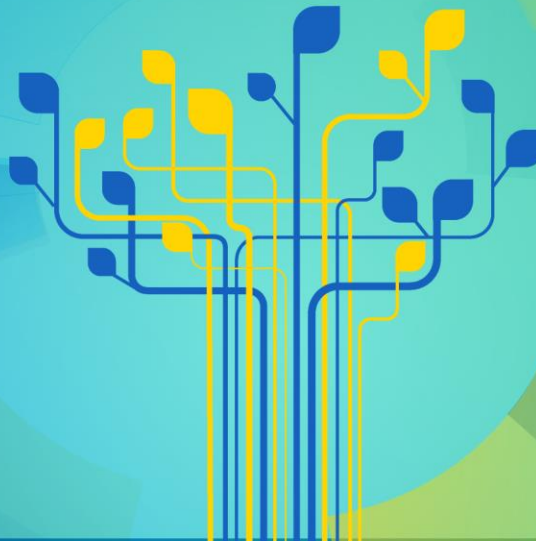
HSE  
Radiation Protection

# Summary of the 2024 RP week at the CERN Shielding Benchmark Facility

D. Bozzato (HSE-RP-AS)

On behalf of the CSBF 2024 Team

PS/SPS user meeting, 26/09/2024, Indico event 1460058

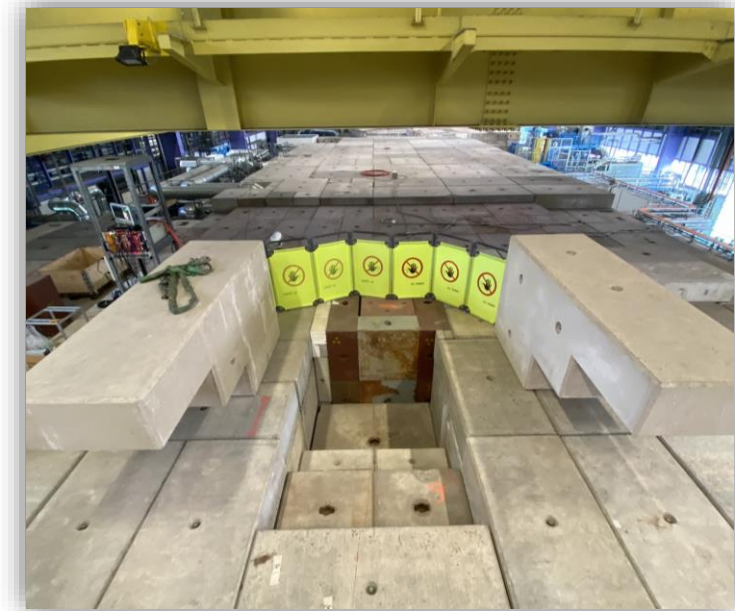


# CERN Shielding Benchmark Facility (CSBF)

- Located within CHARM 90° above the target
- Collimated **high-energy neutron field** modulated by inserting/extracting shielding blocks
- **Very versatile facility:**
  - Passive/active detectors testing;
  - Deep shielding experiments;
  - Monte Carlo radiation transport code benchmarks;
  - Most of the **configuration changes take less than 30 minutes;**
- 15+ peer-reviewed articles published between 2015 and 2024 (plus conference proceedings), recently:
  - D. Bozzato et al., [NIMA.2024.169565](#)
  - N. Nakao et al., [JNST.2023.2239243](#)
  - T. Matsumoto et al., [JNST.2023.2274933](#)



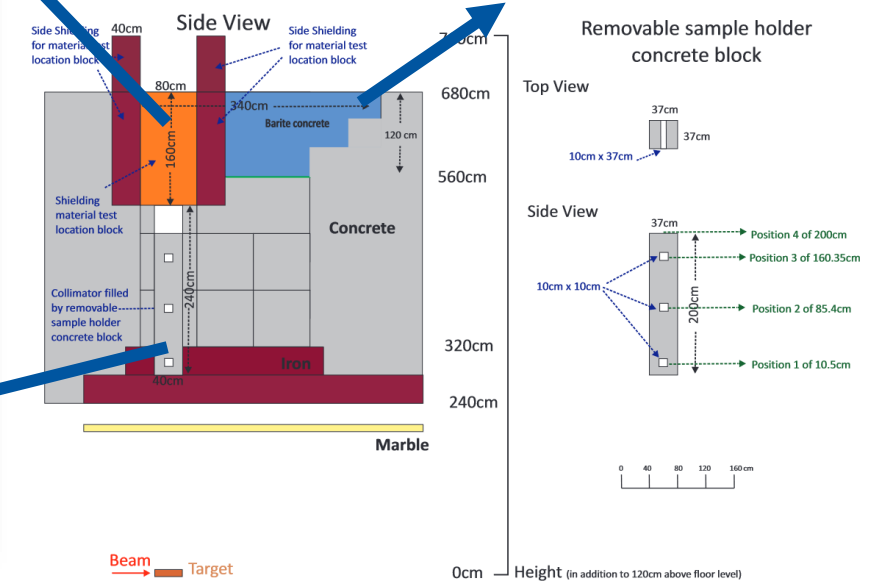
Material Test Location



CSBF Platform



Removable Holder Concrete Block



# CSBF 2024 – Schedule of the RP week 18-24/09

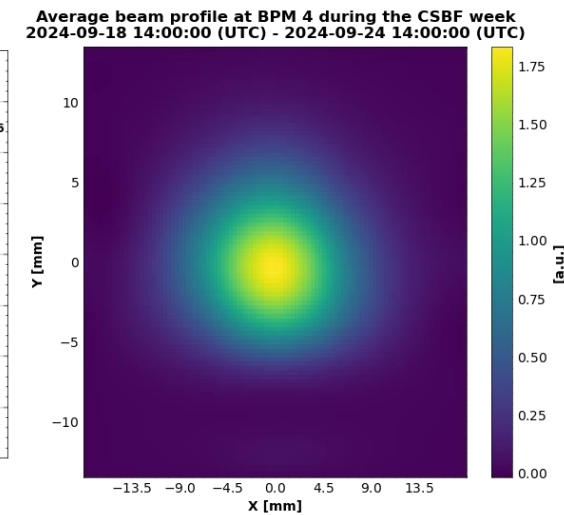
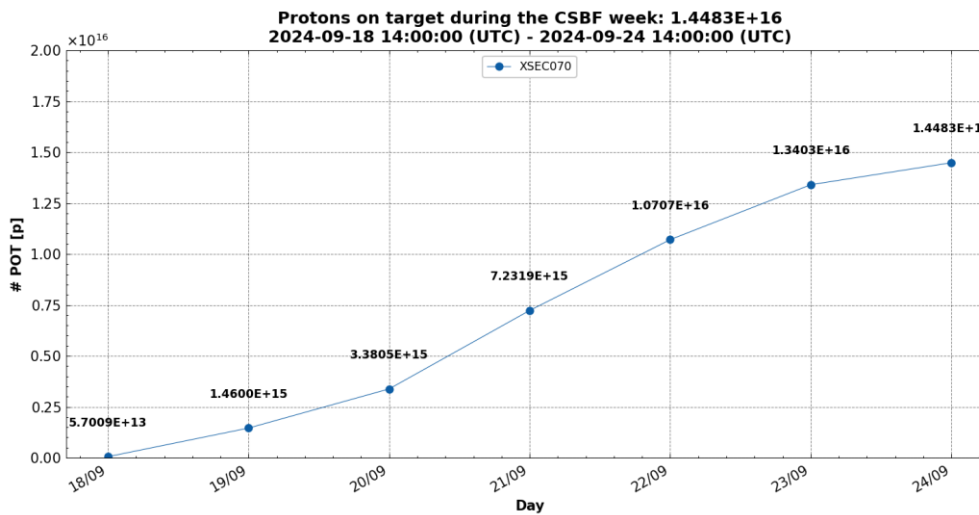
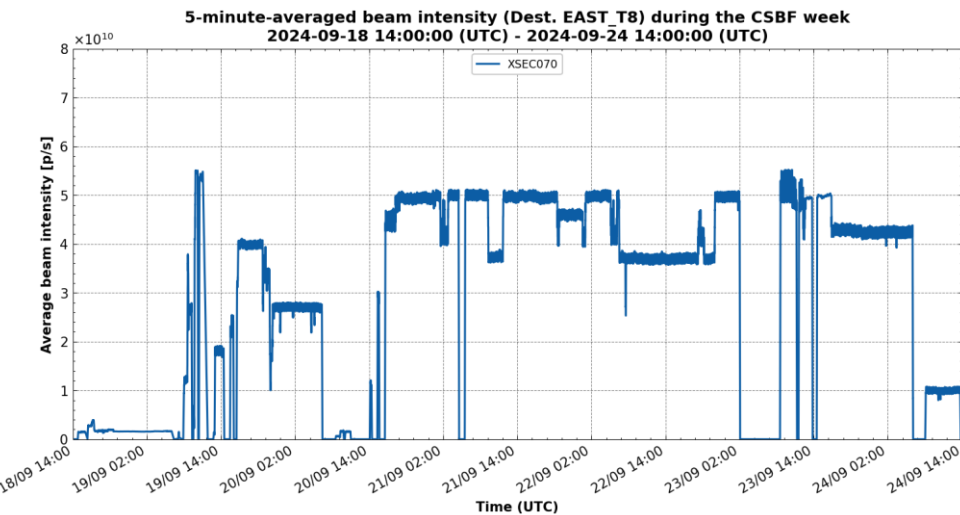
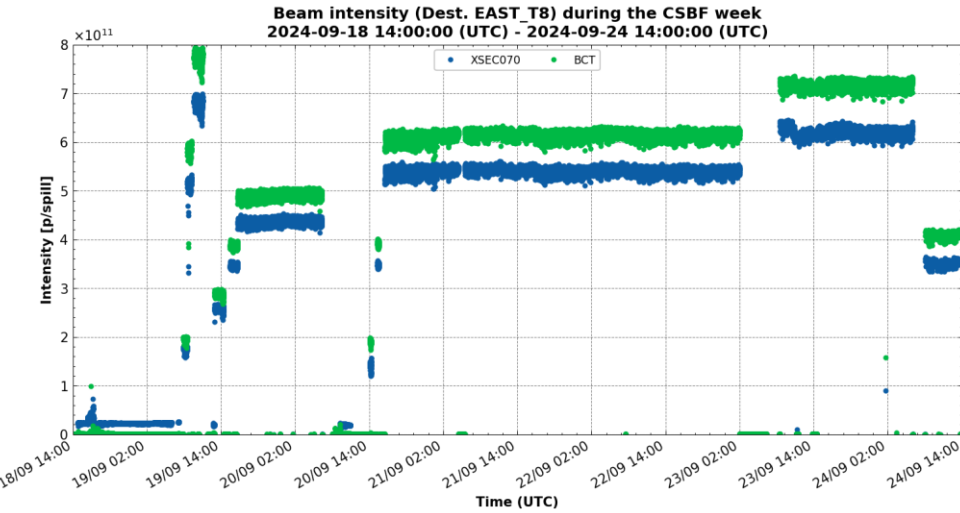
		Wed 18/09	Thu 19/09	Fri 20/09	Sat 21/09	Sun 22/09	Mon 23/09	Tue 24/09	Wed 25/09
0:00-8:00 (night)	0:00-1:00		3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	1:00-2:00		3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	2:00-3:00		3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	3:00-4:00		3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	4:00-5:00		3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	5:00-6:00		3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	6:00-7:00		3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	7:00-8:00		3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
8:00-16:00 (day)	8:00-9:00	0 - Meeting with transport CSBF opening	0 - Closing MTL opening platform	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	9:00-10:00	0 - and RHCB removal	6E+11 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	10:00-11:00	0 - Insertion of 180 cm concrete	6E+11 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	11:00-12:00	0 - Roof preparation	6E+11 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	12:00-13:00	0 - WENDI set up	0 - Closing Platform, 80 cm C MTL	0 - Roof to Ber120, prep. CR39 in	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	13:00-14:00	0 - Csl set up	3E+11 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	14:00-15:00	0 - Csl set up	3E+11 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
	15:00-16:00	0 -	3E+11 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	0 -
16:00-24:00 (evening)	16:00-17:00	3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	0 -
	17:00-18:00	3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	0 -
	18:00-19:00	3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	0 -
	19:00-20:00	3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	0 -
	20:00-21:00	3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	0 -
	21:00-22:00	3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	0 -
	22:00-23:00	3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	0 -
	23:00-24:00	3E+10 1/10 SC	4E+11 1/10 SC	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	DR Activ LHC cables	6E+11 1/10 SC	0 -

- Participation of physicists from KEK, several experiments at different locations, **all successfully accomplished:**
  - CR-39 characterization at the MTL and inside the CHARM access maze;
  - High-energy neutron spectra measurement with an assembly of Csl scintillators;
  - Test of neutron modules for operational dosimeters (DMCs) at the CSBF platform;
  - Neutron attenuation length in special shielding materials (hematite and barite concretes);
  - Activation experiments in CHARM for clearance studies of the LHC electrical cables and residual dose rate benchmarks;



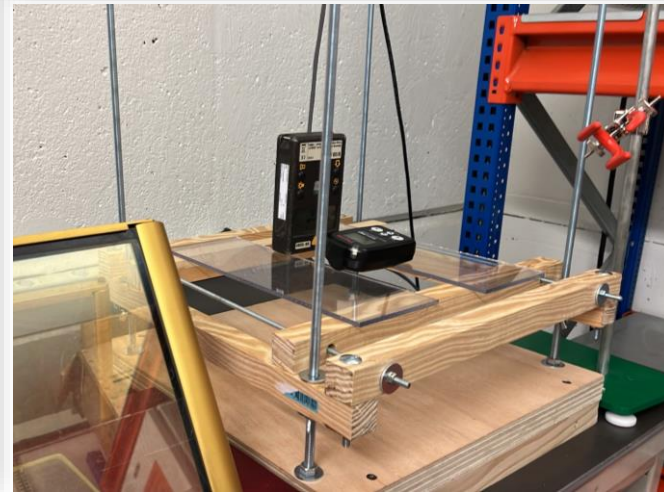
# CSBF 2024 – Run Overview

- Very good beam conditions during the experiments
- Mainly operated at 60E10 p/spill, with approximately one spill every 10 spills of the PS super cycle
- Lower and higher nominal intensities also used: 20E10, 30E10, 40E10, 50E10, 70E10, and 80e10 p/spill.
- Low intensity beams (EAST\_LI\_24) were also used with intensities of 1E10 and 3E10 p/spill, many thanks for setting them up!



# CSBF 2024

## Some Highlights



# CSBF 2024 – The Team

- Eunji Lee (KEK, Japan)
- Noriaki Nakao (Shimizu Institute of Technology, Japan)
- Toshiya Sanami (KEK, Japan)
- Tuyet Tran (KEK, Japan)
- Davide Bozzato (HSE-RP)
- Arnaud Devienne (HSE-RP)
- Patrycja Dyrz (HSE-RP)
- Robert Froeschl (HSE-RP)
- Bartosz Idzior (HSE-RP)
- Angelo Infantino (HSE-RP)
- Tommaso Lorenzon (HSE-RP)
- Fabio Pozzi (HSE-RP)
- Stefan Roesler (HSE-RP)
- Heinz Vincke (HSE-RP)
- Peter Winney (EP-CMX)

**We would like to acknowledge BE-OP-PS, BE-EA, EN-HE, the IRRAD and CHARM operation team, HSE-RP-CS, HSE-RP-IL, and the HSE-RP management**

***Merci!***

