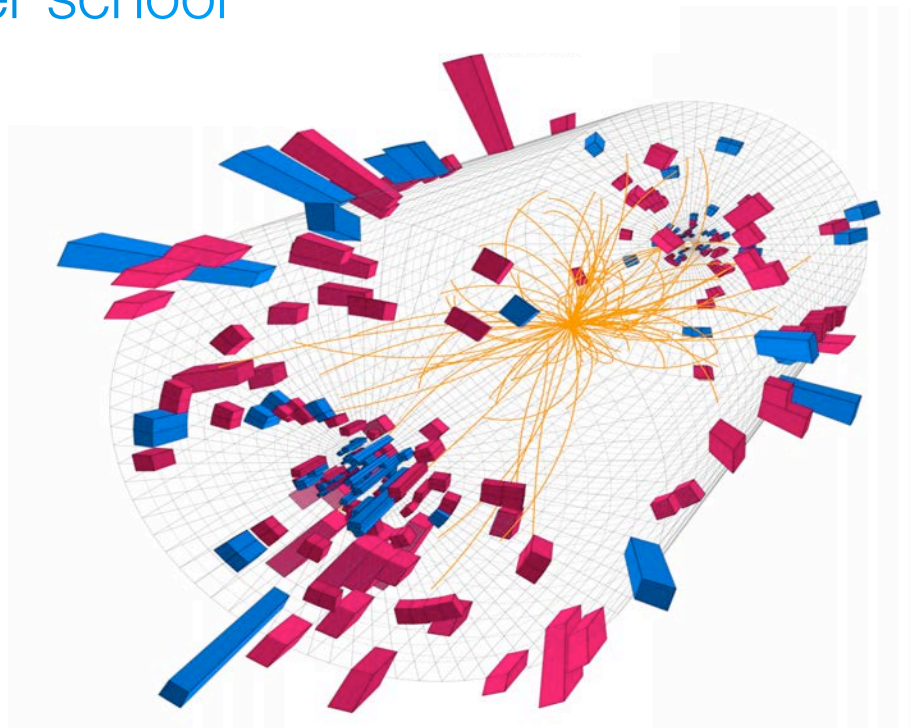


Knowledge Transfer at CERN

Norwegian mini-winter school

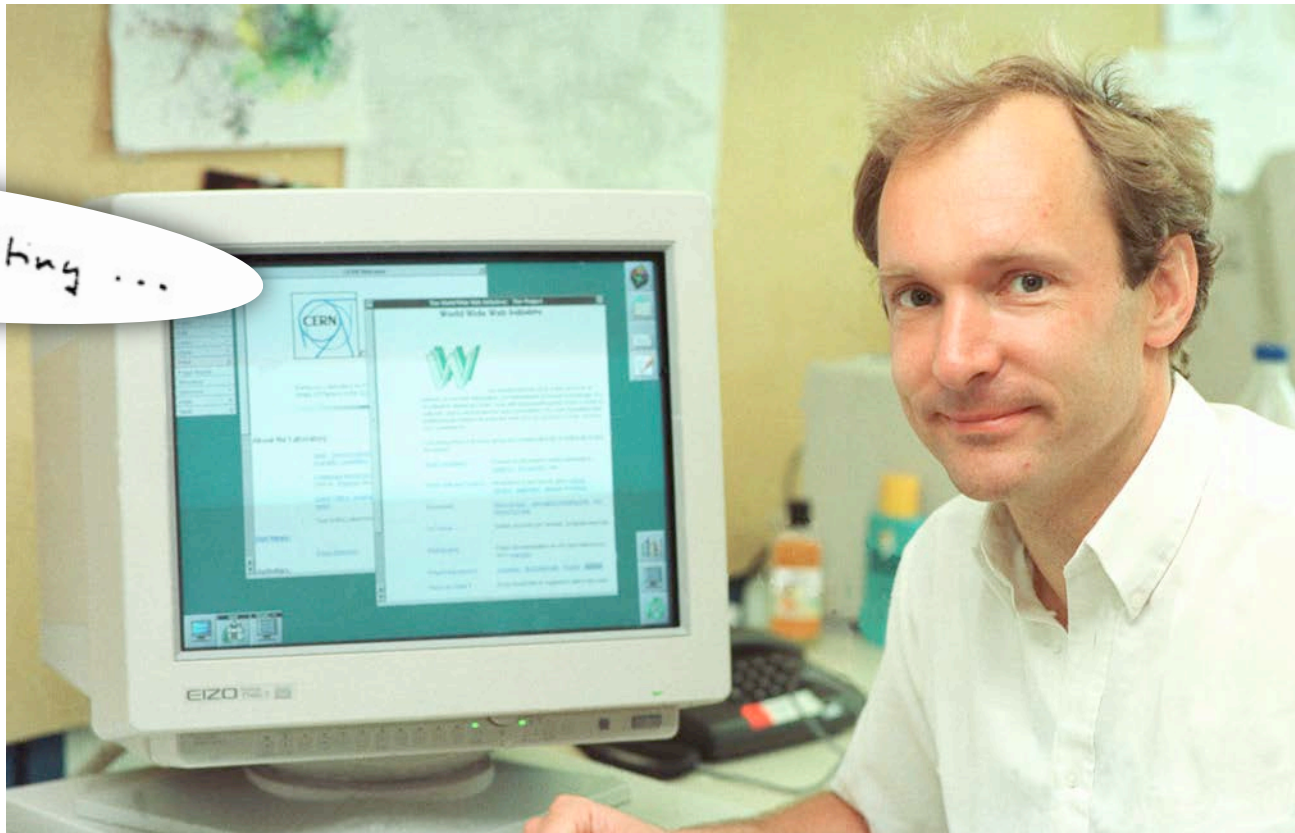
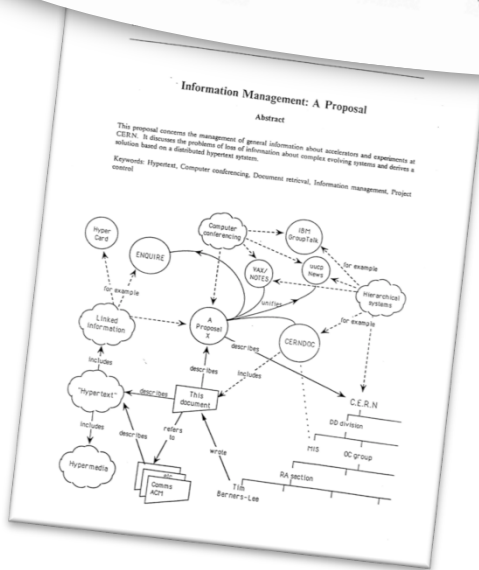


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The World Wide Web

Vague but exciting ...



KT Mission

Maximizing the technological and knowledge return to the Member States industry and society

Promoting CERN's image as a center of excellence for technology



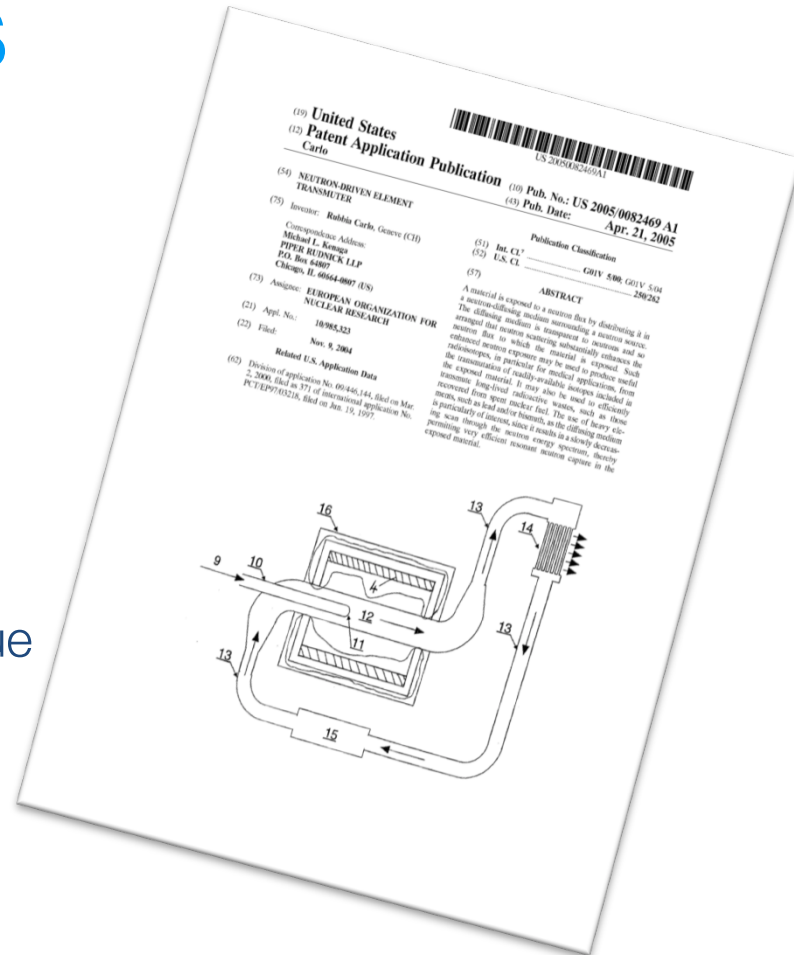
CERN and patents

Strategic motivation:

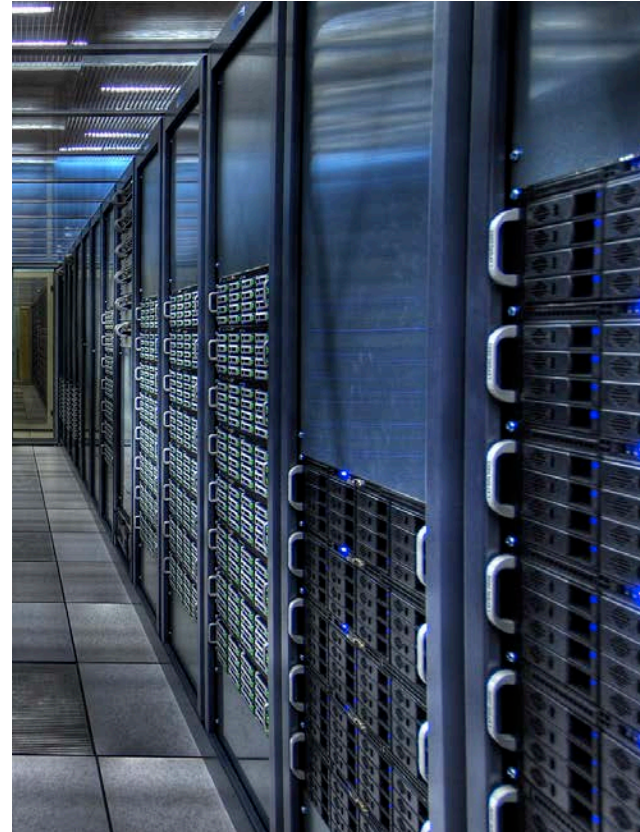
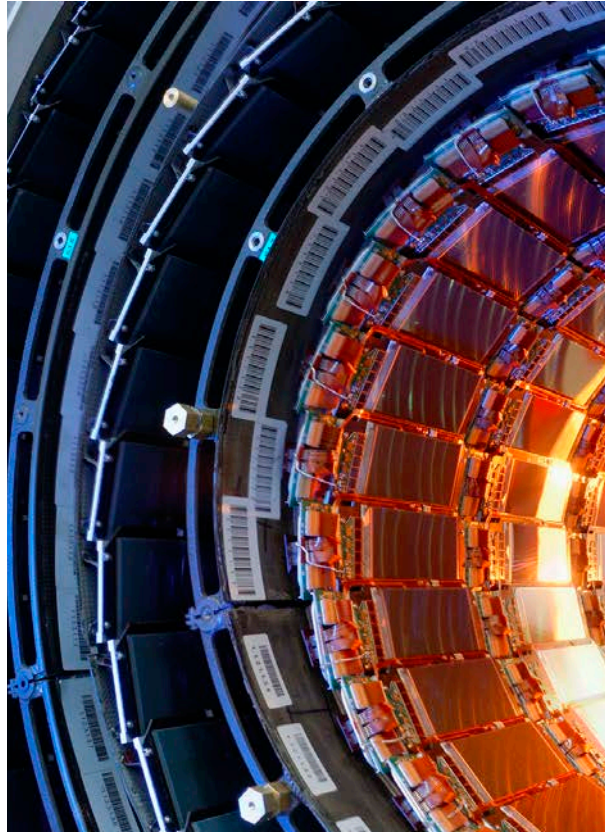
“Promote and enhance the image of the organization as a source of innovation and economic activities”

Patents are taken when it:

- Increases the probability of having the technology transferred
- Significantly enhances the commercial value
- Is needed to ensure recognition CERNs recognition as inventor



Key domains

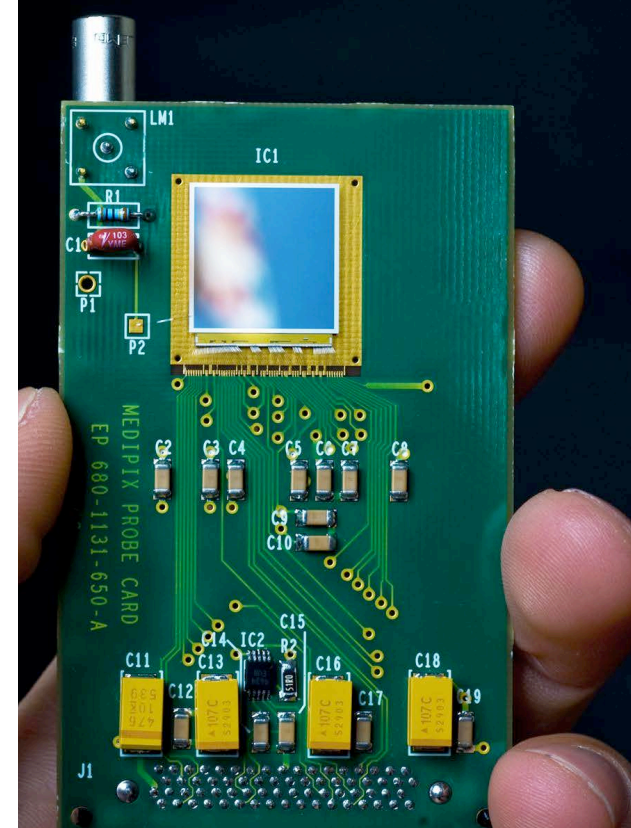
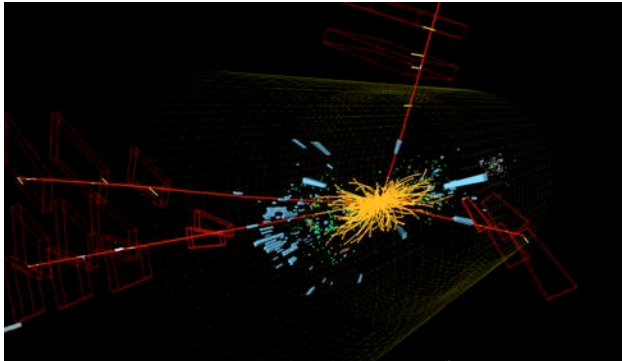


KT Modes

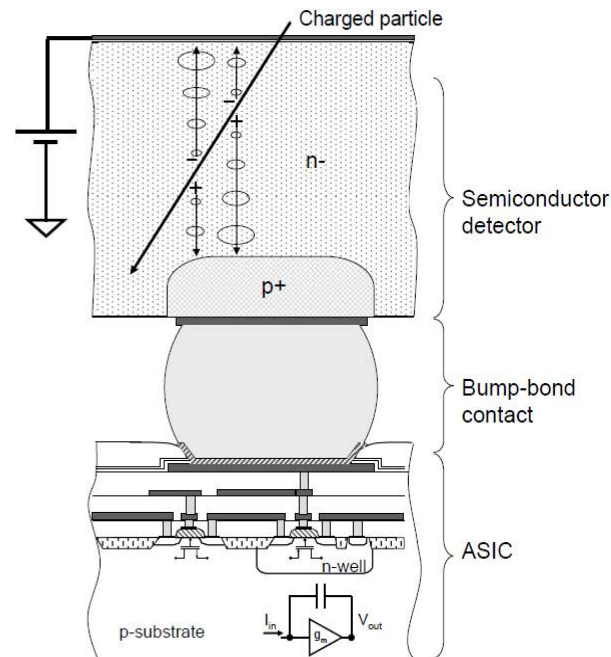
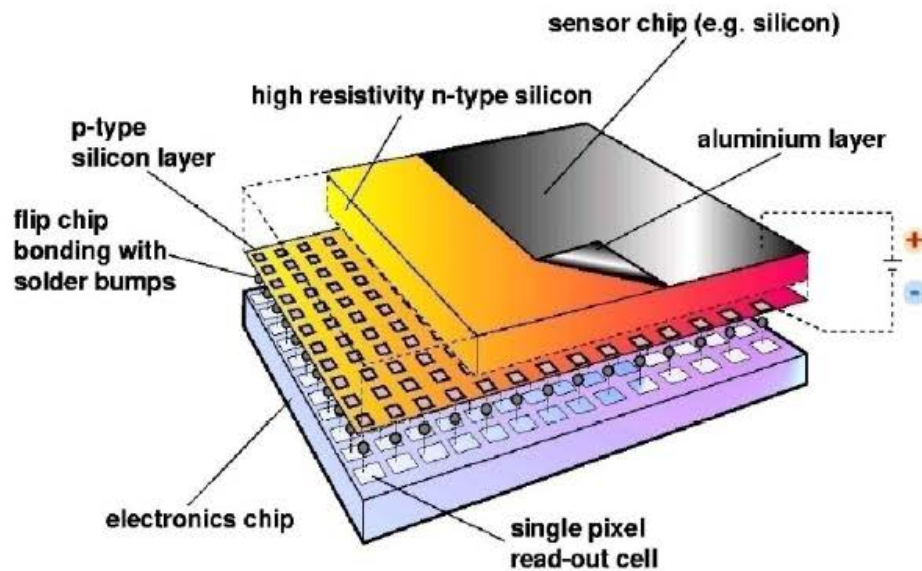
Licensing
Service and consultancy
R&D collaborations
Easy access IP

Open source software
Open hardware

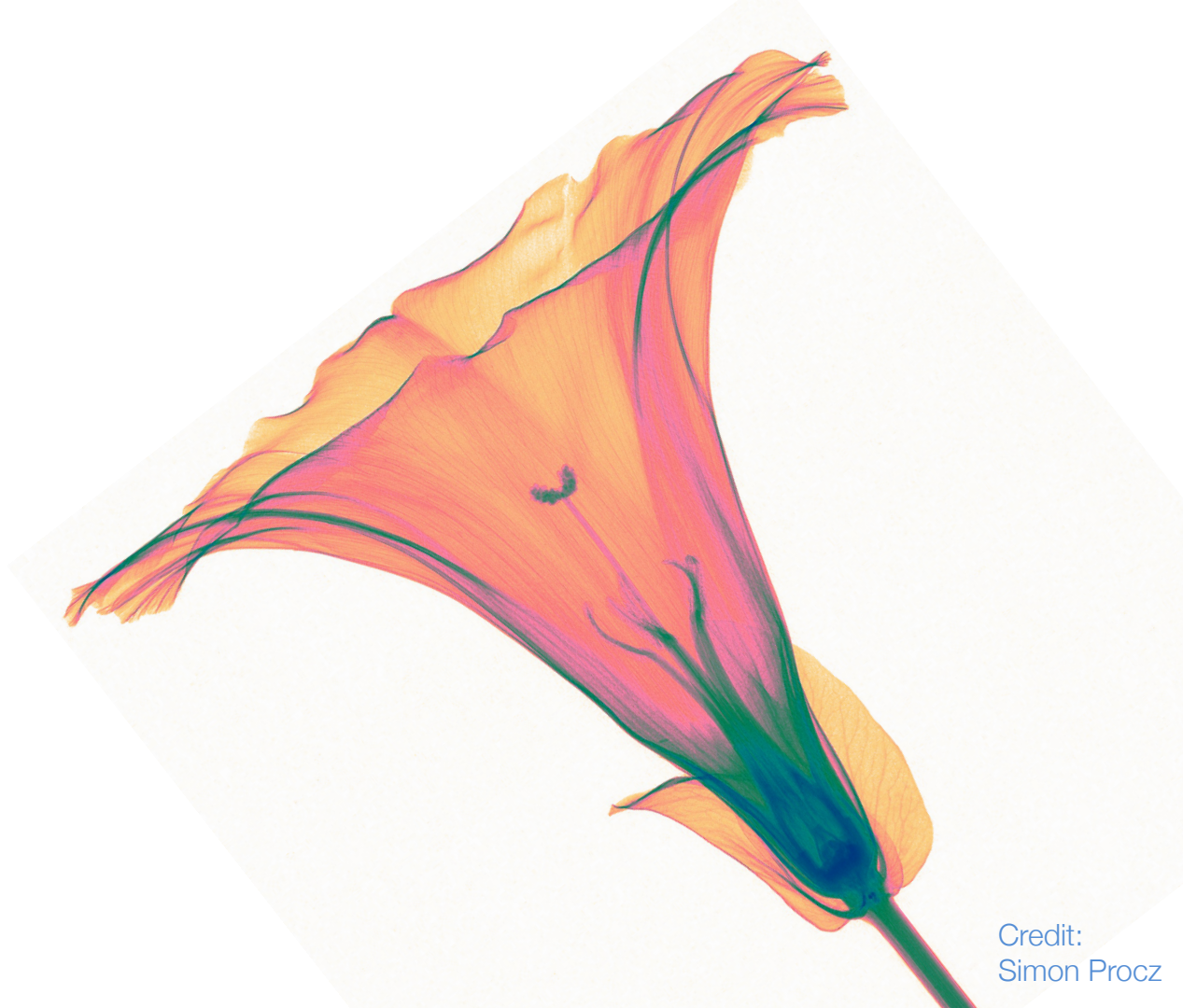
Procurement
Training
EU projects



Medipix



Medipix

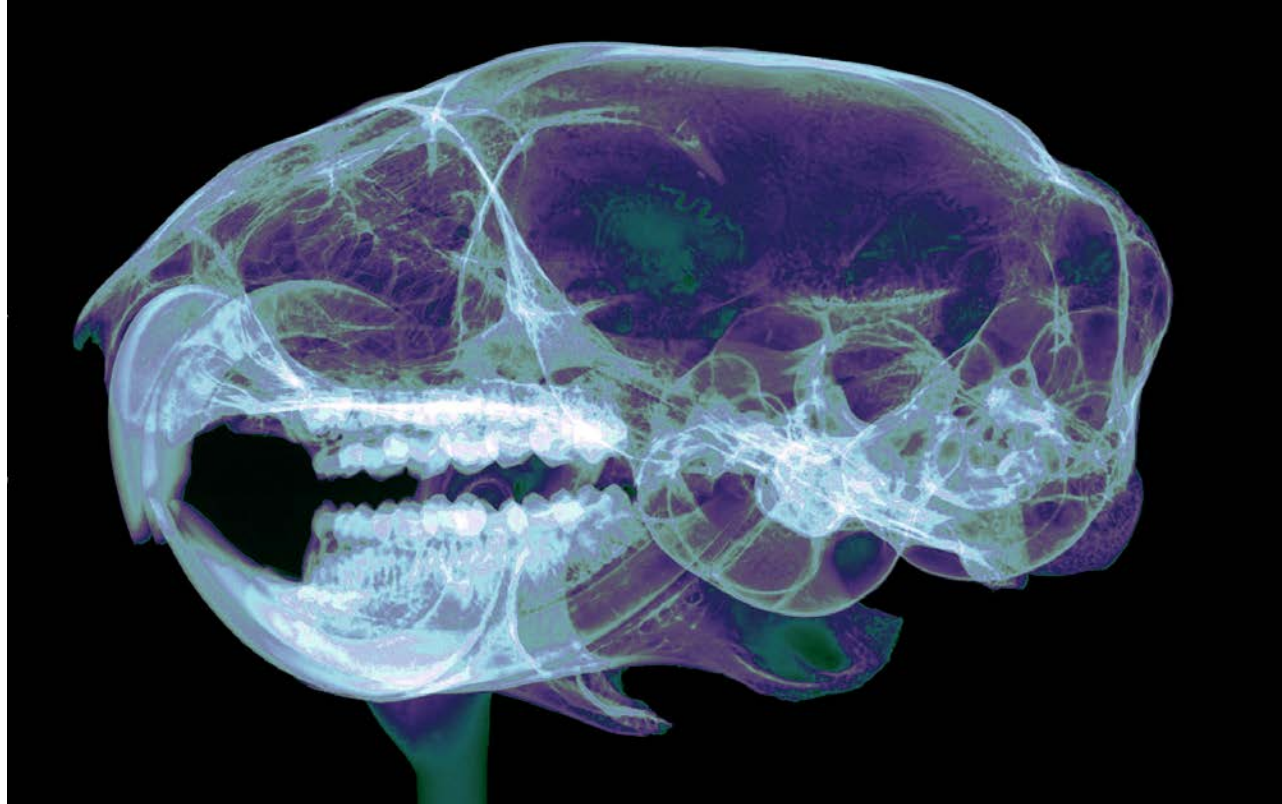


Credit:
Simon Procz

Application: X-Ray

Medical and
industrial X Ray
imaging

XRAY IMATEK, a
spin-off company
from IFAE, is selling
products and
services around the
Medipix2 and the
Timepix chips



Application: Material analysis

PANalytical is a Dutch company that develops and produces scientific instruments

Medipix is used in their range of for x-ray diffractometers



Application: Radiation monitoring

Medipix is used for radiation monitoring in space and

other types background radiation monitoring and dosimetry



Credit: NASA

Application: Research

Research applications:

- Synchrotron radiation
- Electron microscopy
- Detection of low energy particles

- Adaptive optics
- Neutron imaging
- and more



Application: Education

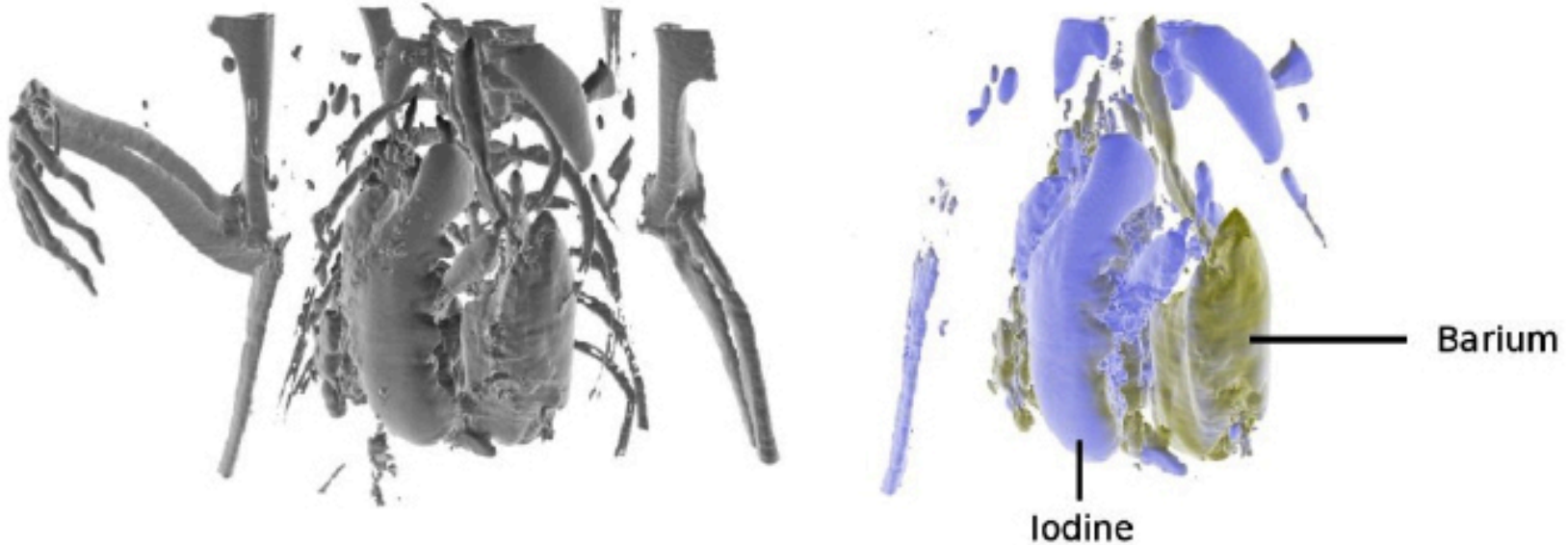
Medipix 2 technology used in an educational toolkit

Allows students to use a Timepix chip in the lab to visualise radiation

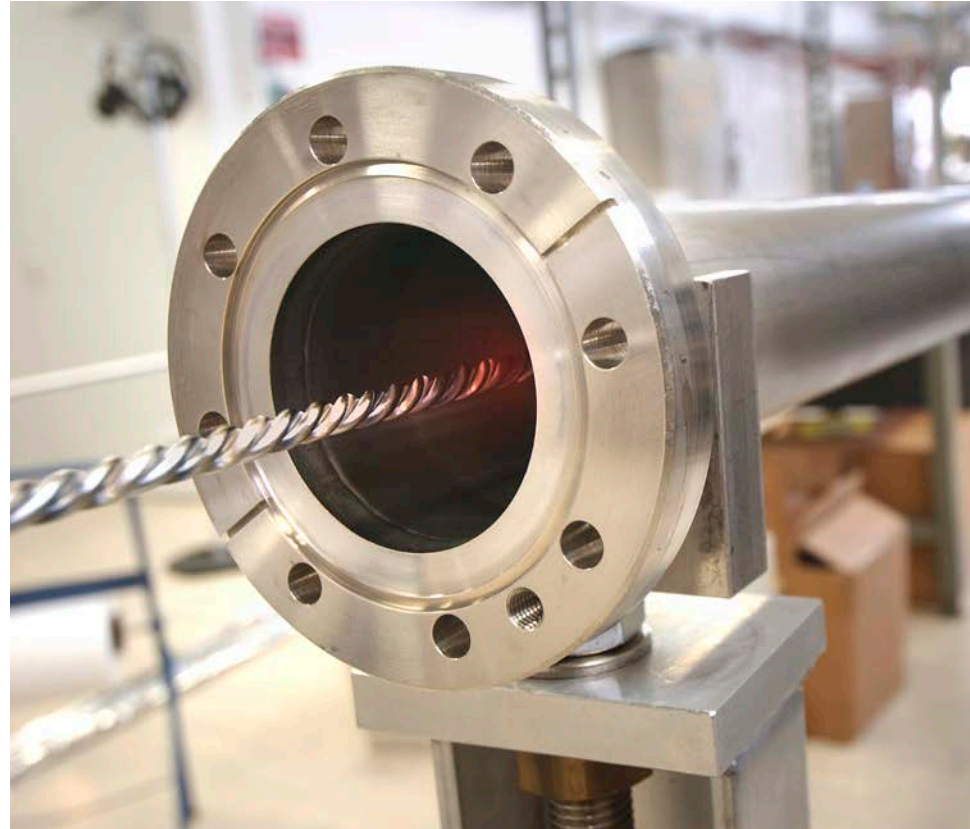
CERN has recently adopted this toolkit as part of its new SchoolLab



Application: Medical Imaging



Non-Evaporable Getter



Open Source

ROOT:

Finance

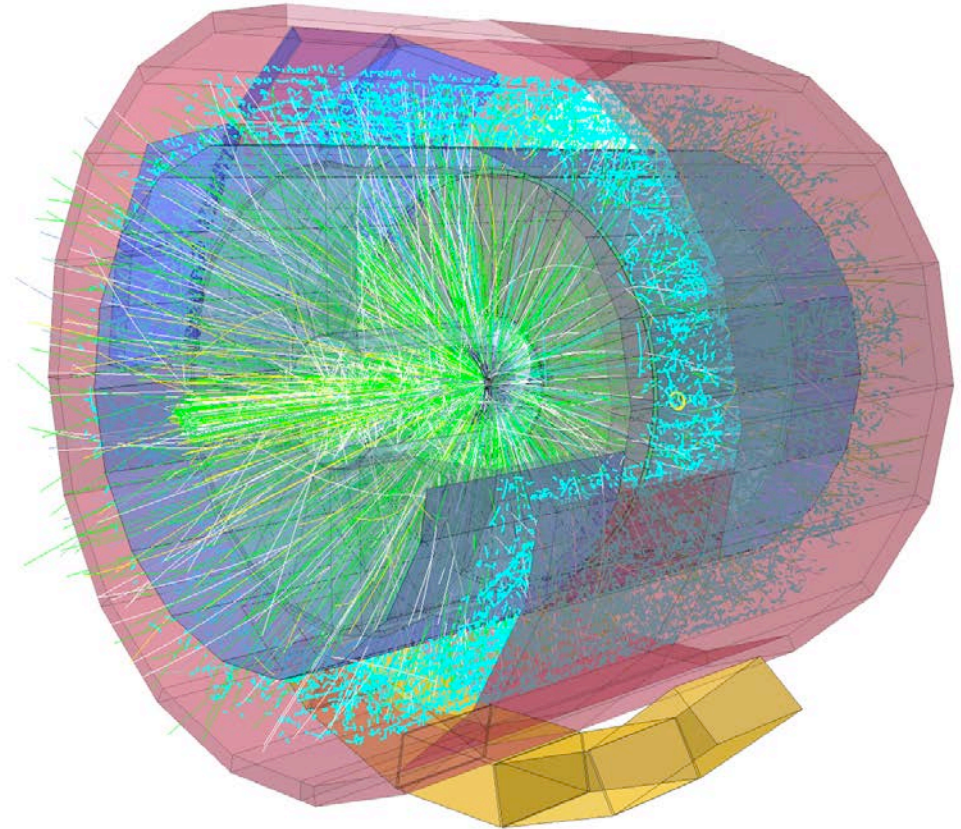
Insurance

Computing

Aerospace

Car manufacturing

...



TIND

INVENIO is a digital library or repository system, released open source

TIND Technologies are selling service, support and customization for the software



CERN Open Hardware License

Legal framework

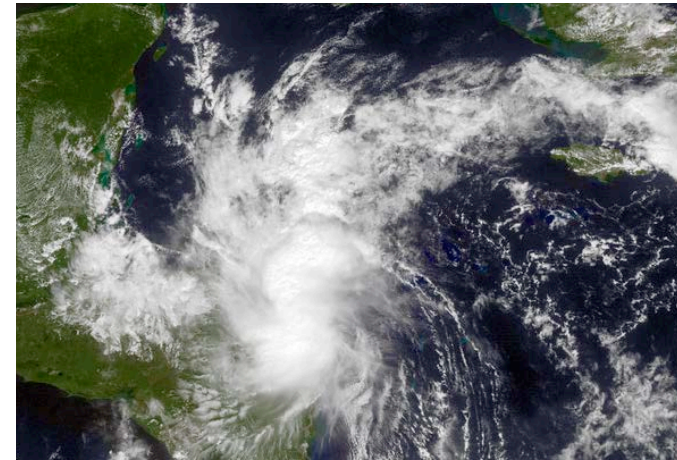
Electronic design community

Facilitate knowledge exchange

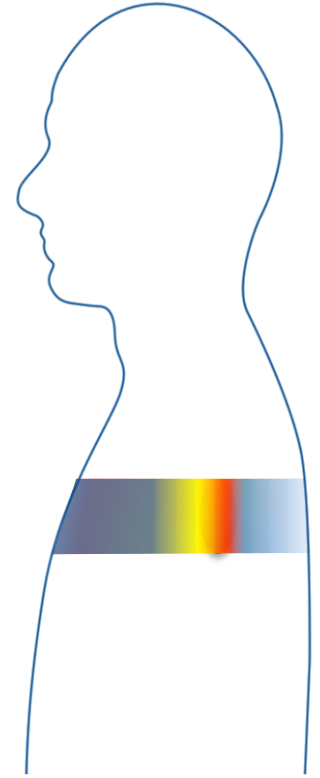
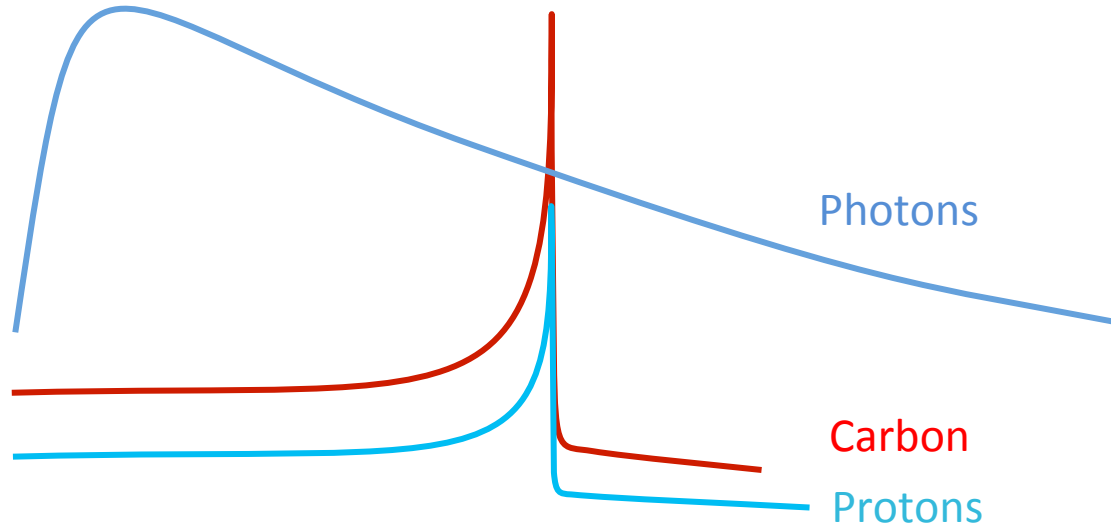
<http://ohwr.org/>



White Rabbit



Hadron Therapy





Medical Initiatives



Medical Accelerator Design

Biomedical Facility

Detectors for beam control
and medical imaging

Diagnostics and Dosimetry
for control of radiation

Radio-Isotopes (imaging
and treatment)

Large Scale Computing
(large data transfers and
analysis, treatment planning
and simulations)

Applications other than
cancer therapy



ICTR-PHE

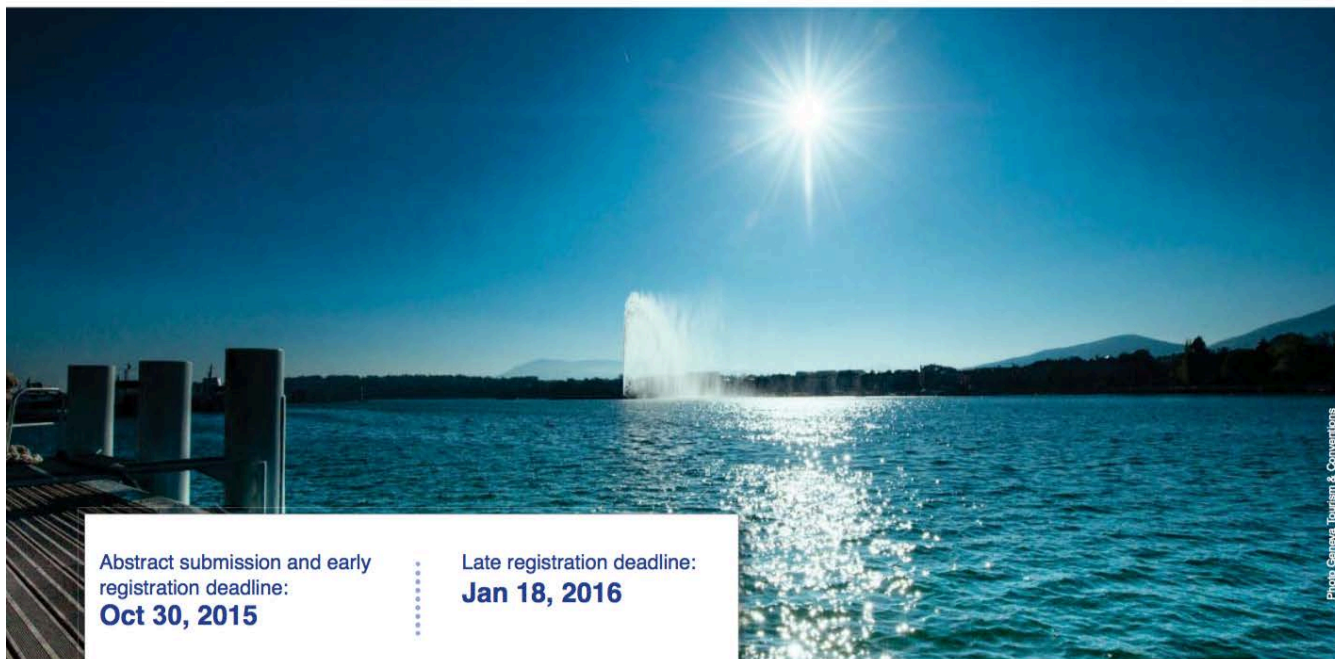


2016



INTERNATIONAL CONFERENCE ON TRANSLATIONAL RESEARCH IN RADIATION ONCOLOGY | PHYSICS FOR HEALTH IN EUROPE

February 15 – 19, 2016 CICG, Geneva, Switzerland



Abstract submission and early
registration deadline:
Oct 30, 2015

Late registration deadline:
Jan 18, 2016

Photo: Geneva Tourism & Conventions

CERN BIC Network

Established incubators:

UK – STFC-CERN BIC

Netherlands – NIKHEF-CERN BIC

Norway – NTNU BIC of CERN Technology

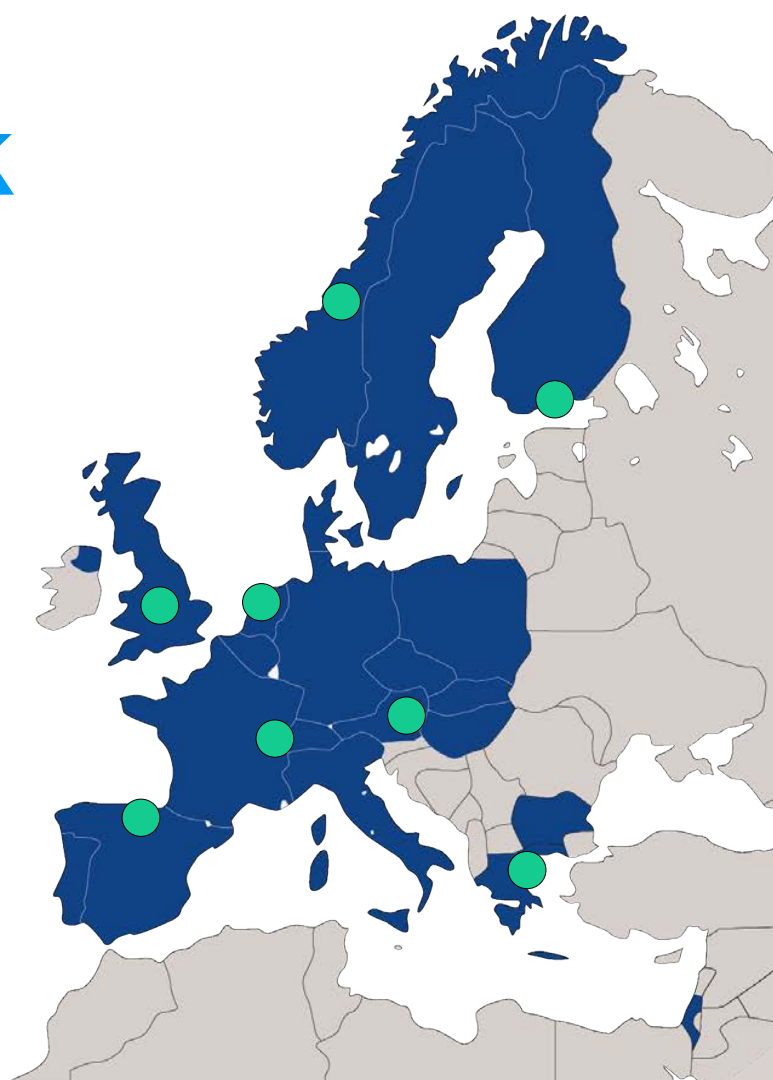
Greece – Technopolis BIC of CERN Technology

Austria – Austria BIC of CERN Technology

France – InnoGEX BIC of CERN Technology

Finland – Finnish BIC of CERN Technology

Spain – Spanish BIC of CERN Technology



KT through People

Every year, hundreds of students come to CERN to contribute to our research programs

An opportunity for young people to learn in a multicultural environment



CERN-NTNU Screening Week



KT Annual Report

Knowledge Transfer **2014**



Base-band tune measurement system (BBQ)

The magnets in the LHC have two main purposes: the first is to provide a horizontal deflecting force that will bend the particle trajectory around the ring and the second is to focus the particles to keep each particle 'tightly' within the LHC's vacuum chamber close to the designated path. Examples of magnets used for these two functions are dipoles and quadrupoles, respectively. The focusing involves horizontal and vertical oscillations - called betatron oscillations - in the movement of the particles around the design orbit. It is important to monitor these oscillations, if the beam is to be kept stable. This monitoring is normally performed through the measurement of a parameter called 'tune' - the number of complete betatron oscillations in one turn around the LHC. To avoid resonance conditions, the frequency of the betatron oscillations must not equal, or be an integer multiple of, the revolution frequency.

The 'BBQ' measurement system was developed to monitor the beam stability in the LHC. It measures the fractional part of the tune by observing the envelope of the amplitude variation due to betatron oscillations that occurs in a coded signal induced by the beam bunches in a beam position monitor. This system has been successfully transferred to other labs such as Brookhaven National Laboratory, Fermilab, and the National Center for Oncological Hadrontherapy. Applications are under investigation to use this system also to analyse mechanical vibration modes, ground motion or seismic signals.

Technical contact: Marie Gessier (Beam Department)

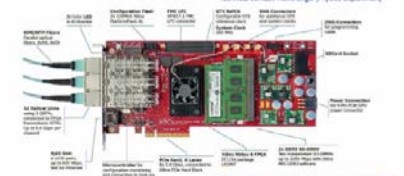


Base-band tune (BBQ) measurement system

Common readout-receiver card (C-RORC) for ALICE and ATLAS

The ALICE experiment uses custom FPGA-based computer plug-in cards to read out data from the front-end electronics of the detectors for the computer clusters of data acquisition (DAQ) and high-level trigger (HLT) subsystems. The previous cards for the DAQ and HLT were developed as independent products and are now facing common problems with obsolete major interfaces and limited test speeds. A new common card has been developed to enable the upgrade of the readout chain towards higher inclusivity while providing backwards compatibility with the current architecture. Furthermore, the ALICE experiment has comparable hardware requirements for the upgrade of its readout system and will use the newly developed common readout-receiver card. Owing to its flexibility, it could also be used in FPGA development kits that main FPGA manufacturers provide to their customers, and in advanced DAQ systems in general.

Technical contact: Heiko Engel (Physics Department)



Overview of the hardware components in the C-RORC card

Questions

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cern.ch/kt