

Schools competition: Win a beam line

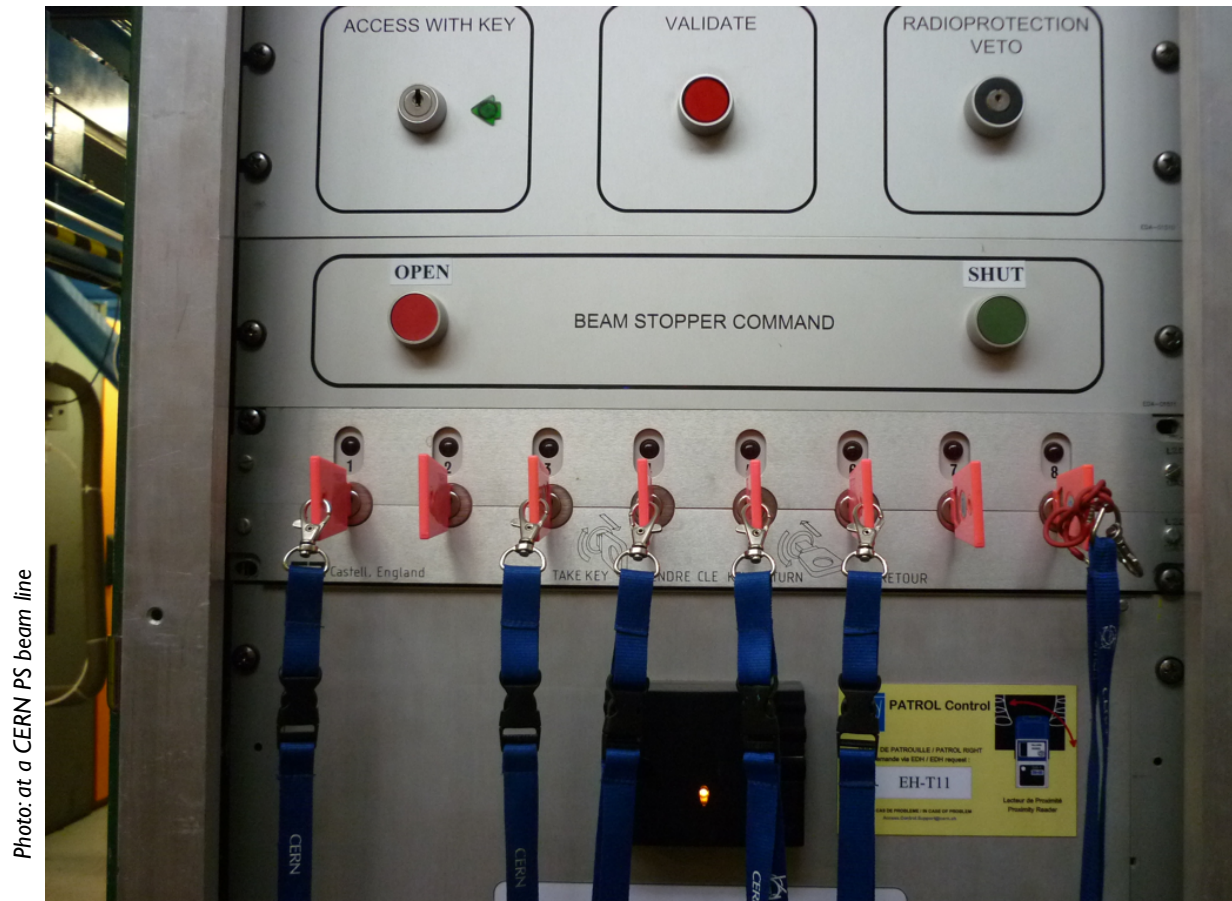


Photo: at a CERN PS beam line

Motivation

The best way of learning is to involve experience

This talk: idea of a project in which pupils become scientists

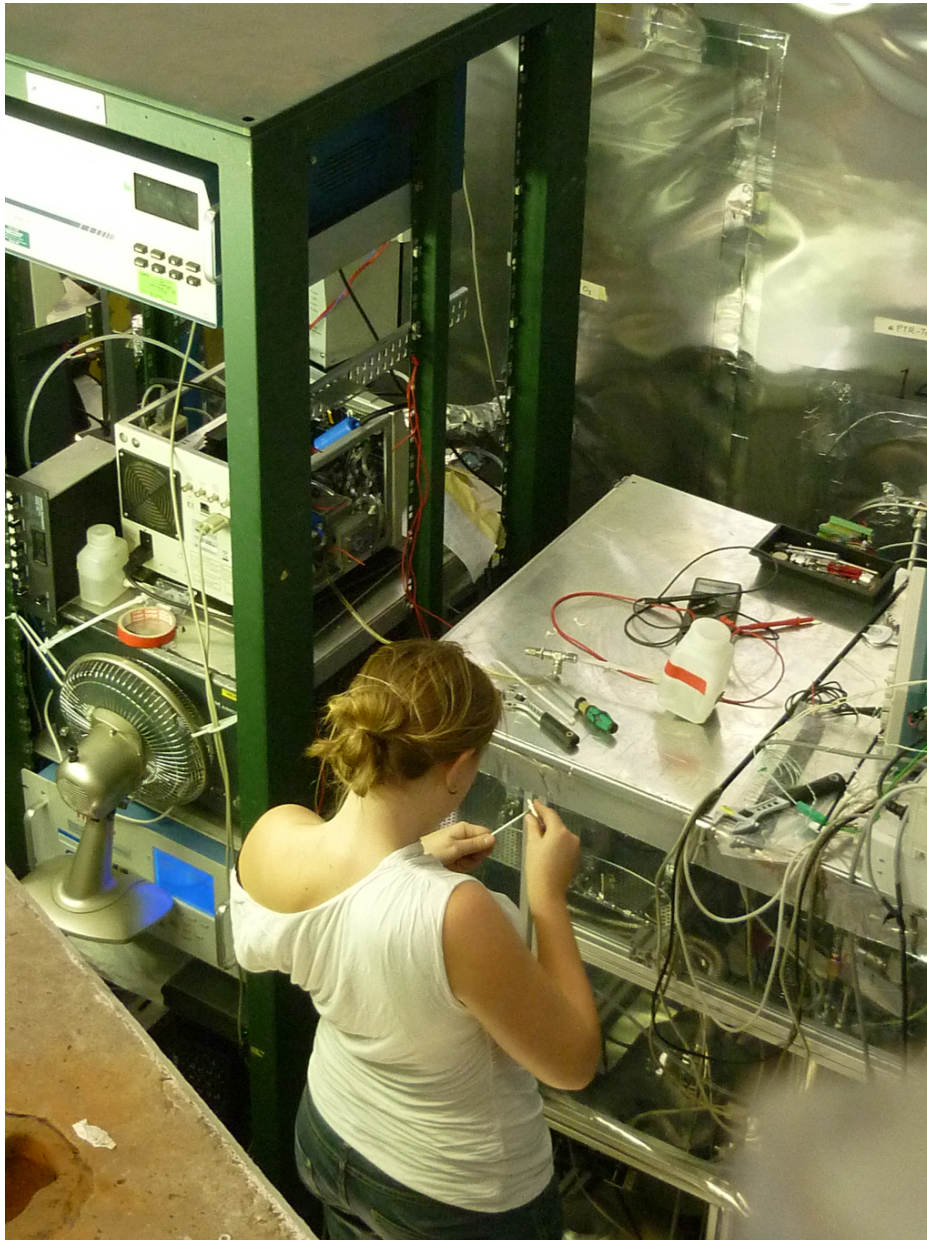


Photo: at a CERN PS beam line

Idea

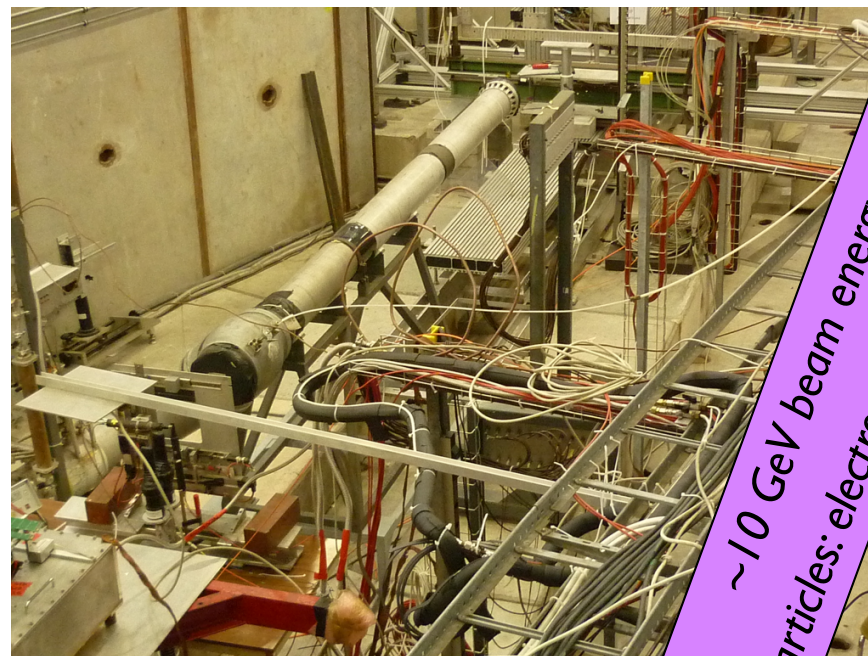
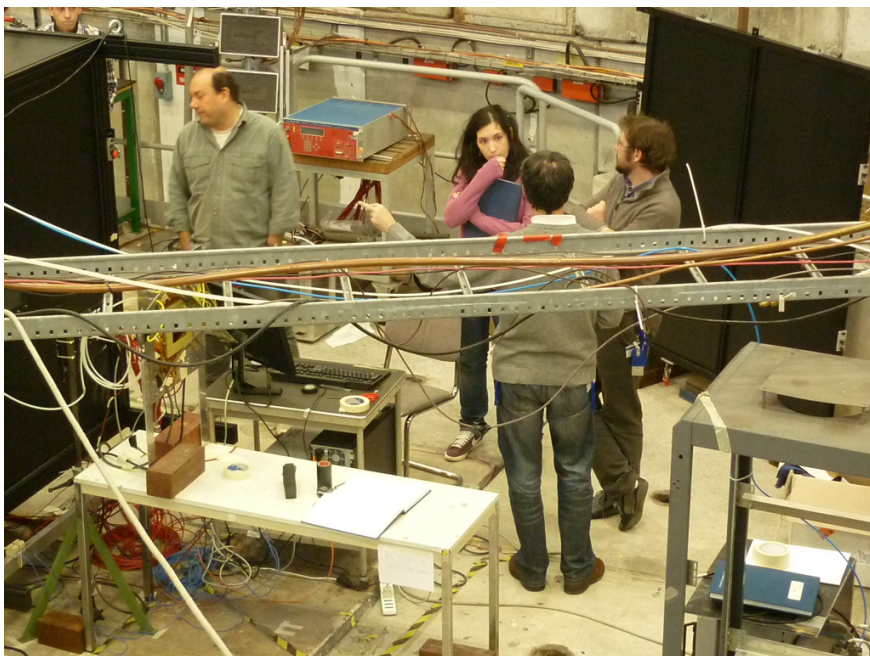
- Worldwide competition among schools for beam time at CERN
 - ➔ class to phrase scientific question, to work out / design / build an experiment which uses particle beams and to write / submit a proposal;
 - ➔ a committee selects best proposals;
 - ➔ selected proposals are presented in the public session of the PS and SPS Experiments Committee (SPSC) depends on schedule...;
 - ➔ SPSC decides which experiment wins one week of beam time at a CERN accelerator;
 - ➔ class comes to CERN to do their experiment;
 - ➔ class writes up results (if possible results are published).

*As close as possible
to real science life*

Idea supported at CERN

- CERN management and departments in favour...
- ... boundary conditions:
 - ➔ 2013 and 2014: long shutdown of the CERN accelerators and experimental facilities
 - Proton Synchrotron (PS) back in operation 15 July 2014;
 - other accelerators (Super Proton Synchrotron SPS and LHC) late October 2014;
 - beams available up to 15 December 2014.
- PS and its T9 experimental area is the only viable option
 - ➔ sufficient time to set up / test / commission the experiment with beam.

Beam lines @ PS East Area



*~10 GeV beam energy,
particles: electrons, muons, pions*



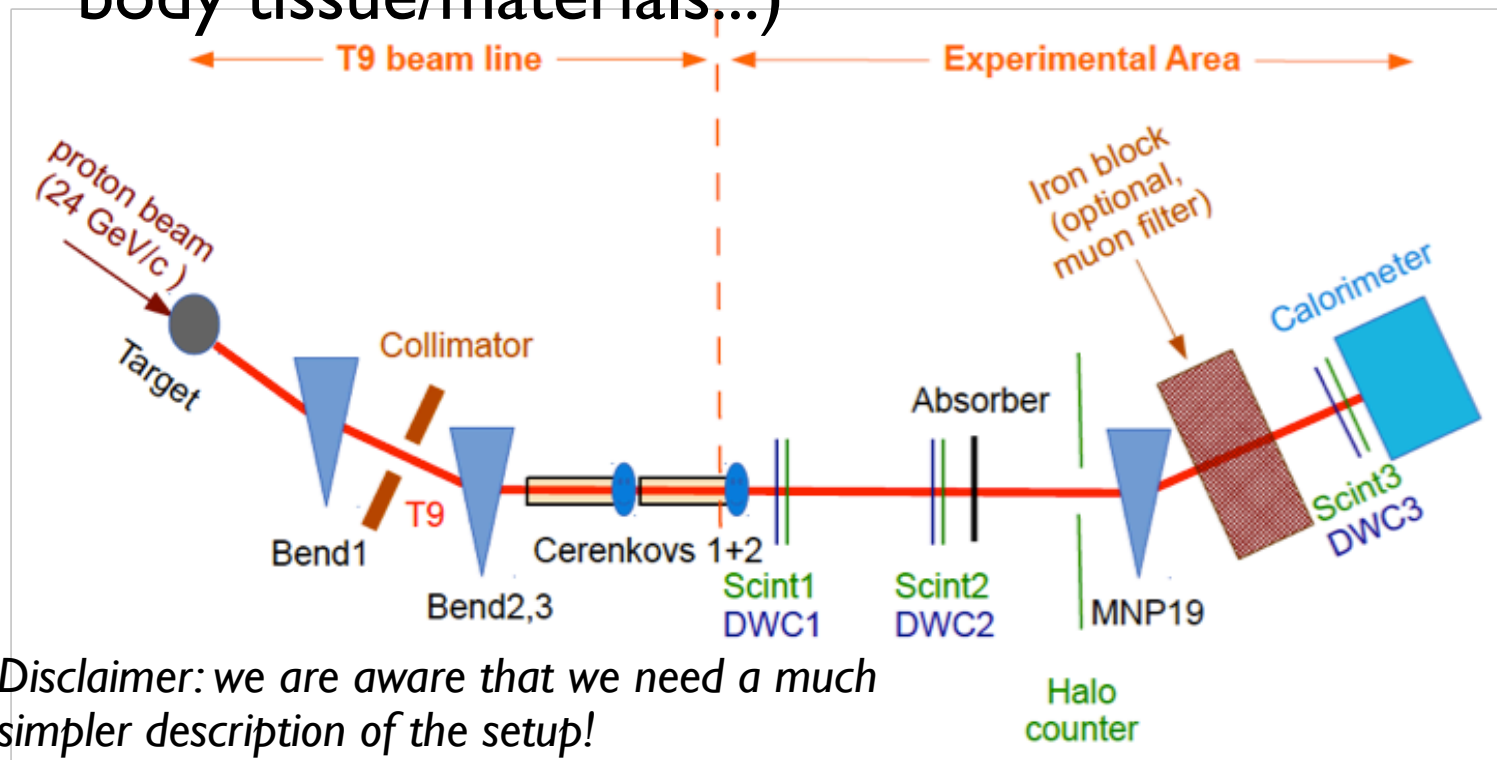
Photos: the T9 CERN beam line

PS East Area

- typical CERN beam line;
- easy access (and close to Restaurant I);
- excellent experimental conditions and reliable performance;
- ...

An example experiment

- Experiment to determine particle composition of the beam before and after an absorber (e.g. to study impact of particles on body tissue/materials...)



More ideas and examples to inspire the pupils are very welcome!

- Slight changes of the setup allow many other experiments.
- Example experiment should be used to explain available beam line, detectors and instrumentation.

A possible timeline (I)

...from draft launch document by James Gillies

Phase 1: The run-up

CERN creates Google+ and Facebook events a few days in advance of the kick-off. Via social media posts and mailing lists, teachers, parents, and other science enthusiasts are encouraged to take part in the event(s) and spread the word about the competition.

Help needed!

Phase 2: The kick-off

Interested students and adults can then participate in the official kick-off by joining a Google+ hangout where scientists from CERN will present the project and answer questions.

(Hangouts will be organised in many languages (English, French, German, Italian, Spanish...))

Help needed!

Comment Christoph: Run-up / kick-off should happen well before Christmas. Otherwise time to prepare an experiment for 2014 too tight.

A possible timeline (2)

...from draft launch document by James Gillies

Phase 3: Registration – the Letter of Intent

Online registration will open on the date of the first hangout. Registration notifies CERN of your intention to submit a proposal and qualifies you for future Hangout sessions. Registration will e.g. require: Country/language preference, name and email of adult coach, a 140-character statement on why you should win this competition. Registration will close at midnight CET on XX.YY.201Z

Phase 4: Proposal

Create a two-part proposal (1000 to 2000 words) that explains

- o Why you want to come to CERN;
- o What you hope to take away from the experience;
- o Initial thoughts on how you would like to use the particle beam line;
- o A **1-minute video** that summarises the proposal in a creative, entertaining way.

Proposals must be received by 28 February 2014. Winners will be notified in May 2014.

Phase 5: Experiment

Should take place in September 2014

Lot of help needed!

More details on the competition

...from draft launch document by James Gillies

- Participating pupils should be older than 16 years;
 - Proposals will be evaluated according to:
 - ➔ Motivation of the students
 - ➔ Creativity
 - ➔ Feasibility of the proposal
 - ➔ Demonstration of ability to follow the scientific method.
 - The first prize is a trip to CERN to carry out experiments ideally in August/September 2014. The winning team will be invited to CERN for a period of up to two weeks.
 - The team will be divided into three groups that will rotate between
 - ➔ the CERN Accelerator Control Centre,
 - ➔ the East Hall beams control room,
 - ➔ the control room for the experiment itself.
 - Members of the school that do not come to CERN will be able to take part in the data analysis and participate in the experiment via the exchange of web-based data.
 - All shortlisted projects will receive T-shirts and a surprise gift from the CERN shop.
 - All proposals will be showcased on the website after the competition closes, CERN will issue certificates to the teams that submitted them.
- Groups will receive priority to organise a visit to CERN or take part in a particle physics masterclass, and teachers will receive priority for CERN's high-school teacher programmes.

More details - Project structure

- Safety issues at CERN settled and procedures in place;
- Sufficient technical and financial support for project at CERN
 - ➔ ...to set up infrastructure (social media, hang-outs, web pages, beam line equipment and instrumentation, detectors, analysis facilities, control room...)
 - ➔ and to support/pay colleagues to set up data acquisition systems, controls and analysis software which is expected to be a full time activity for ~4 people.
- However no project coordinator identified up to now.

Your help and support

- Project needs your ideas, support and help to
 - ➔ spread the word about the project;
 - ➔ encourage pupils and teachers to participate;
 - ➔ give support to schools during the design phase;
 - ➔ act as national contact for questions;
 - ➔ give input and ideas to improve the project;
 - ➔ ...

Thank you!

If project in 2014 is successful...



Picture: yesterday at a CERN beam line

...continue
competition in a
regular programme?

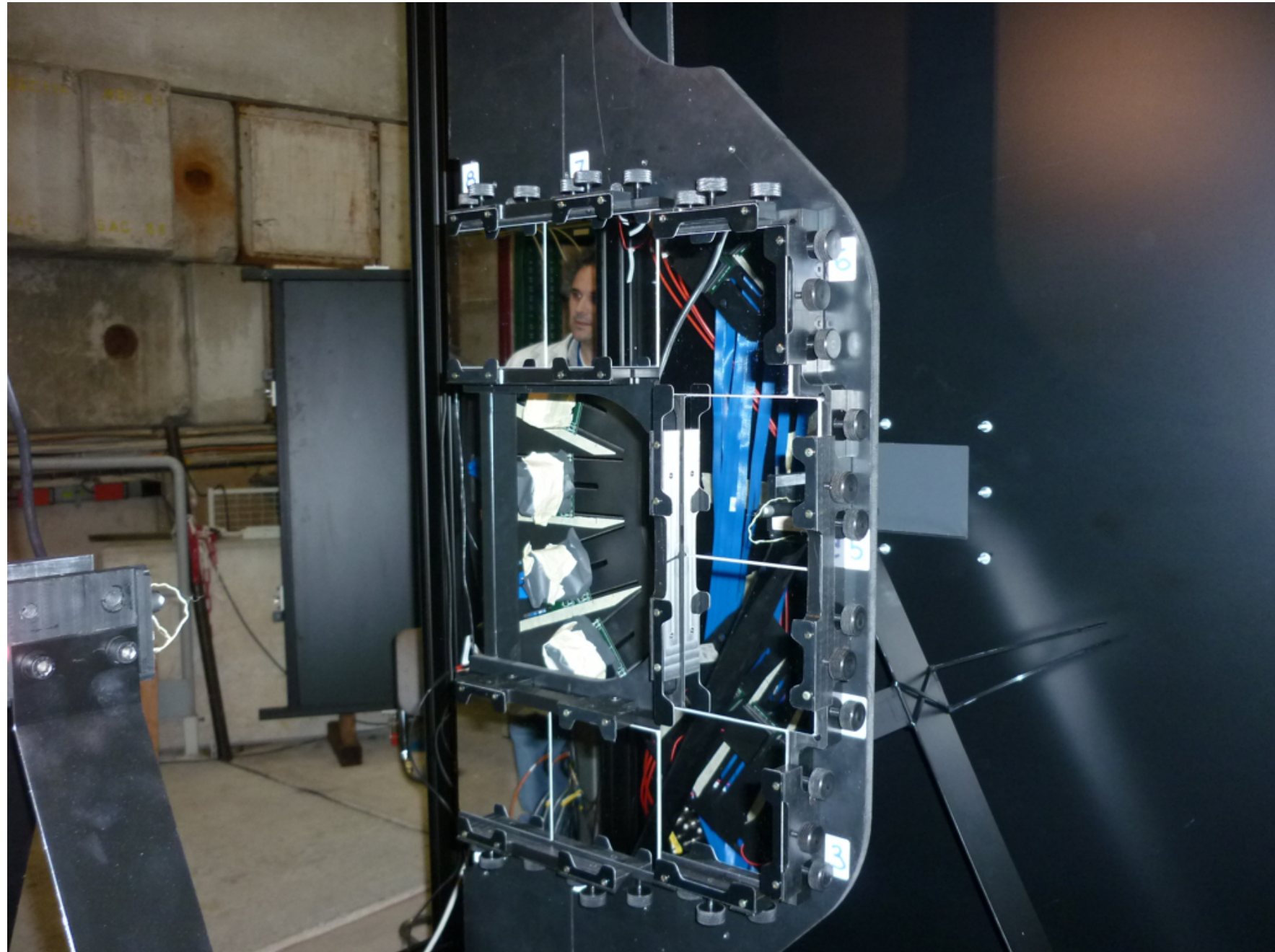
For an experimental
physicist nothing
compares to running
an experiment!

Back-up slides

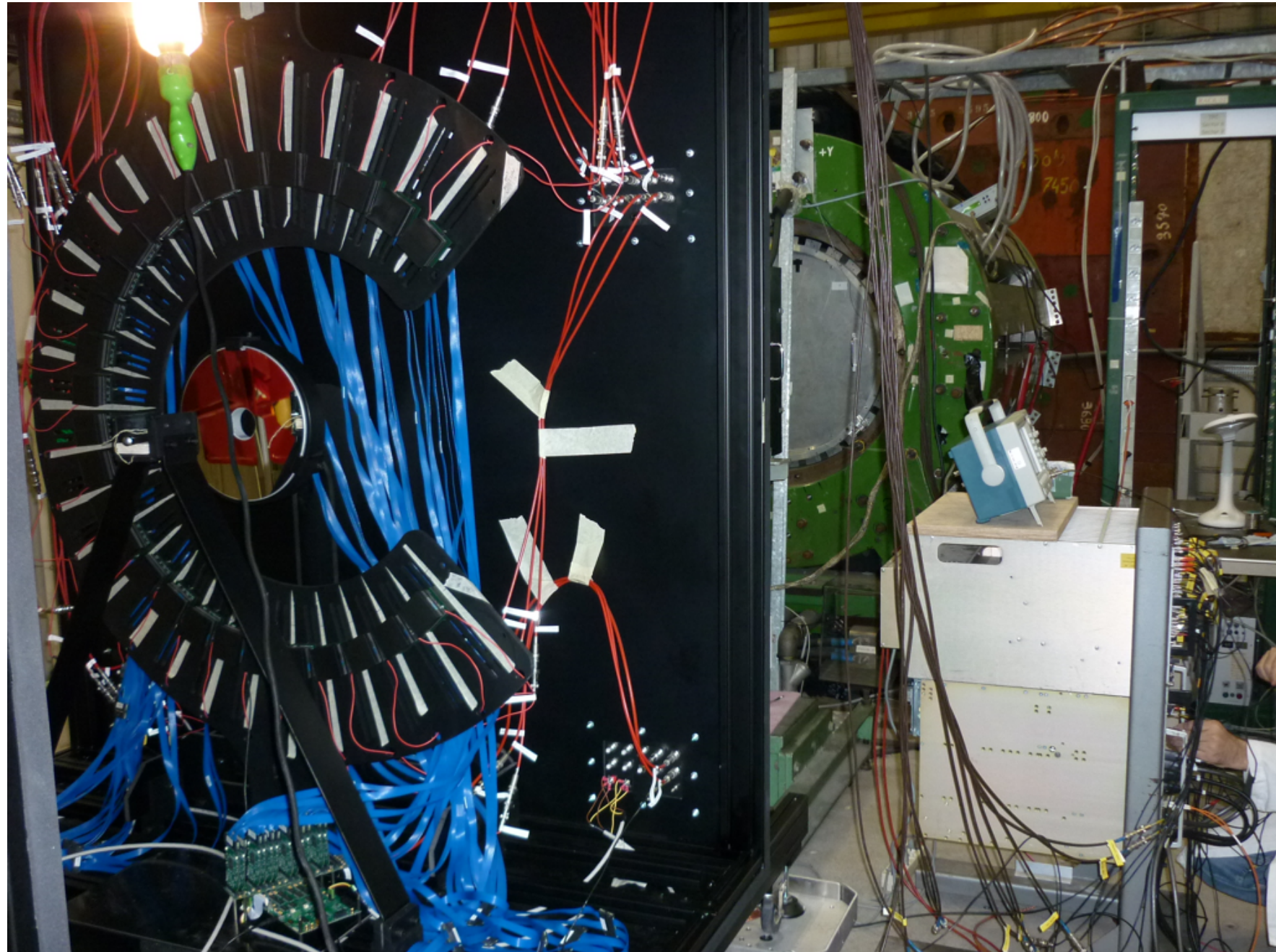
The PS East Area



The PS East Area



The PS East Area



Beam line for Schools -joint IPPOG-EPPCN meeting, 15 November 2013

Christoph Rembser

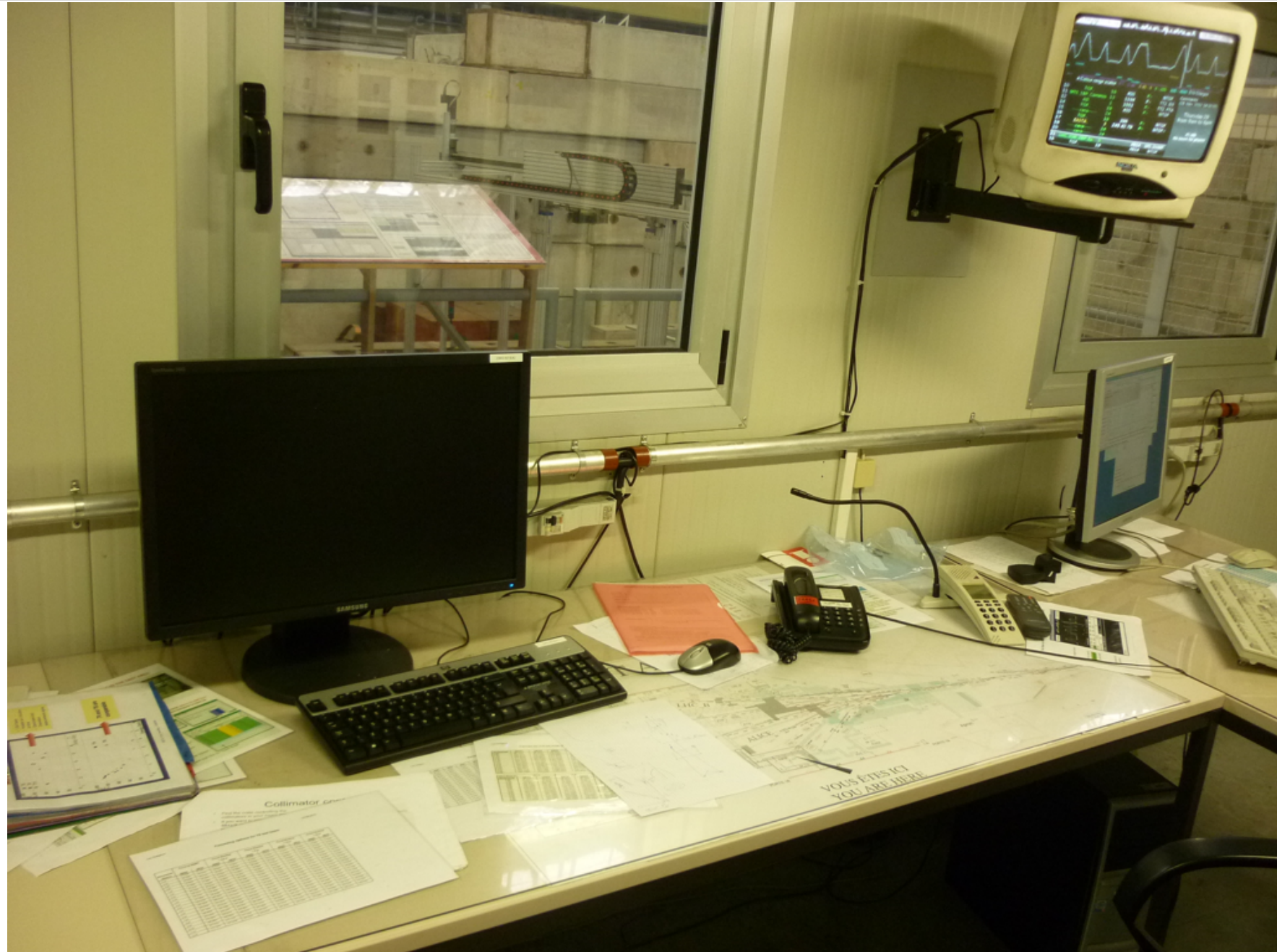
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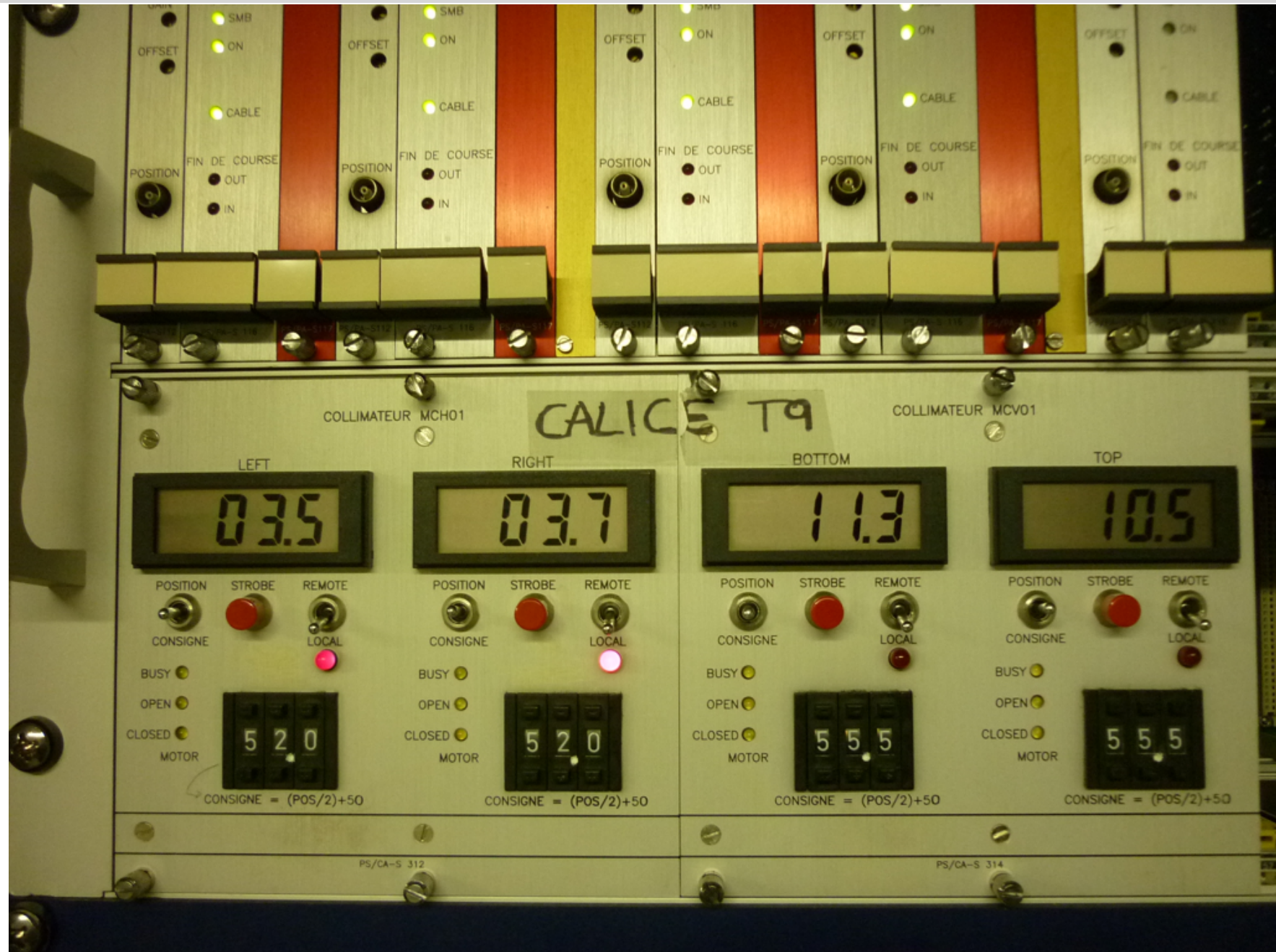
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