# 4th EPS TIGS Hands-on Event: enlarging the horizon of young physicists and engineers

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**With the idea of bringing students together from all over the continent to innovate, to experiment and learn with the expertise of field specialists, the Technology and Innovation Group (TIG) of the European Physical Society in collaboration with IdeaSquare (CERN) has organised the fourth edition of the "EPS TIG Hands-on Event for Science, Technology and Interfaces".**

The young group of 18 students were taught skills commissioning and running advanced scientific instrumentation and rapid-prototyping, but were also provided with the opportunity to develop their communication and teamwork abilities.

Many young students in Physics and STEM may lose the overview of their studies and the true fun and privilege it is to evolve in these fields when it comes to their day-to-day life. The start of a new semester offers a clean slate to develop experience, to gain knowledge outside of the academic realm, face challenges and meet experimented scientists who have overcome them. It is the time to visit places where the creative environment tickles the students' passion for understanding physical concepts, high-level experiments but also to analyse information and connect with each other. It is in this regard that the Technology and Innovation Group (TIG) of the European Physical Society and IdeaSquare (CERN) have hosted the "4th Hands-on Event for Science, Technology and Interfaces ", between October the 13th and the 15th at CERN, Geneva.

The group of 18 students was warmly welcomed by the introductive words of Dr. Stefan Kubsky and Dr. Markus Nordberg before heading out to visit the Compact Muon Solenoid particle detector (CMS) of the Large Hadron Collider (LHC) at CERN. After a guided tour of the underground facilities, the participants were introduced to CERN technologies and IP-commercialization via a knowledge transfer lecture given by Ashwin Ravikumar, Entrepreneurship Development Officer at CERN. Day 1 ended with an introduction to IdeaSquare and its facilities by Dr. Markus Nordberg.

The second day of the event started with an introductive workshop on rapid prototyping with Dina Zimmermann, Prototyping Facilitator at CERN IdeaSquare, during which the students teamed up to solve their first rapid prototyping challenges and find new solutions to the

suggested problems. Dr. David Dennetiere, head of the optics group of the experimental division at the SOLEIL Synchrotron (France), gave a remote introductive lecture on interferometry in Optics and its applications. This allowed the students to understand the knowledge basics to properly tackle the first experiment of the event: Doppler measurements with light. Four groups of students were created, each handling an essential aspect of a scientific experiment which researchers face daily in their careers: theoretical predictions, mechanical set-up, software and data analysis. The students realised immediately that not only were they working on each individual aspect of the process, but the groups had to work interactively with each other in order for the complete mechanism and dynamic of the experiment to happen. They applied the same strategy after Dr. Olivier Acher's (Innovation Director at HORIBA) video-introduction to the new NanoGPS OXYO software, in order to operate their first hands-on nanometrology experiment: comparing OXYO to the old-fashioned Wheatstone bridge method. The groups successfully built the two experimental setups while designing the relevant interfaces by communicating and enthusiastically working as one. Some very motivated and passionate students kept on working on the data analysis and the due final presentation at IdeaSquare until late at night.

The last day of the event started with a hands-on introduction to Labview and FPGAs presented by Odd Oyvind Andreassen, section Leader of the Measurements, Tests and Analysis at CERN, alongside Adriaan Rijllart, retired colleague of the same group. During this workshop, the students had the opportunity to experiment and play around with Labview by programming different tasks on a virtual machine. The results of the two experiments of the day before were then presented to the whole group and the organisers by the data-analysis team, helped by a person from each other group to sum up what had been done. These results were accompanied by a general discussion around what would be to improve and what was well done, which completed the knowledge and skills acquired from the past few days. After a summary and conclusive words by the main organisers Dr. Stefan Kubsky and Dr. Markus Nordberg, the participants left CERN light-hearted, holding onto these few days of discovery and experience as the days where they learned many new skills and projected themselves in their future careers as scientists.

Special thanks go to the EPS, to the TIG and its chair Christophe Rossel, to the CERN IdeaSquare for making this event possible and to Stefan Kubsky and Markus Nordberg for organising it.

The final presentation is accessible under following link: https://indico.cern.ch/event/1253966/contributions/5267617/ ■

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# A year of celebration of 70 years of CERN

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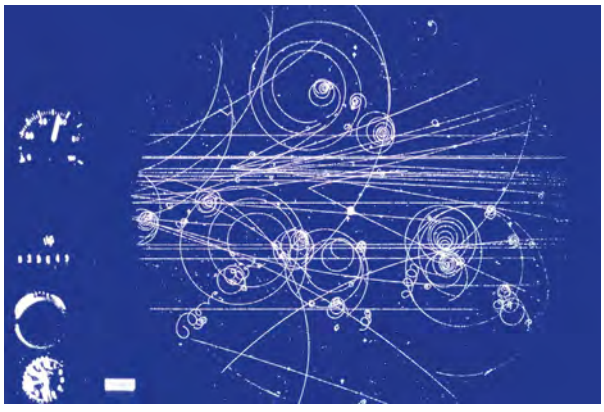
**On 30 January CERN, the European Laboratory for Particle Physics, kicked off a yearlong programme to celebrate its 70th anniversary in 2024.**

CERN came to life in 1954, in the aftermath of the Second World War, to bring excellence in scientific research back to Europe and to foster peaceful collaboration in fundamental research. Today, CERN counts 23 Member States, 10 Associate Member States and a community of 17,000 people from all over the world, with more than 110 nationalities represented. Currently, the laboratory is home to the Large Hadron Collider. Building on its legacy of research and technological development, CERN is already looking to the future, in particular by studying the feasibility of a Future Circular Collider.
CERN invites everyone to join the year of celebration and take part in events, which aim to kindle scientific curiosity, honour scientific progress and collaborative efforts, and underscore the role of science in society. For the complete CERN70 anniversiary events and programme of activities, visit www.cern.ch/cern70 ■



▲ The image from 1960 is of real particle tracks formed in CERN's fist liquid hydrogen bubble chamber to be used in experiments. It was a tiny detector by today's standards at only 32 cm in diameter. Negatively charged pions with an energy of 16 GeV enter from the left. One of them interacts with a proton in the liquid hydrogen and creates sprays of new particles, including a neutral particle (a lambda) that decays to produce the 'V'-shape of two charged particle tracks at the centre. Lower-evergy charged particles produced in the interactions spiral in the magnetic field of the chamber. The invention of bubble chambers in 1952 revolutionised the field of particle physics, allowing real particle tracks to be seen and photographed, after releasing the pressure that had kept a liquid above its normal point (Image: CERN)