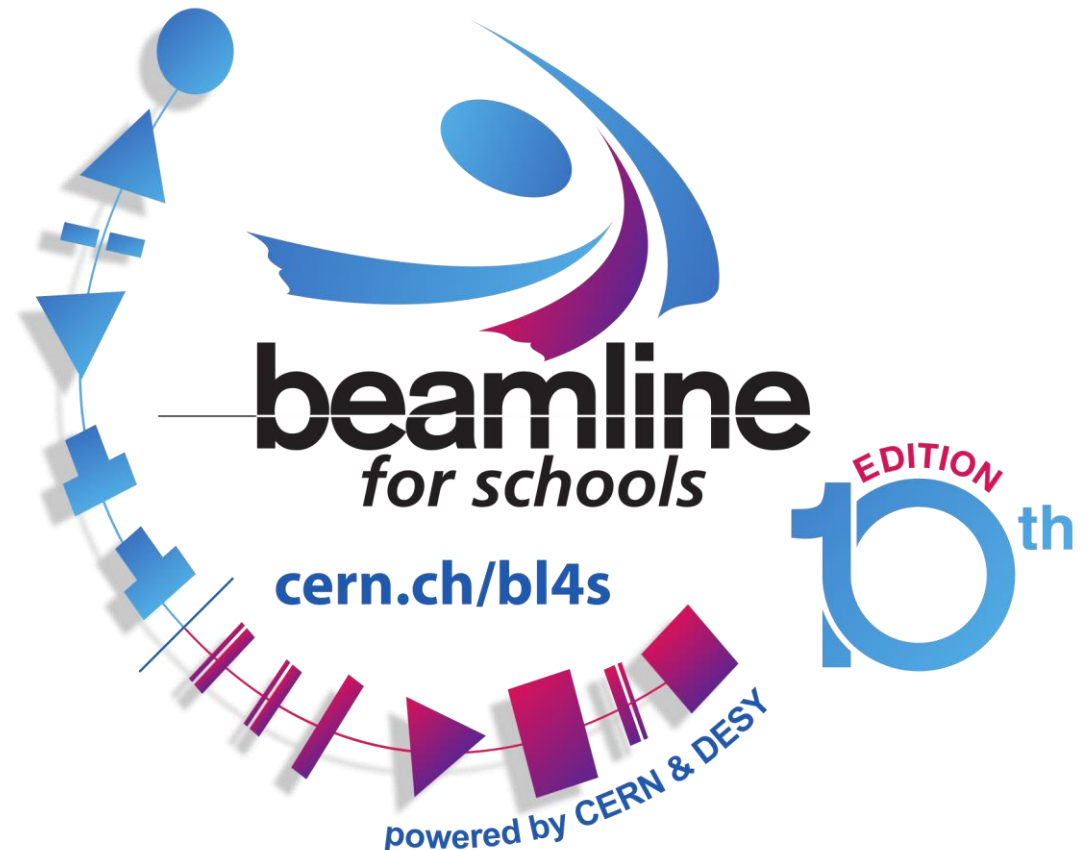


# Beamline for Schools

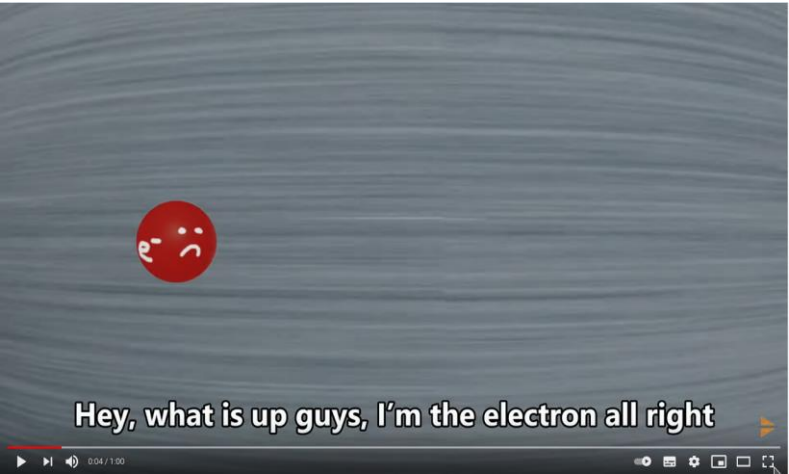
September 14 to 28, 2023

10<sup>th</sup> edition



# BL4S 10<sup>th</sup> edition

In 2023, **379 teams** representing **63 countries** submitted a proposal, in total **more than 2500 high school students!**



Beams: 2018 Beamline Proposal  
International School Manila

Determining the relationship between the energy of a  $\pi^-$  meson beam and its ability to penetrate and react with a carbon-based, non-biological material to determine the viability of "pion therapy" — an alternative Method for cancer treatment

Sae Joon Cheon, Yash Karan, Sana Singru,

Introduction

Finding effects in the community. Two out of three of the most common tree therapy<sup>2</sup>. These methods are extremely painful and problems, irreversible and thus does not necessarily

Last year, our cancer therapy —  $\pi^-$  was scope to develop have now come up with comparisons between skin tissue using graph theory has on human

Overview and Background

Negative pions properties similar to he However, pions being

<sup>1</sup> "Cancer Statistics", Yama  
<sup>2</sup> "Types of Cancer Treatments"  
<sup>3</sup> "Optim D. Medicinal Chemistry", 2014, p. 766

Liceo Scientifico Statale "T.C. Onesti", Fermo, Italy

Team TCO-ASA

ChDR-CHEESE  
Cherenkov Diffraction Radiation - Characteristic Energy

Detecting the Elusive  $\Delta^+$  Baryon in an Electron-Proton Inelastic Scattering Through its Decay-Products

International School of Geneva, Nations' Flying Foxes  
John Desolis, Yoonsoo Kim, Hiroki Kozaki, Sarah Shafiq, Mikhail Slepovskiy, Petr Strundin, Zihong Xu  
Word Count: 1002

Introduction:

Just as scattering visible light off of a cell using a microscope allows us to examine a cell, a collision between resting protons and an electron beam produced by a particle accelerator could allow us to "see" subatomic particles and its miscellaneous interactions otherwise unobservable. Such a collision could result in interesting scattering effects, creation of elusive particles whose decay products can be detected and analyzed to trace back the event, which potentially enables us to further identify properties of the particles.

A histogram depicting the collision of a 4.9GeV electron beam with a static source of protons can be seen on Fig 1. The x-axis represents the energy/momentum of the scattered electrons, while the y-axis indicates the number of times an interaction of a specific energy/momentum occurred. The approximate peaks in the band of 3.5–4.2 GeV electrons suggest an inelastic scattering, which we are interested in to investigate.

(Fig.1) / Source: W. BARTHEL, B. DIEBELZAKI, H. KREIBEL, J. MCELROY, U. MEYER-BRECKENHUT, W. SCHMIDT, V. WALTHER and G. WEIER, ELECTROPRODUCTION OF PIONS NEAR THE  $\Delta(1236)$  RESONANCE AND THE FORM FACTOR  $C^*M_{\pi^0}$  OF THE  $(nN)$ -VERTEX - Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany and H. Institut für Experimentalphysik der Universität Hamburg, Germany

(Fig.1) Thomson, Mark. Particle Physics Handbook: Deep Inelastic Scattering. The University of Cambridge, Department of Physics, Cavendish Laboratory. 2011. [www.lapth.cnrs.fr/~thomson/particlephysics/handbook/handbook\\_4\\_2011.pdf](http://www.lapth.cnrs.fr/~thomson/particlephysics/handbook/handbook_4_2011.pdf)

# Winning teams 2023

"Particular Perspective" from Pakistan  
(CERN)

"Myriad Magnets" from the USA (CERN)

"Wire Wizards" from the Netherlands  
(DESY)

# Congratulations!



"Particular Perspective" from Pakistan on the **top left**, "Myriad Magnets" from the USA on the **bottom left**, and "Wire Wizards" from the Netherlands on the **right**

(Images: Particular Perspective, Myriad Magnets, Wire Wizards)

# Stay at CERN



Safety Day

# Stay at CERN Safety Day

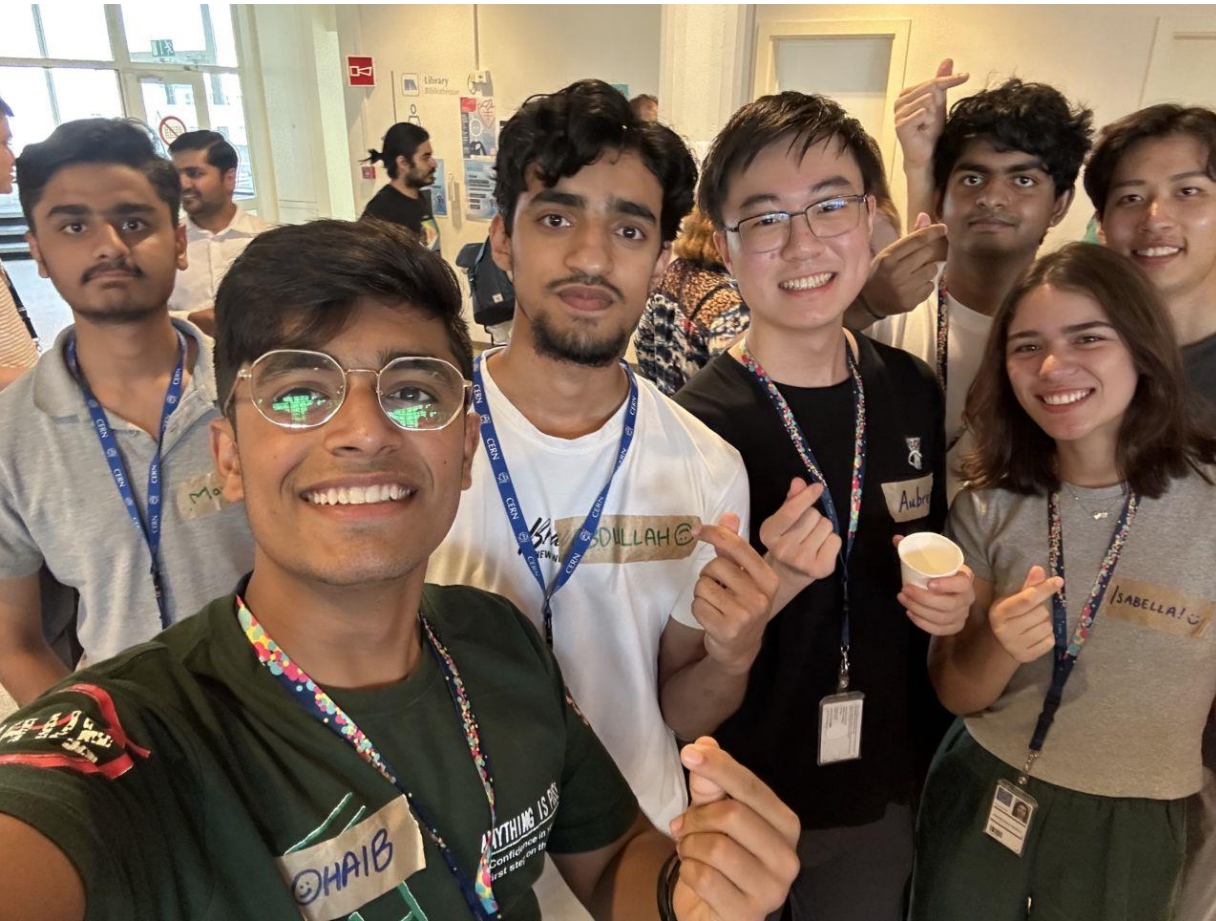


# Stay at CERN Safety Day



# Stay at CERN

## Welcome Reception



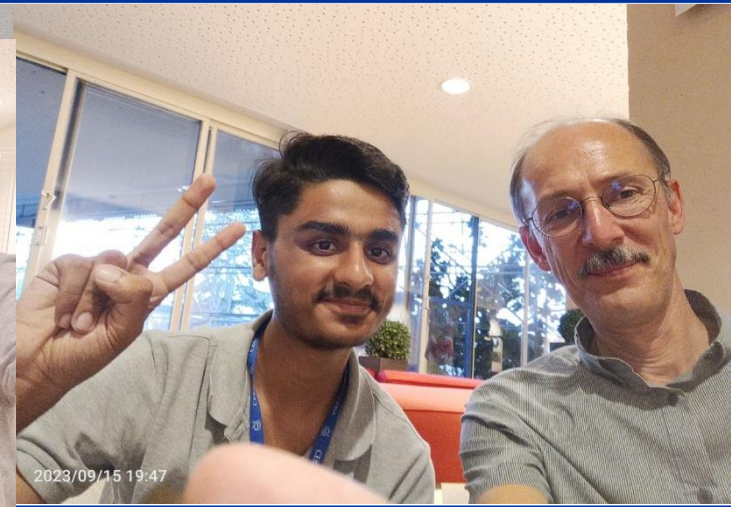
## “Trigger it out”

Let's experience how trigger systems work!

- 1) If you talk with a person who does not belong to your team, take a photo
- 2) Upload the photos here:  
<https://cernbox.cern.ch/s/FYrIJFRoTqJaq5T>

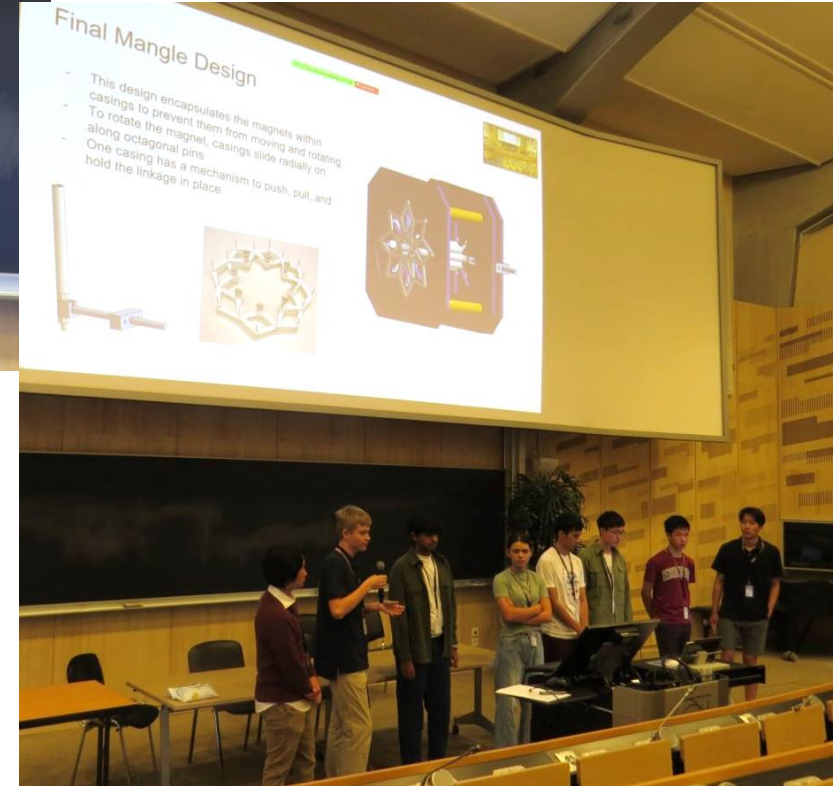


→ We will discuss your observations in tomorrow's session on data acquisition!



# Stay at CERN

## Introduction Presentations



# Stay at CERN

## Introduction Presentations

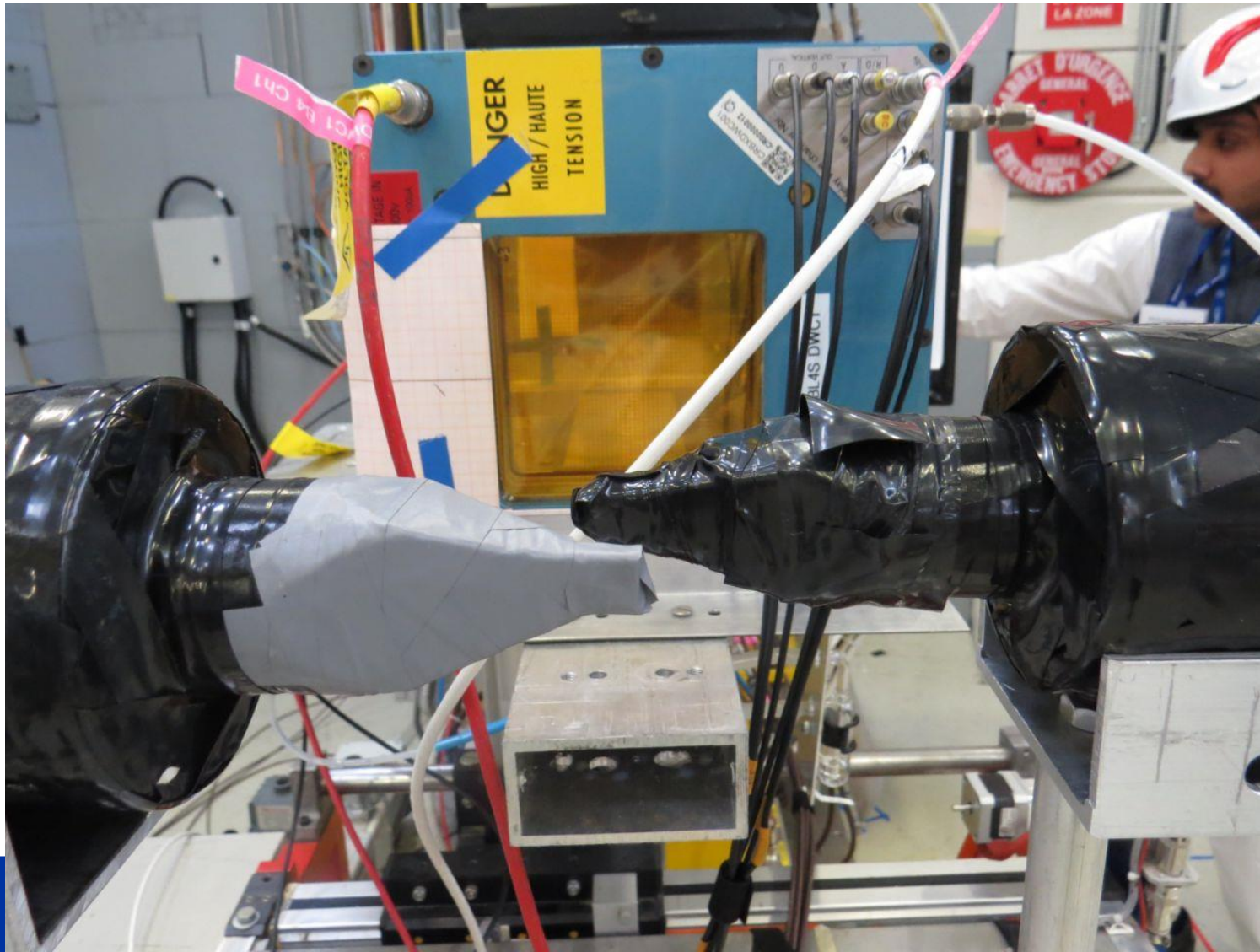


# Stay at CERN

# Visiting Geneva

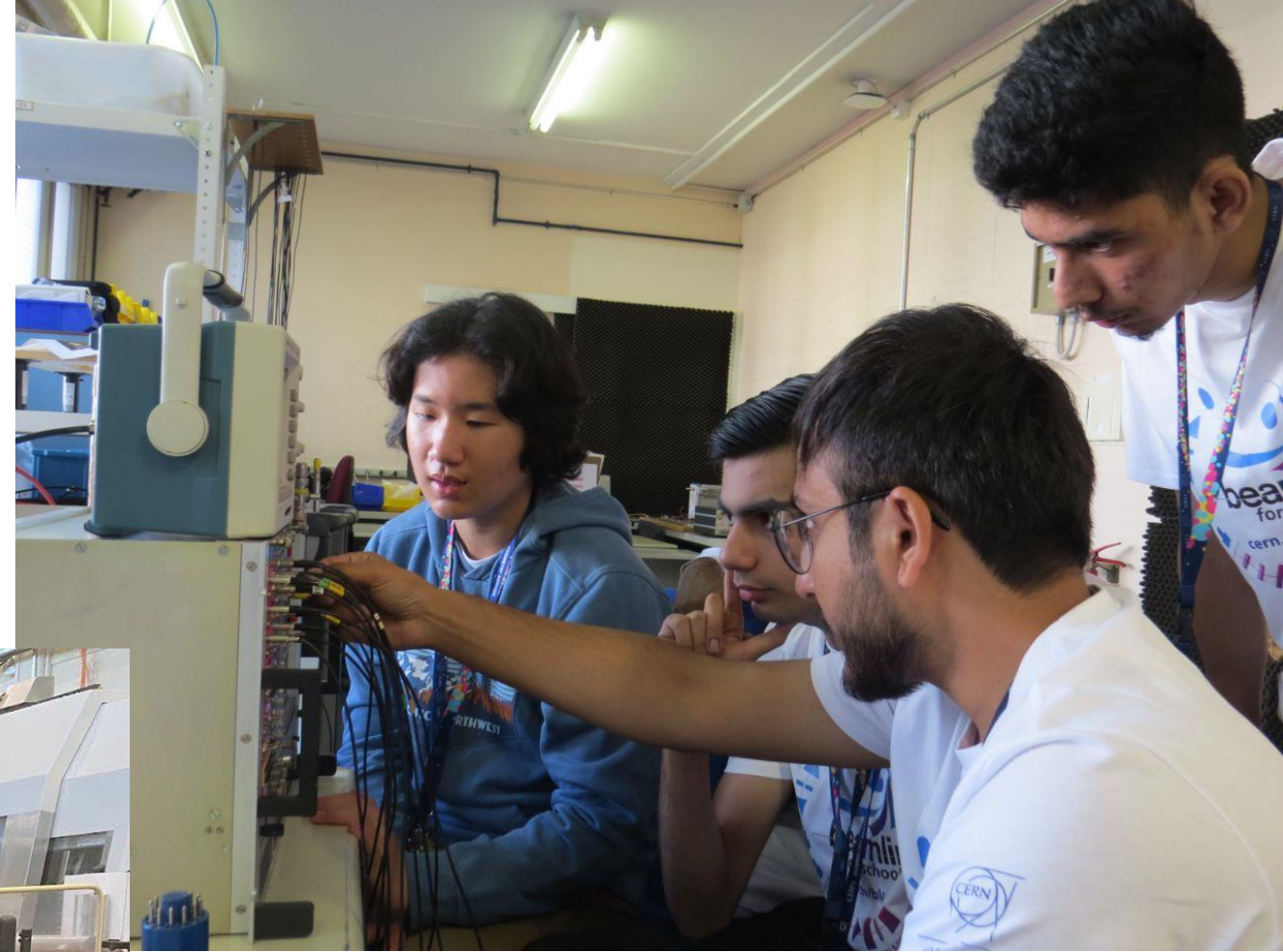


# Stay at CERN *Beam Days*



# Stay at CERN

## Hands-on with Markus



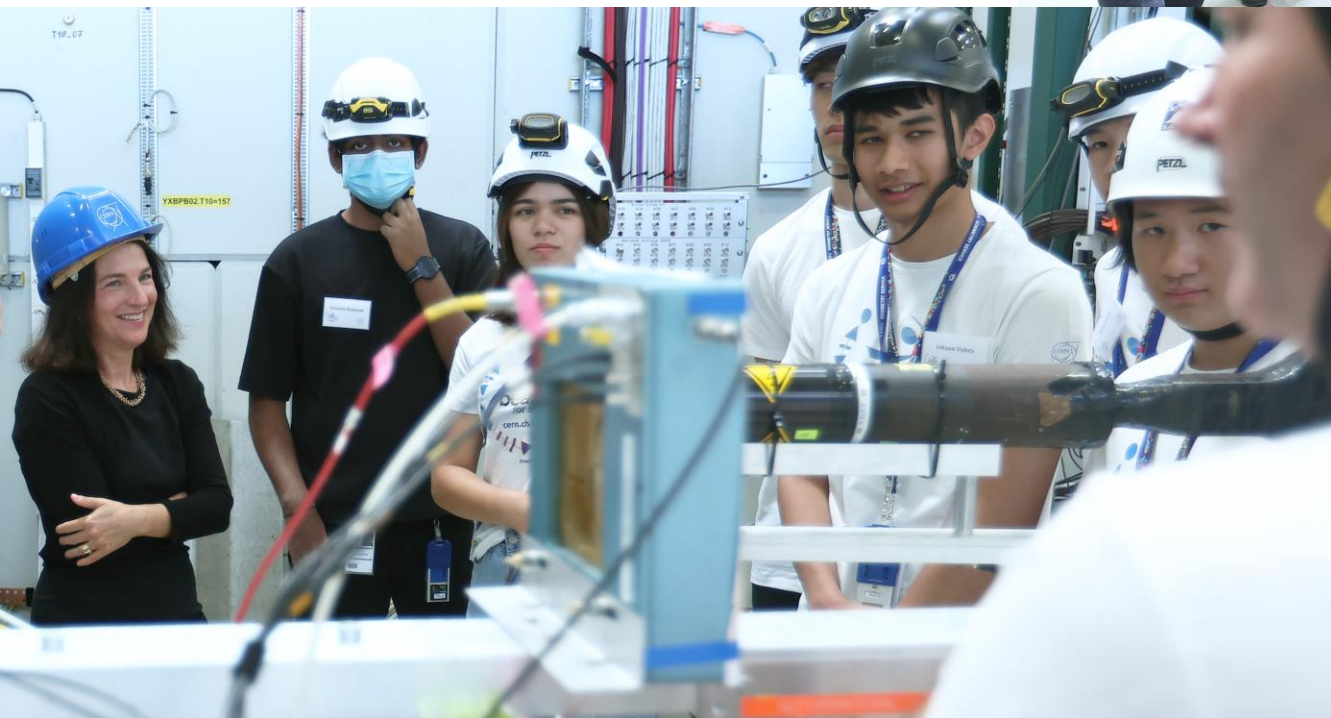
# Stay at CERN

## Celebration of the 10<sup>th</sup> edition



# Stay at CERN

## Celebration of the 10<sup>th</sup> edition



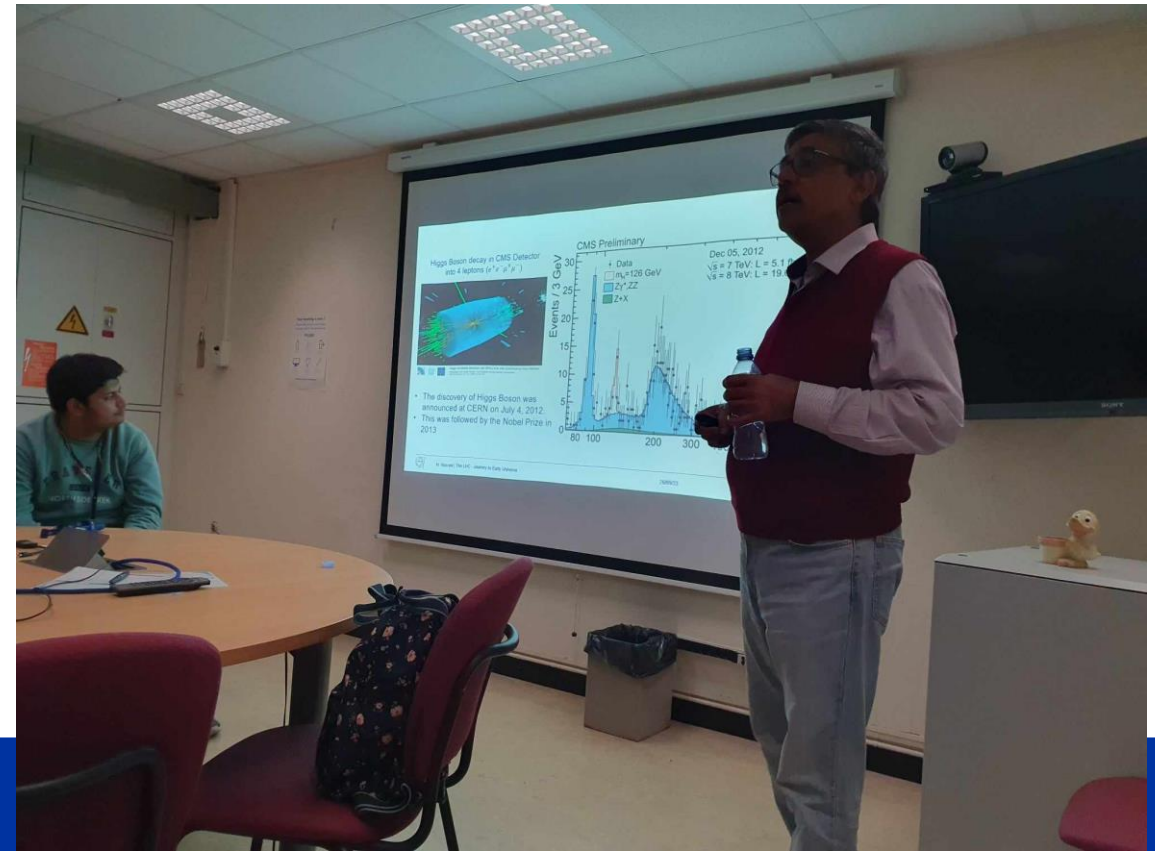
# Stay at CERN

## Celebration of the 10<sup>th</sup> edition



# Stay at CERN

## Learning about the LHC – Luminosity and Cosmology



# Stay at CERN



Visiting CERN

# Stay at CERN

## Swiss Dinner



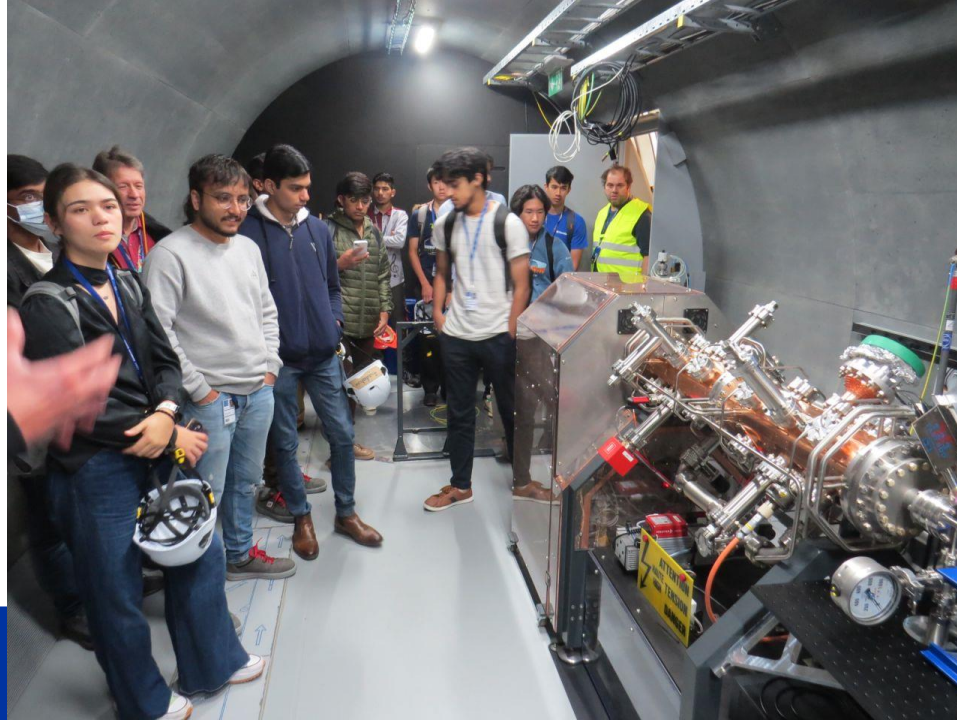
# Stay at CERN

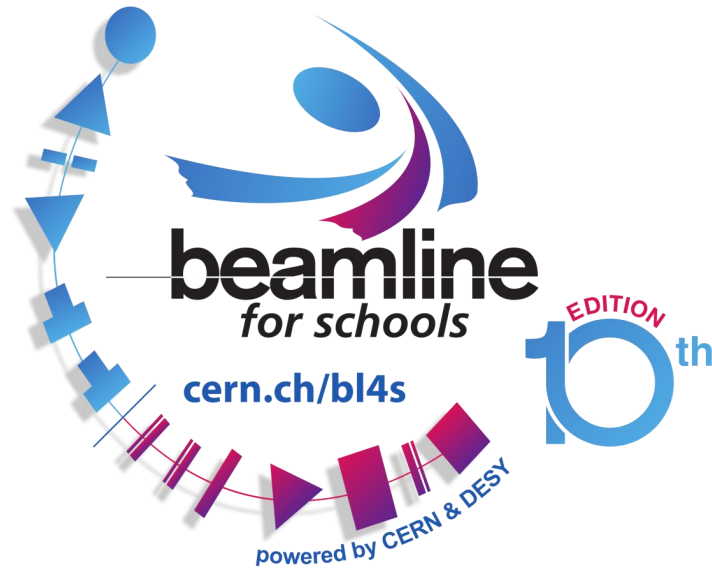
## Last Beam Day



# Stay at CERN

## Science Gateway





Au revoir\*

\*French for “see you again”

# Departure

**28 September:**

❖ **Check out** from the hotel  
by 12:00

- luggage can be stored in the hotel
- remove food (if any) from the fridge

❖ You can keep your safety shoes

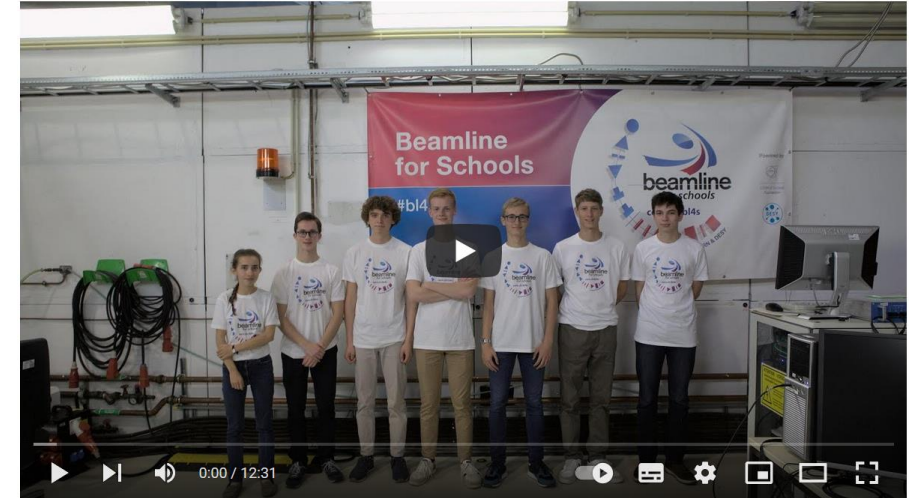
*Return your **safety helmet,**  
**dosimeter, CERN card, and lunch**  
**check to Sarah & Markus!***



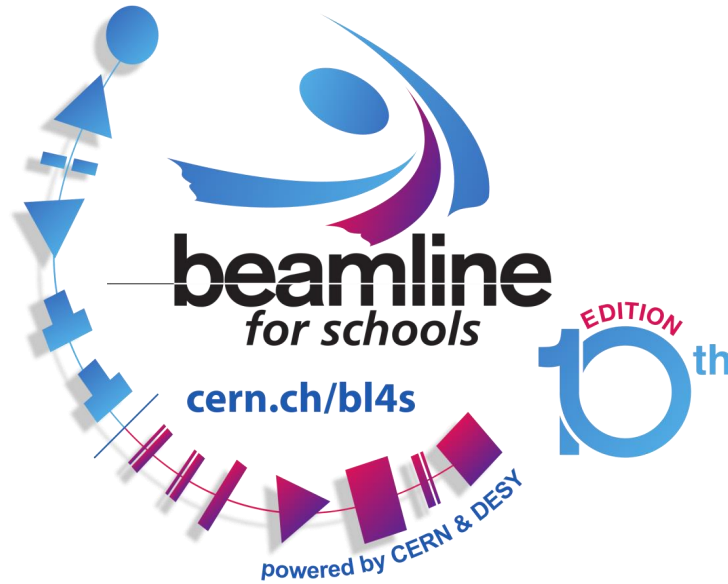
# It's just the beginning ...

## BL4S will not be over on 28 September

- ❖ Continue analysing the data you will collect
- ❖ Write a **report** about your experience at CERN that can be published on the BL4S website
- ❖ Write a **scientific paper** about the results of your experiment ⇒ We will help you publishing it in a scientific journal!



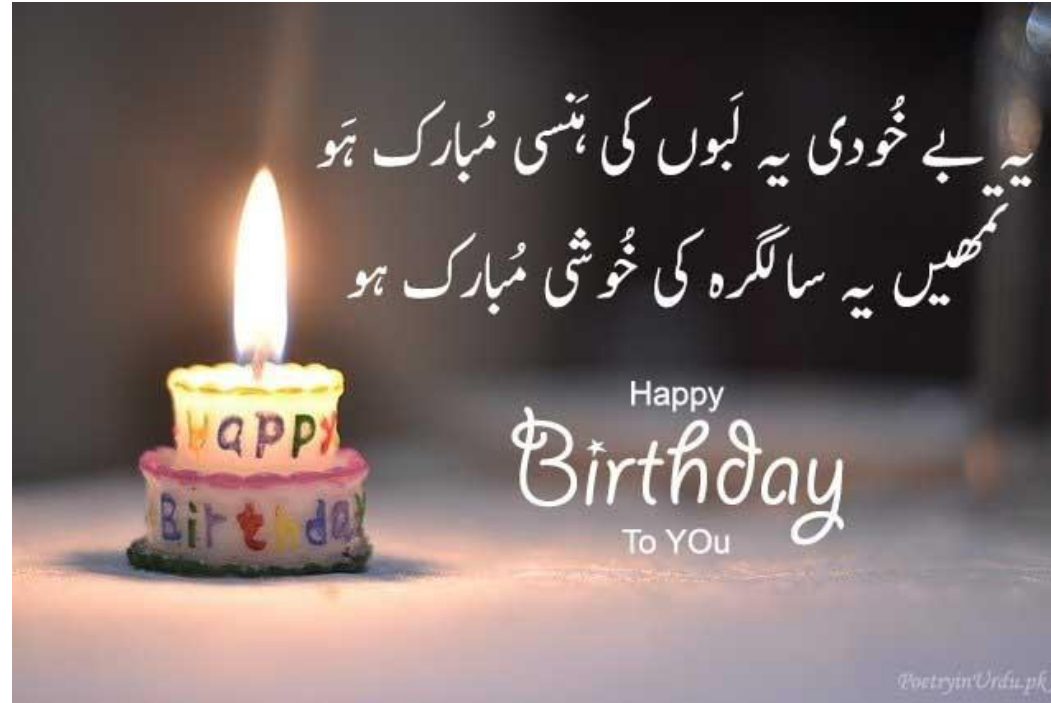
Share your  
experience  
with others!



It was a great pleasure to meet you  
and to conduct experiments with you! :)

**We will miss you very much!**

P.S.: Happy Birthday, Abdul!





P.P.S.: Thank you so much to our support scientist for all your time, kindness, and endless patience and passion!

**We wish that you can catch up on sleep!**