



Beamline for Schools

A Physics competition for high-school students

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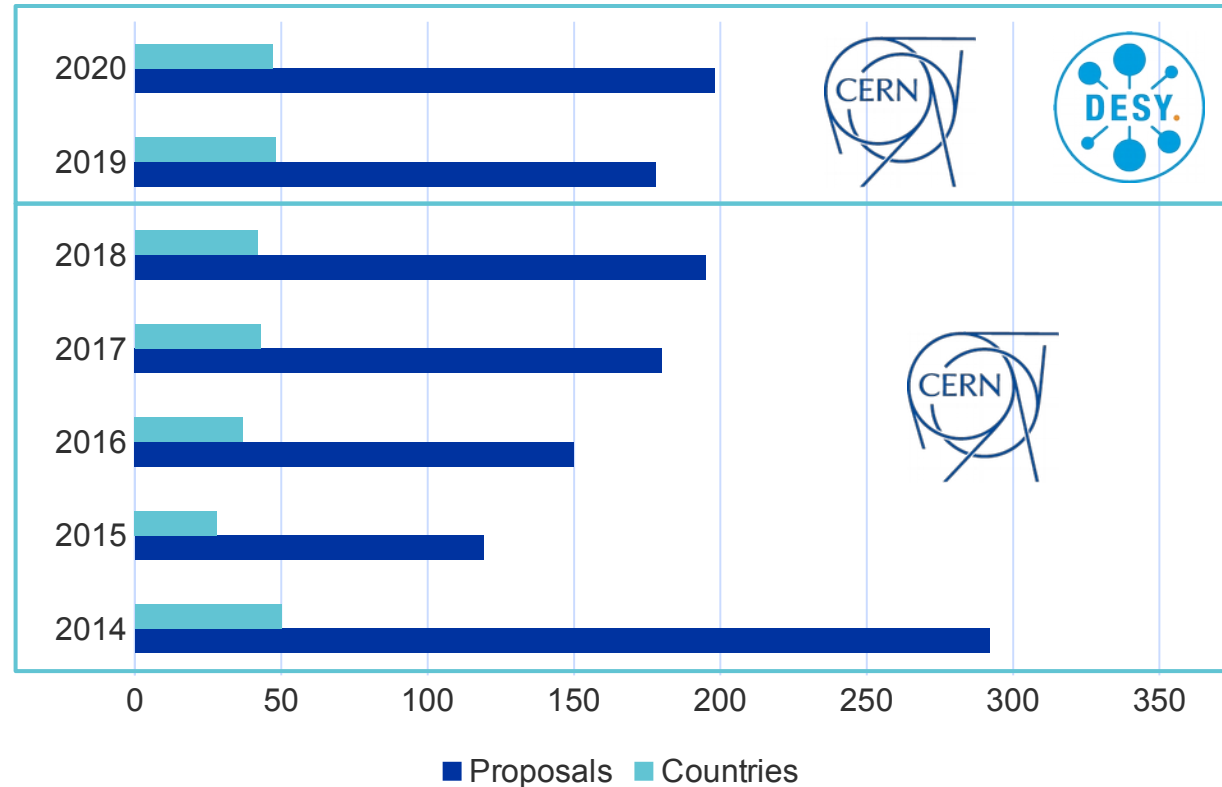
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Taking part in Beamline for Schools (a reminder)

- International competition for teams of high-school students.
- 5-9 people per team, ≥ 16 years old (for winners, September 2021).
- Submit your proposal by April the 15th at Midnight CET.
- The teams sending the two best proposals will be invited to DESY (Hamburg) in September 2021 to perform their experiments.
- The best ~20 proposals will receive additional prizes.
- Special award for the best video.
- Winner announcement June 2021.
- Participation certificates for all participants.



Overview



- More than 11000 students from 91 different countries took part in the competition from 2014 on.
- 4 winning teams published their results in peer-reviewed scientific journals.

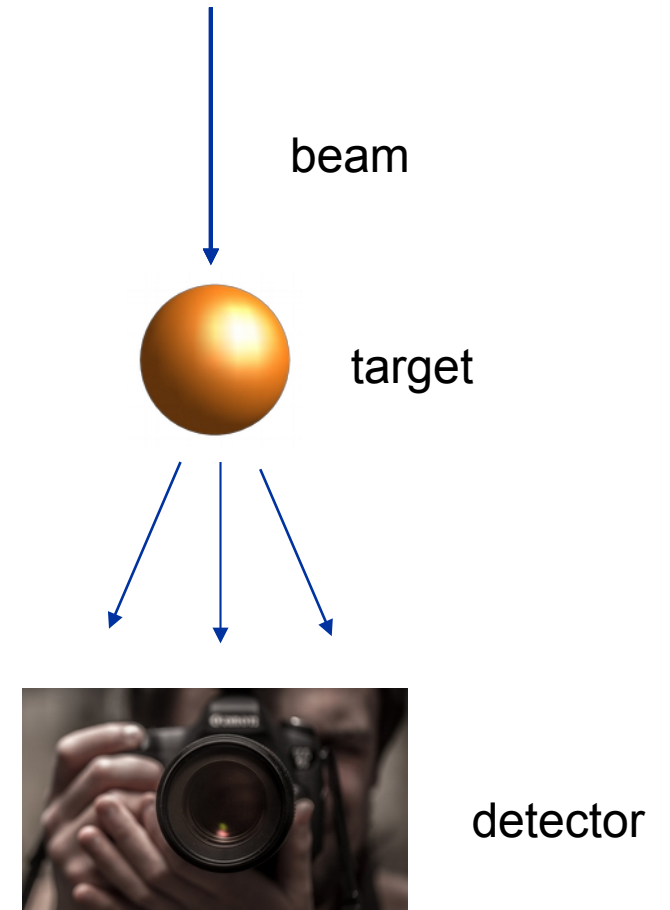
CERN and DESY



- The competition is hosted at the DESY II test-beam area since 2019.
- Both the CERN and DESY management support the competition.
- BL4S is funded by external sponsors.

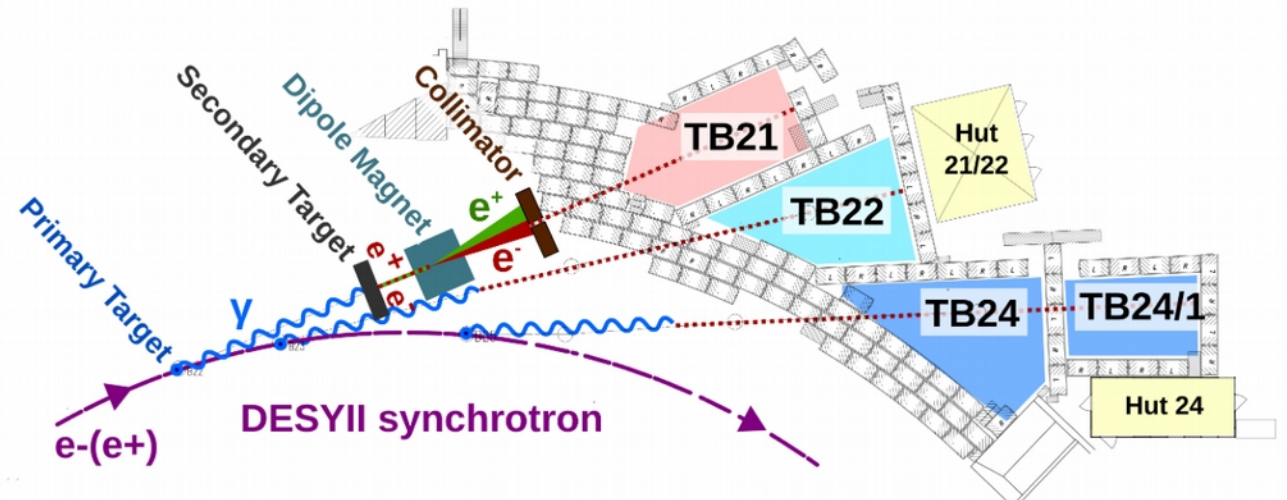
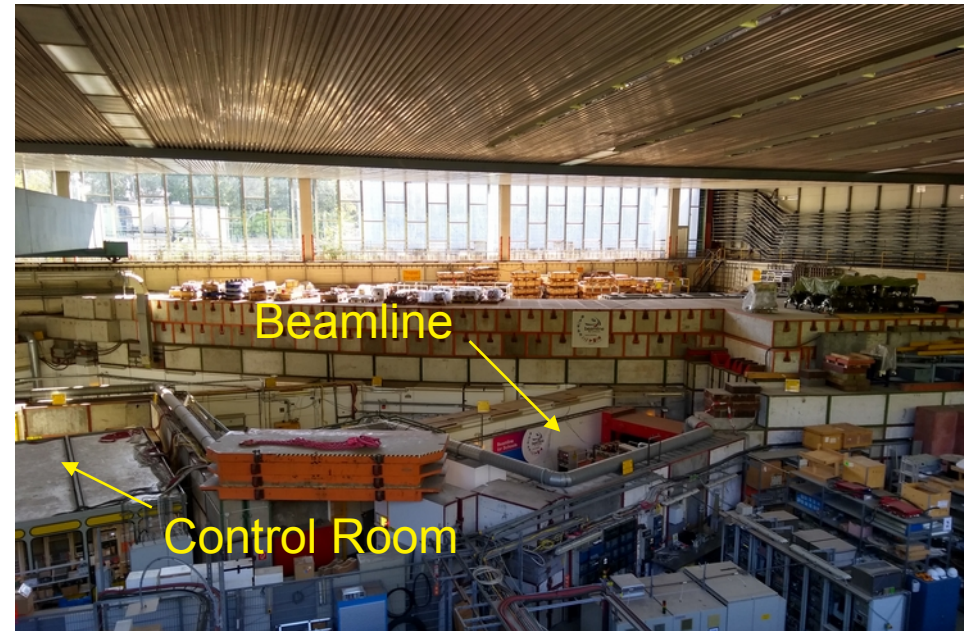
Experiment requirements

- The proposal has to be design for the test-beam facility of the DESY II synchrotron.
- Fixed target configuration: particle beam crossing/ passing close to a target (solid, liquid, gas). The target is not mandatory.
- Experiment design:
 1. Beam
 2. Target and/or other components (magnets, absorbers, etc..)
 3. Detectors
 4. Trigger/readout



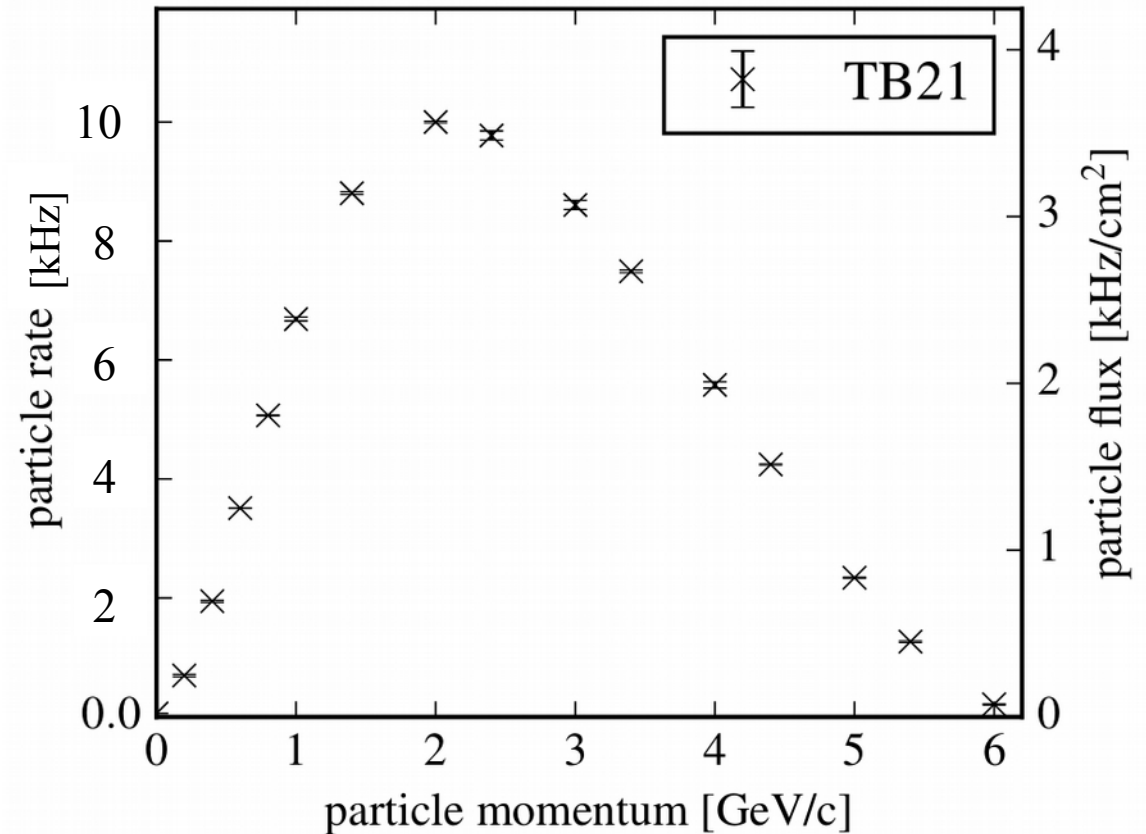
Beam properties

- DESY II is a synchrotron: it accelerates electrons up to 6.3 GeV.
- For the experiments: secondary beam of electrons or positrons.
- The user can select the particle, the collimation and the momentum.
- Beam-spot size: 2x2 cm



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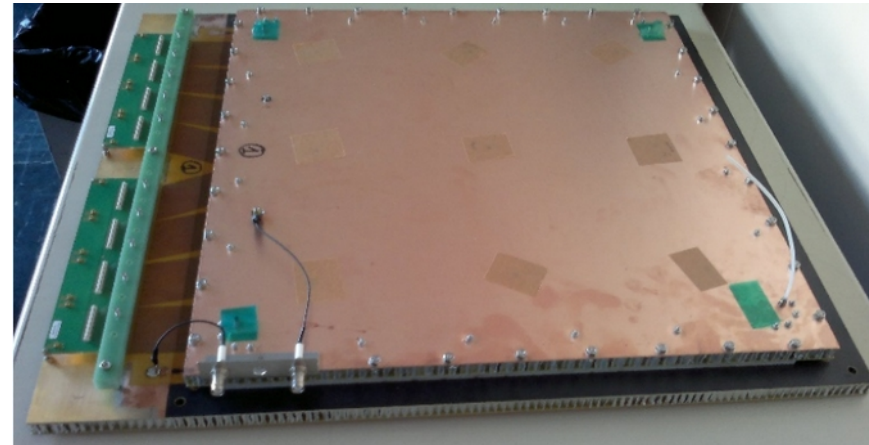
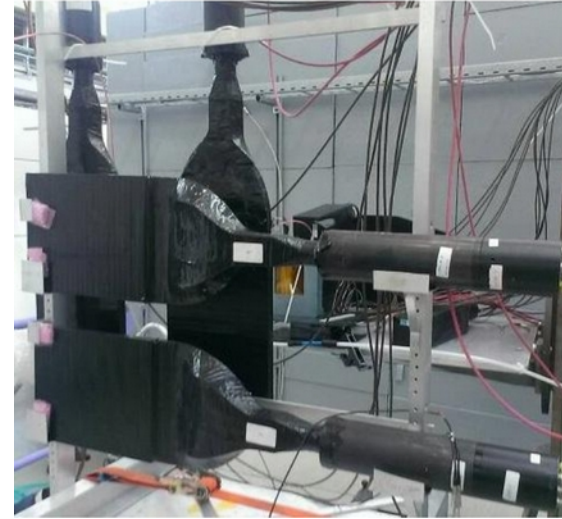
Detectors

- Different detectors are available for BL4S.
- The choice depends on the purpose of your experiment.
- Each detector has its own readout system.
- The data-acquisition systems controls all the detectors and the experiment (you don't need to worry about that).



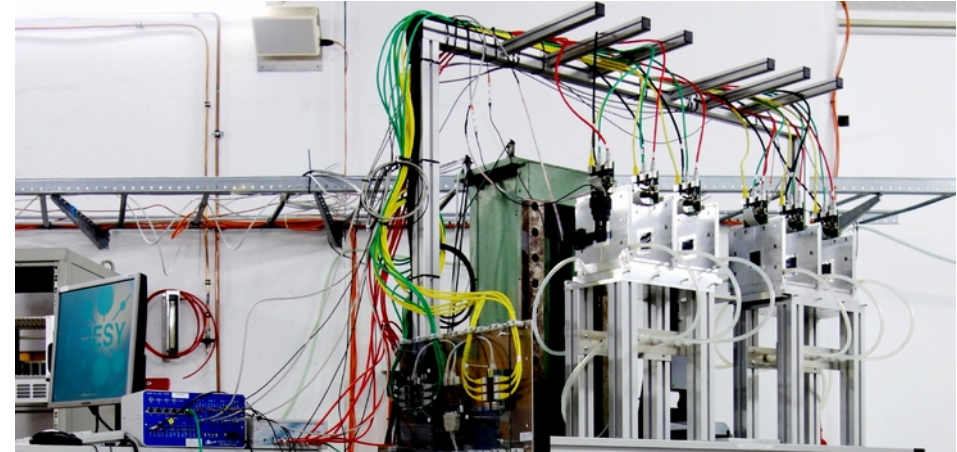
Detectors

- Scintillators + photomultipliers – **particle counting, trigger, TOF measurements**. At least 6 available.
- Delay Wire Chamber – **2D tracker** – active area 10x10 cm, resolution 200-300 μm (10^{-6} m), dead-time~700 ns.
- MicroMegas detectors – **1D tracker** – 40x40 cm, resolution 200 μm . 4 available
- Beam telescope – **2D tracker** – 2x1 cm, resolution 3 μm .
- Lead crystal calorimeter – **Energy of particles** – 16 available, 10x10x37 cm, energies > 500 MeV.



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- **Any detector provided by the teams (CMOS, cloud chamber, Cherenkov detector, etc..).**

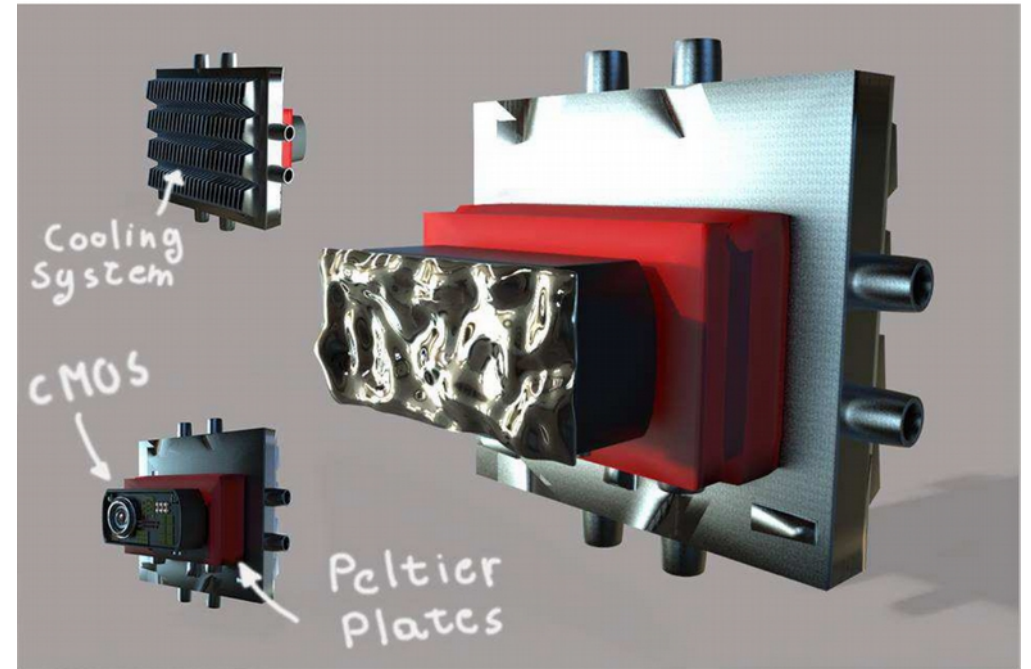
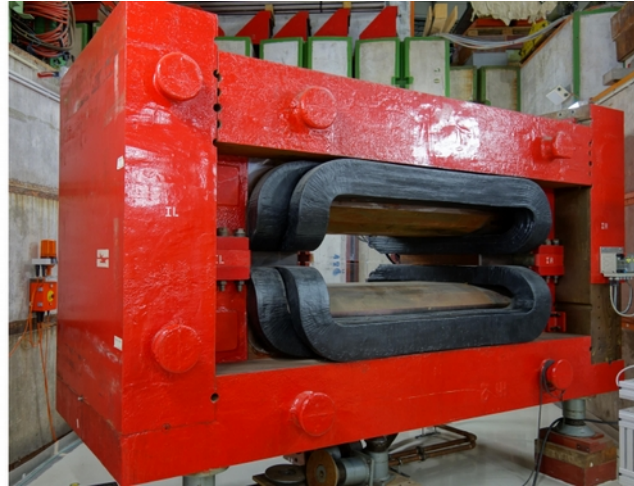


Image from Leo4G proposal in 2015

Additional equipment

- PCMAG – superconducting solenoid magnet, 1 T. Opening of 77 cm in diameter. Able to rotate.
- BRM (Big Red Magnet), normal conducting magnet, up to 1.35 T. Opening of 1.5 m x 0.35 m.



- Absorbers: iron block to absorb all particles.

It's time to build your experiments!

Questions?

