

CERN Knowledge Transfer

Aplicações da Investigação em Física de Partículas



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Business Development

CERN Knowledge Transfer



09:00 → 12:30 Lectures

📍 503/1-001 - Council Chamber

09:00

Impacto no Brasil destes programas / Portuguese Language Teachers Programmes: Impact in Brazil

🕒 1h

Nilson Garcia foi o primeiro coordenador da participação de professores brasileiros nestes programas e irá falar-nos do respetivo impacto / was the first coordinator of the participation of teachers from Brazil in these programmes and will speak about its corresponding impact

Speaker: Prof. Nilson Garcia (UTFPR)

10:00

Pausa para respirar / Breathing break

🕒 30m

10:30

Aplicações médicas da Física de Partículas / Medical Applications of Particle Physics

🕒 1h

Pedro Abreu irá falar-nos de algumas aplicações médicas em física de partículas, em particular a terapia com partículas eletricamente carregadas / will speak about medical applications of particle physics, in particular about cancer therapy with charged particles

Speaker: Pedro Abreu (LIP - Laboratório de Instrumentação e Física Experimental de Partículas (PT))

11:30

Física em ATLAS / ATLAS Physics

🕒 1h

Ana Peixoto irá falar sobre a experiência ATLAS e os seus resultados de física / will talk about the ATLAS Experiment and its physics results

Speaker: Ana Peixoto (LPSC/CNRS (Grenoble, FR))

12:30 → 14:00

Lunch break

🕒 1h 30m

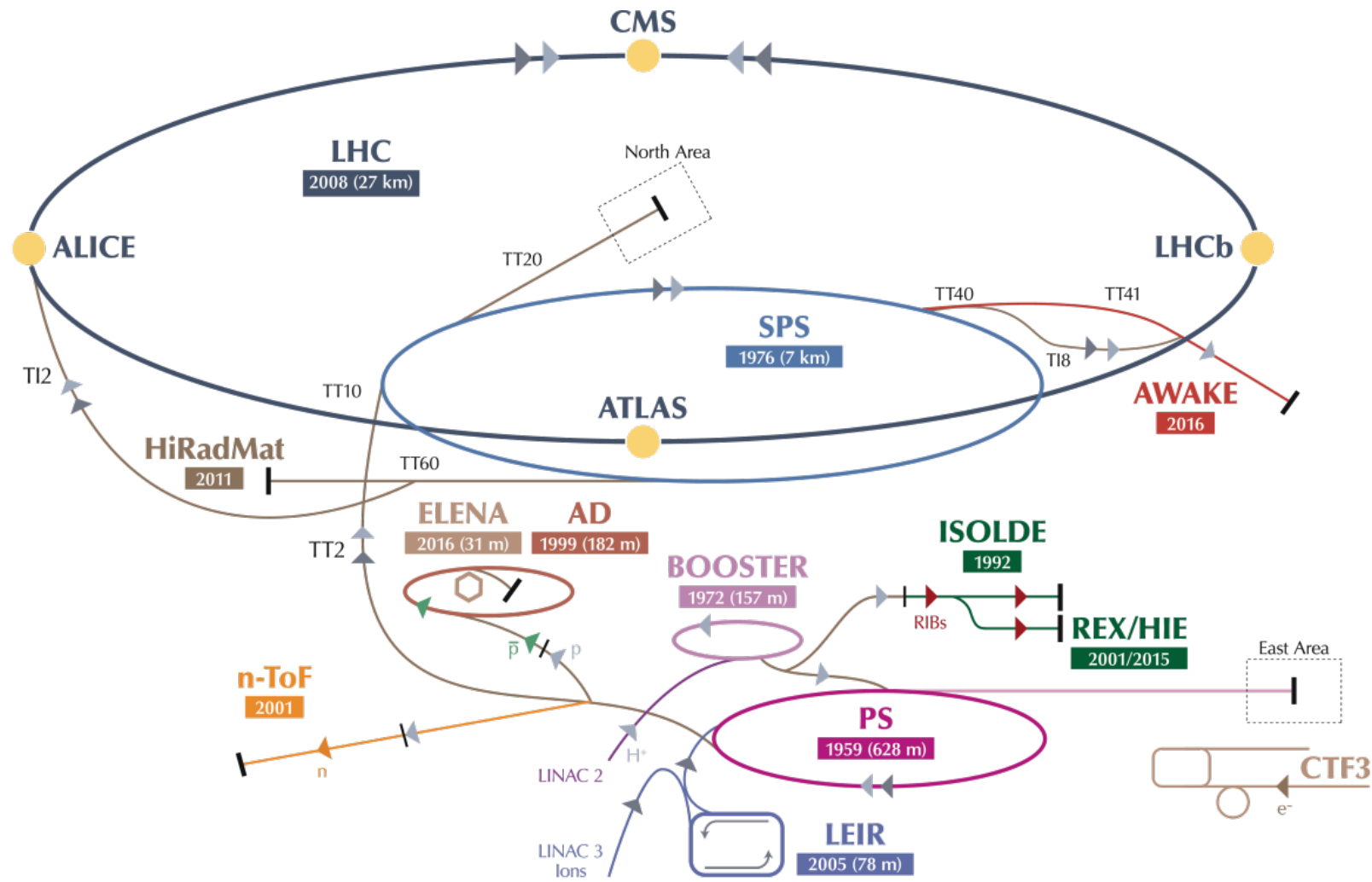
14:00 → 17:30

Mãos na massa / Hands-on particles

📍 222/R-001

Sessão prática de análises de dados (atividades das Masterclasses) / Data analyses and activities (Masterclasses)





▶ p (protons) ▶ ions ▶ RIBs (Radioactive Ion Beams) ▶ n (neutrons) ▶ \bar{p} (antiprotons) ▶ e^- (electrons) ▶ \leftrightarrow proton/antiproton conversion ▶ \leftrightarrow proton/RIB conversion

LHC Large Hadron Collider SPS Super Proton Synchrotron PS Proton Synchrotron AD Antiproton Decelerator CTF3 Clic Test Facility
 AWAKE Advanced WAKEfield Experiment ISOLDE Isotope Separator OnLine REX/HIE Radioactive EXperiment/High Intensity and Energy ISOLDE
 LEIR Low Energy Ion Ring LINAC LINear ACcelerator n-ToF Neutrons Time Of Flight HiRadMat High-Radiation to Materials

CERN's mission

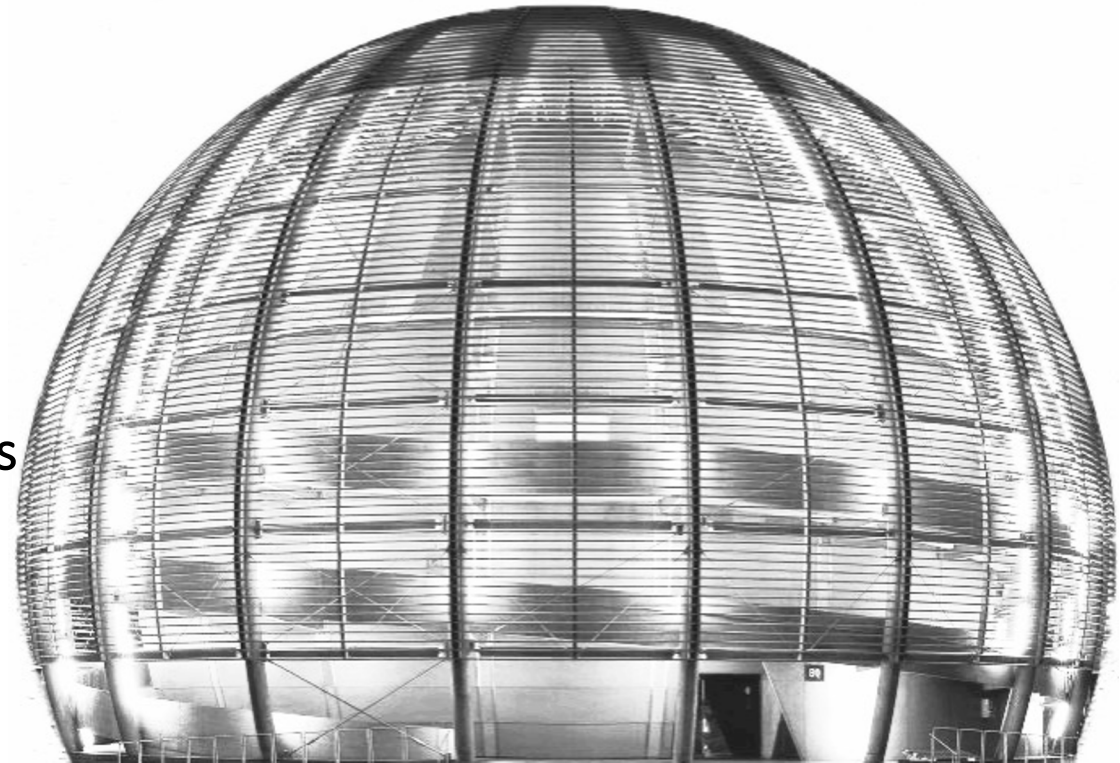
- **Push back the frontiers of knowledge**

E.g. the secrets of the Big Bang ...what was the matter like within the first moments of the Universe's existence?

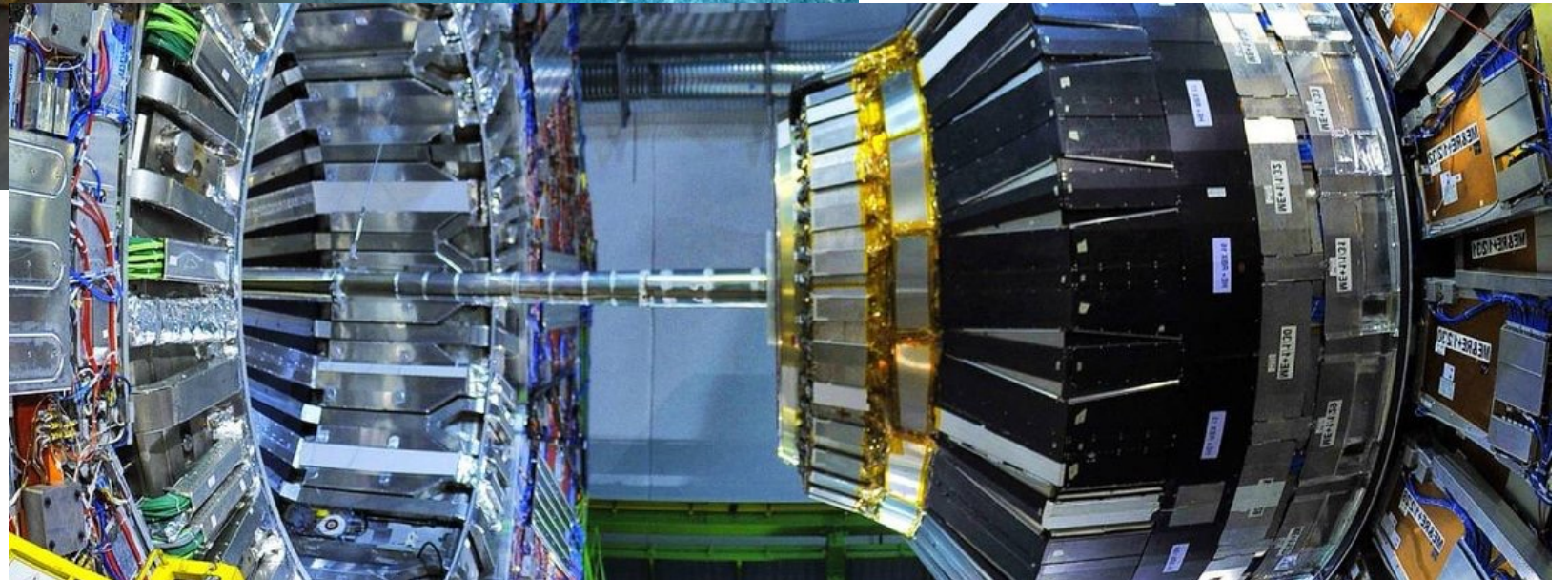
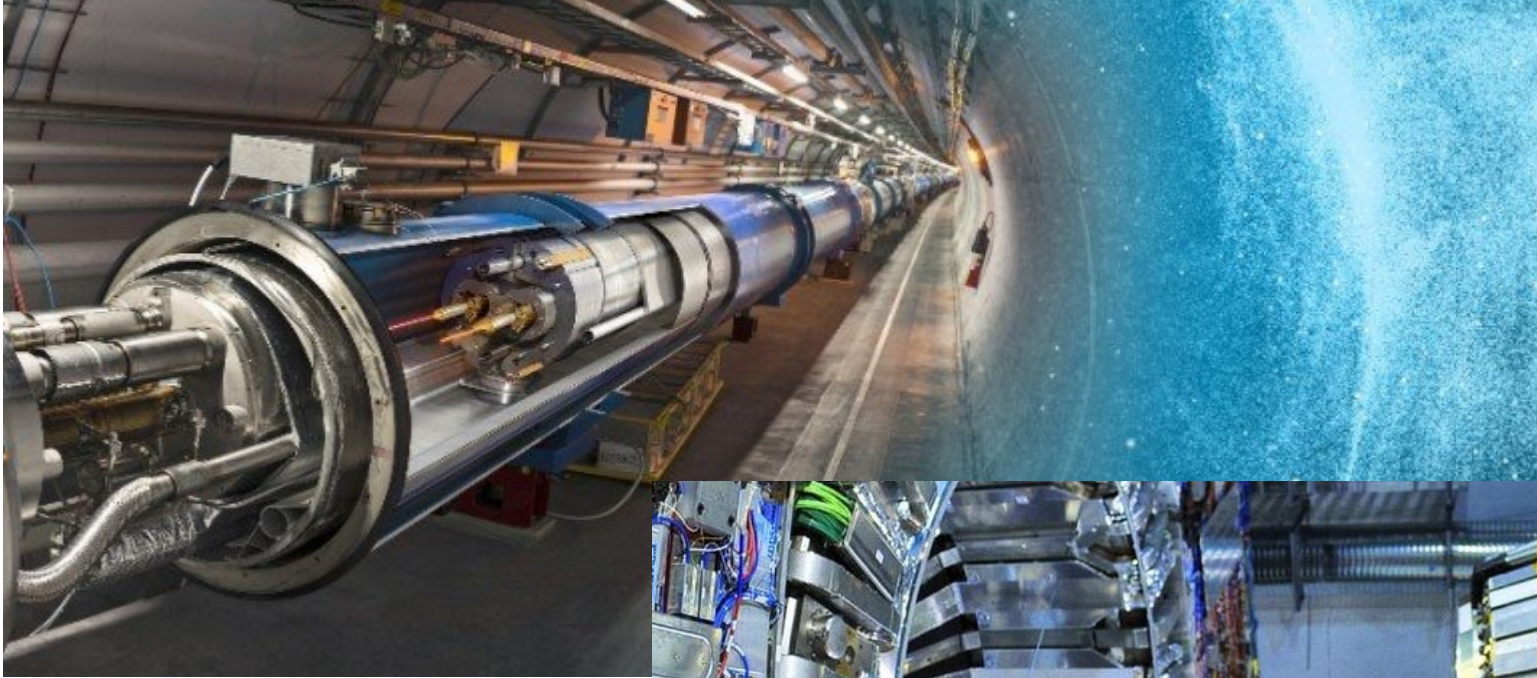
- **Develop new technologies for accelerators and detectors**

E. g. Information technology - the Web and the GRID;
Medicine - diagnosis and therapy

- **Train scientists and engineers of tomorrow**
- **Unite people from different countries and cultures**



How can CERN impact our lives?





Expertise and technology from designing, building and operating one of the most complex machines on earth.

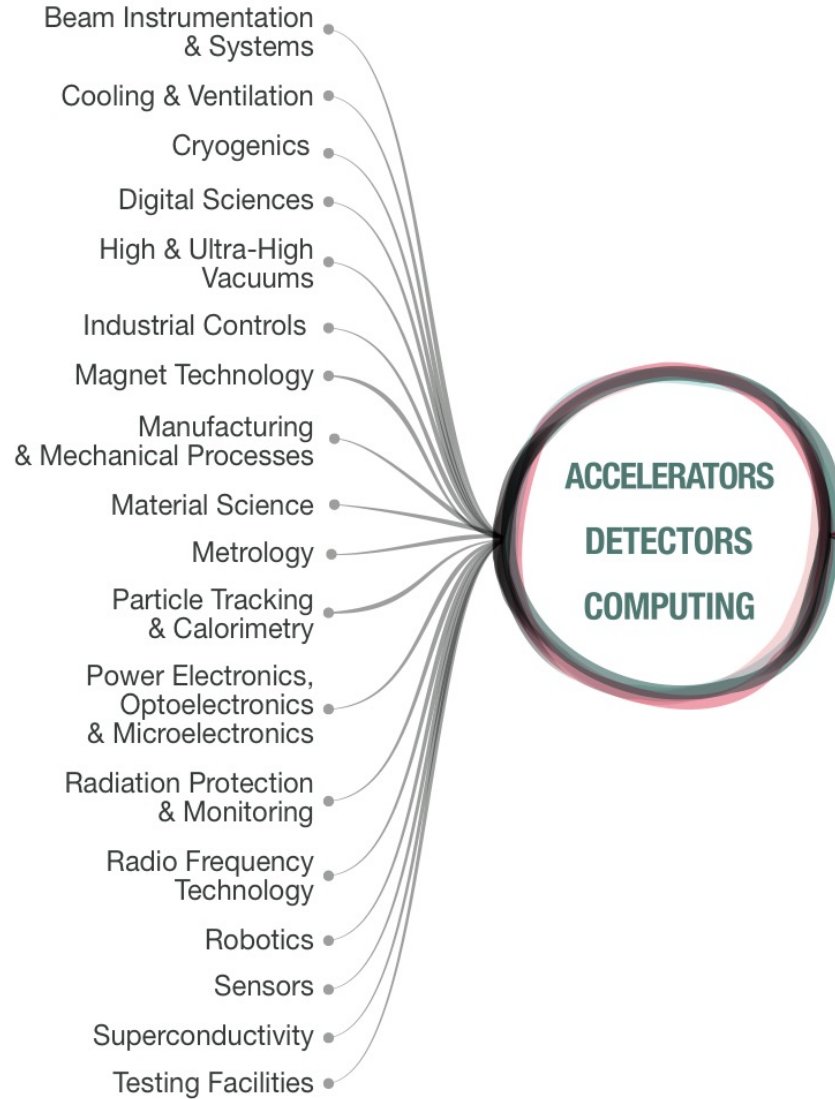


Expertise and technology in digital sciences,
very large volume data management,
advanced data analytics and visualisation.

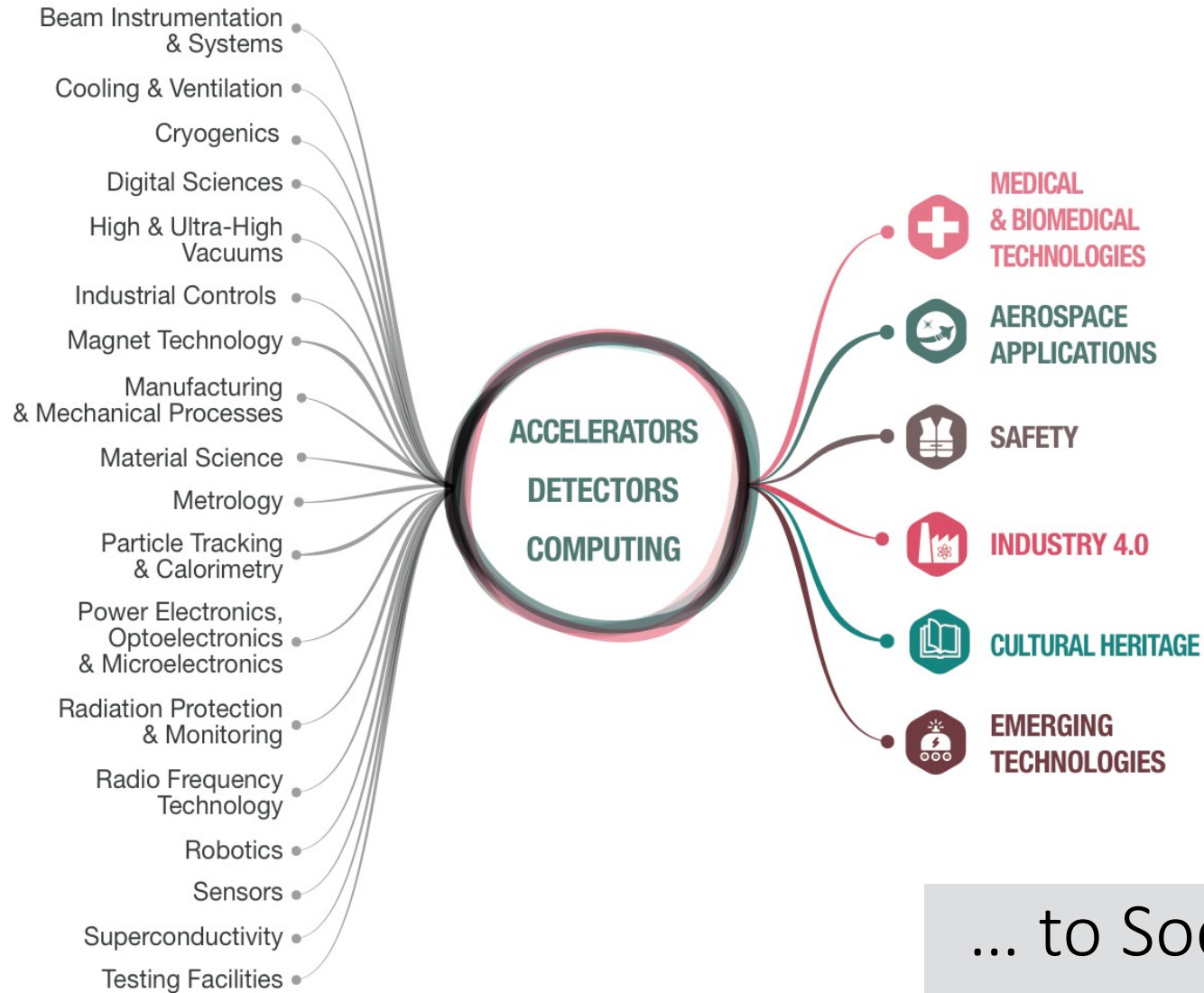
From CERN Technologies ...



From CERN Technologies ...

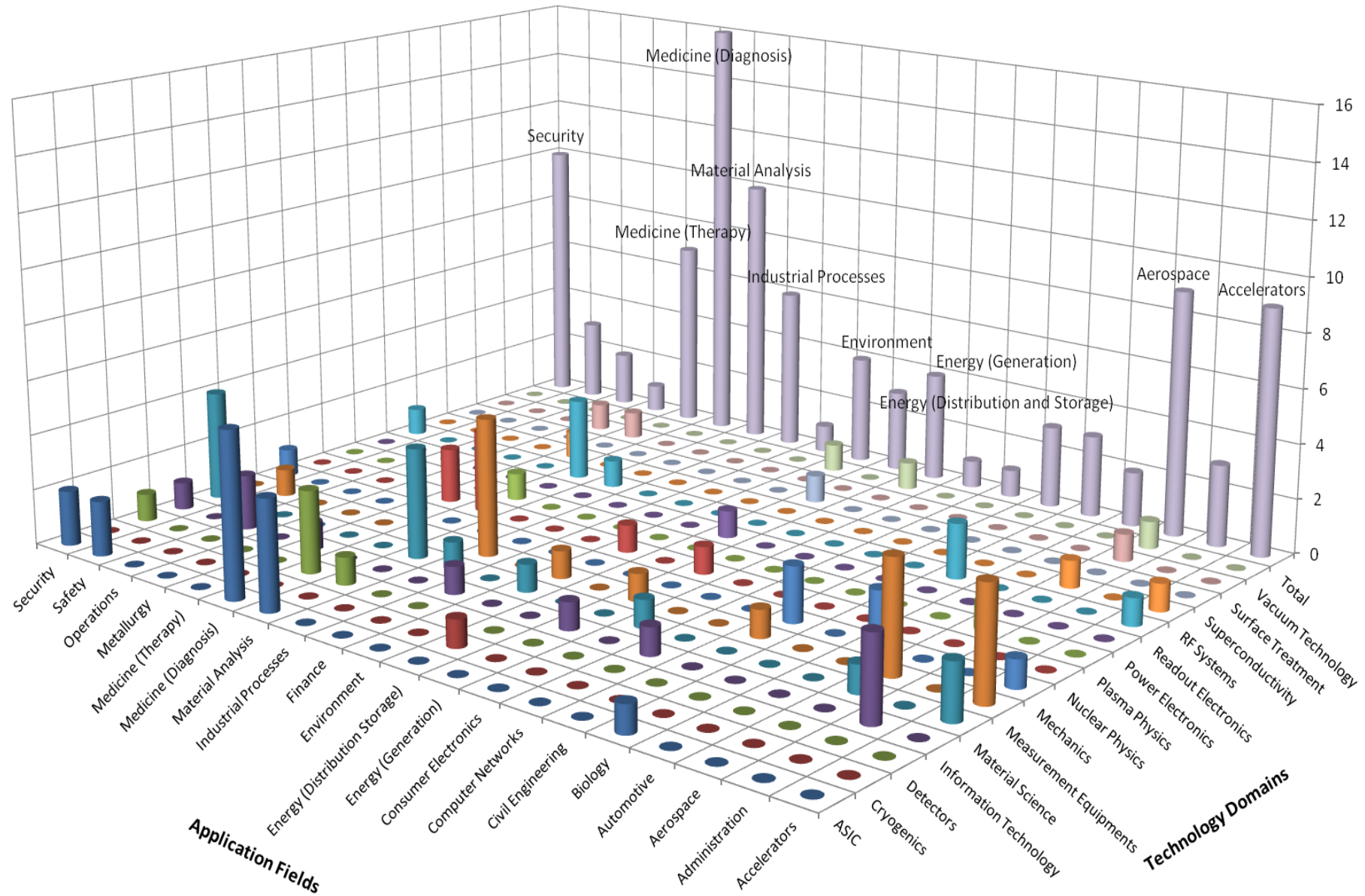


From CERN Technologies ...



... to Society

Technology Portfolio

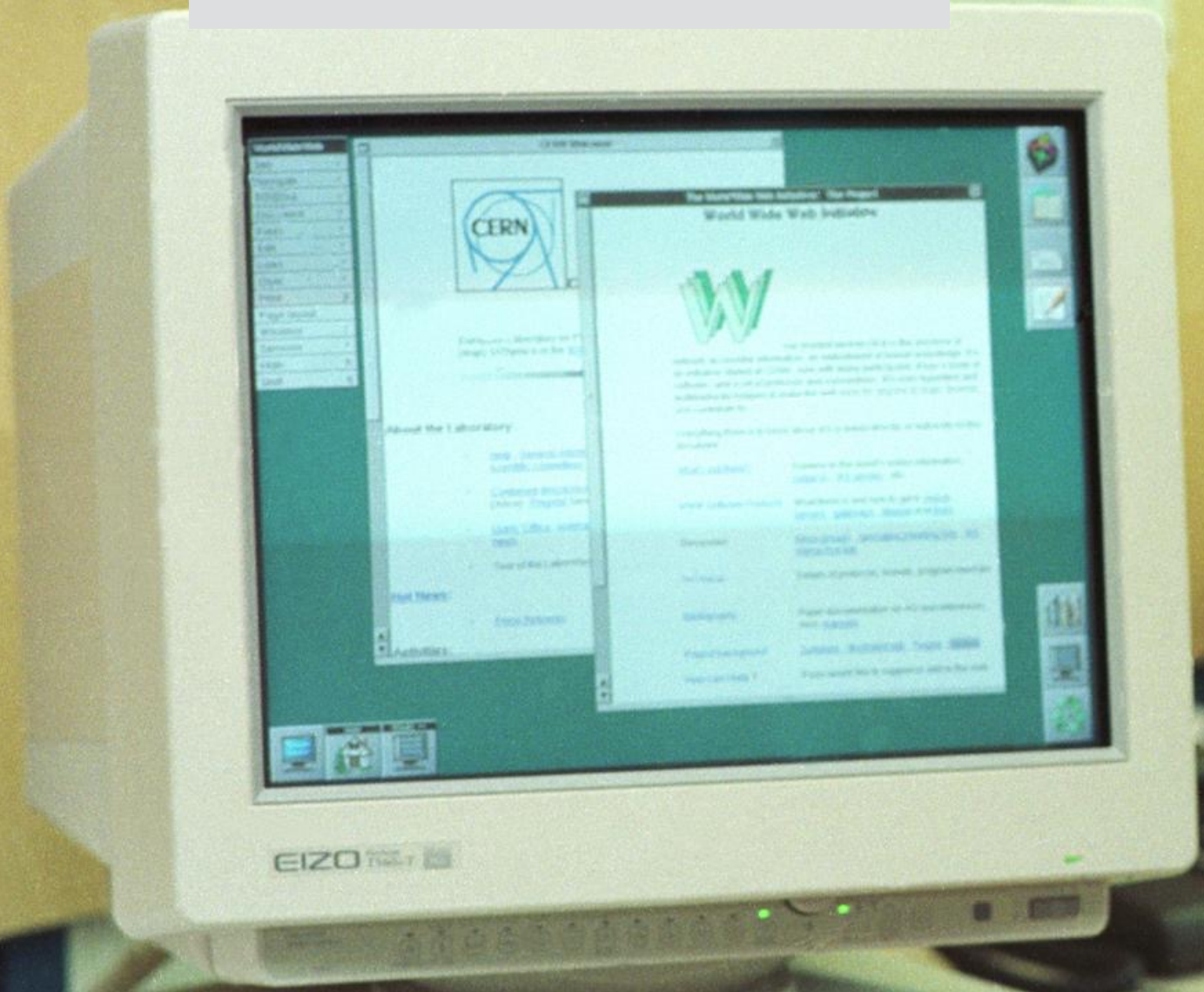




The **mission** of the CERN
Knowledge Transfer group is to
maximise the global positive
impact of CERN on **society**



The World Wide Web - born at CERN






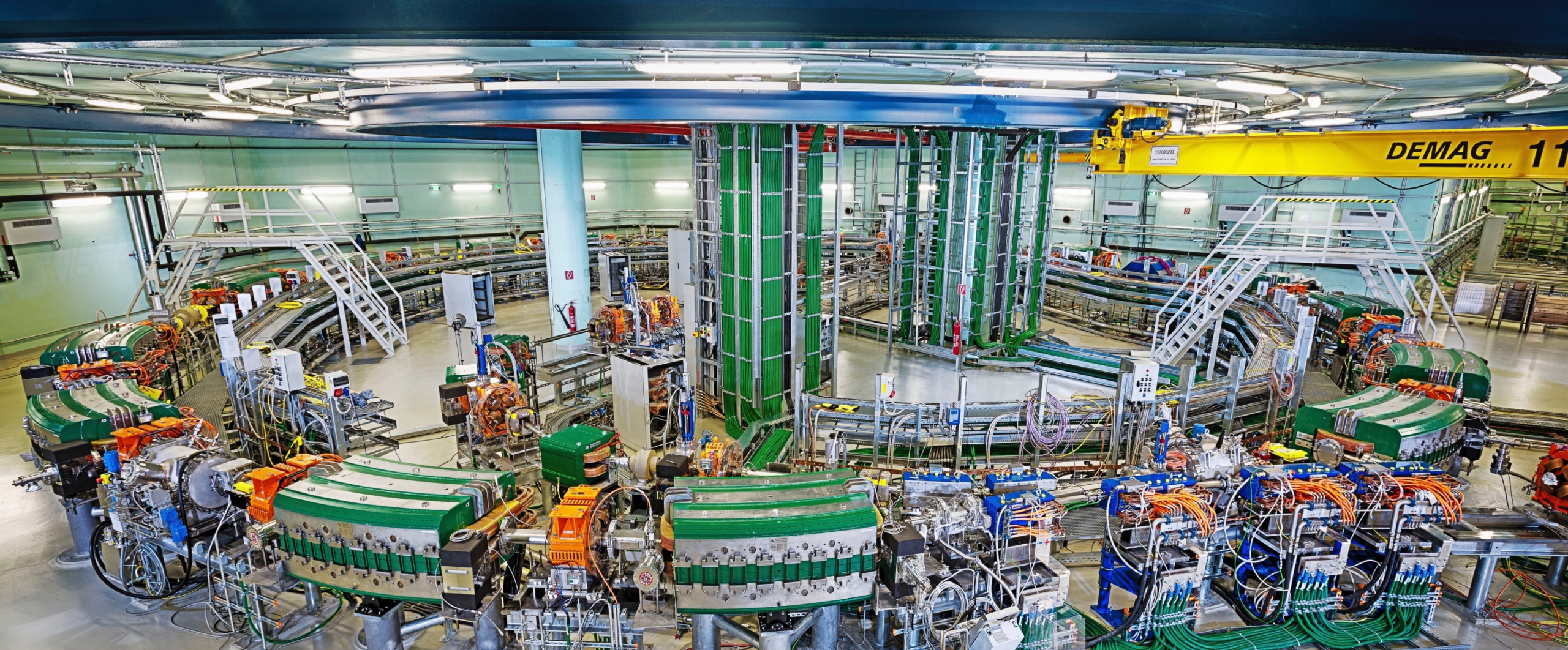
Trackball with optical encoders, used later in the mouse of a PC...

The first touchscreen to exist was at CERN



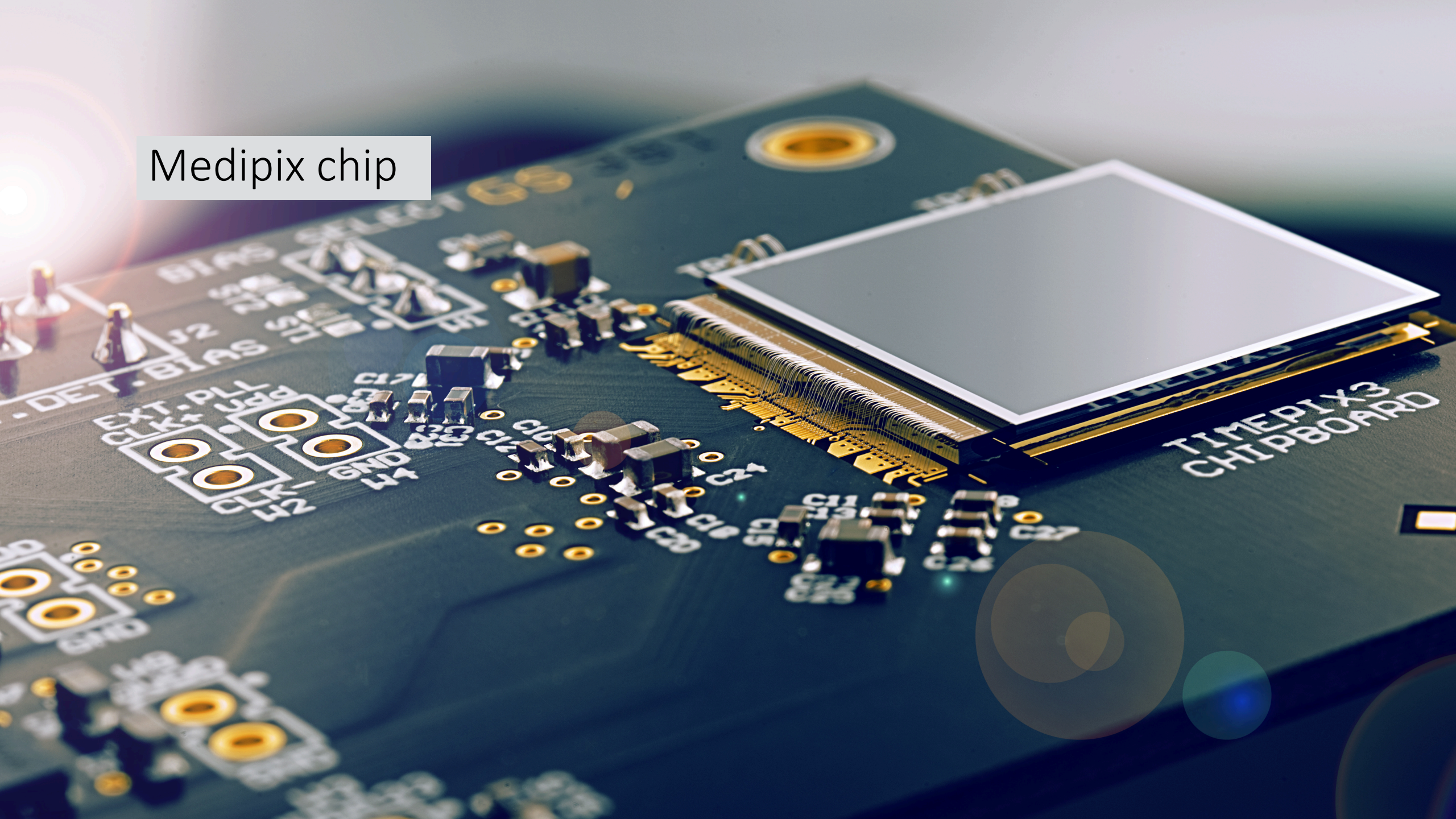


MedAustron started patient treatments in December 2016...



...and is using a lot of CERN technology for its proton acceleration

Medipix chip

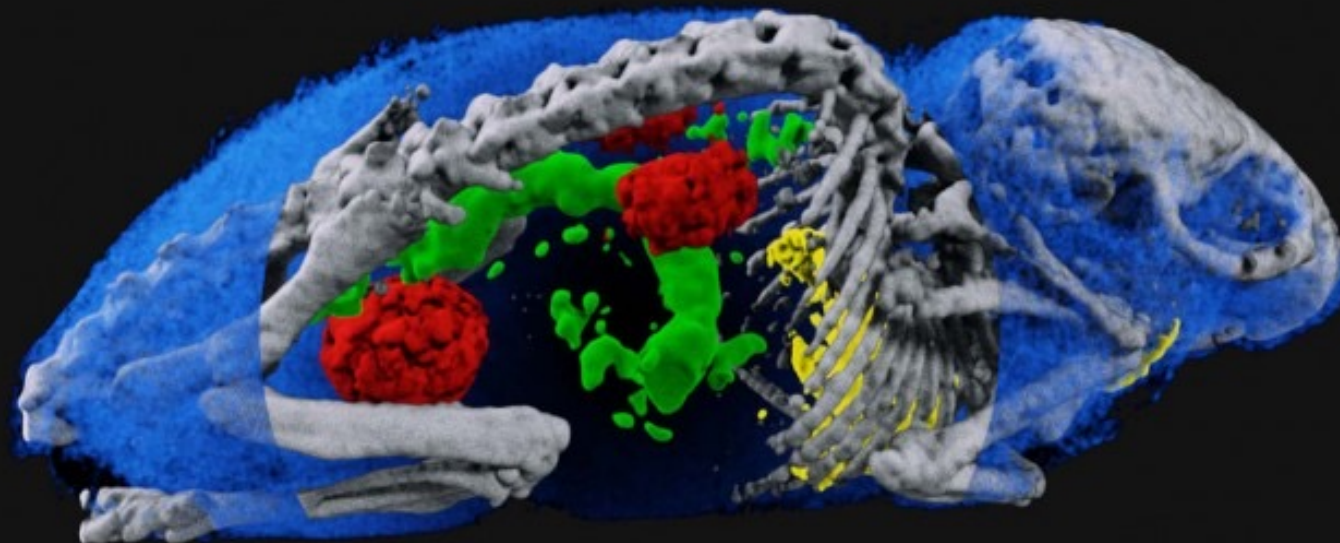


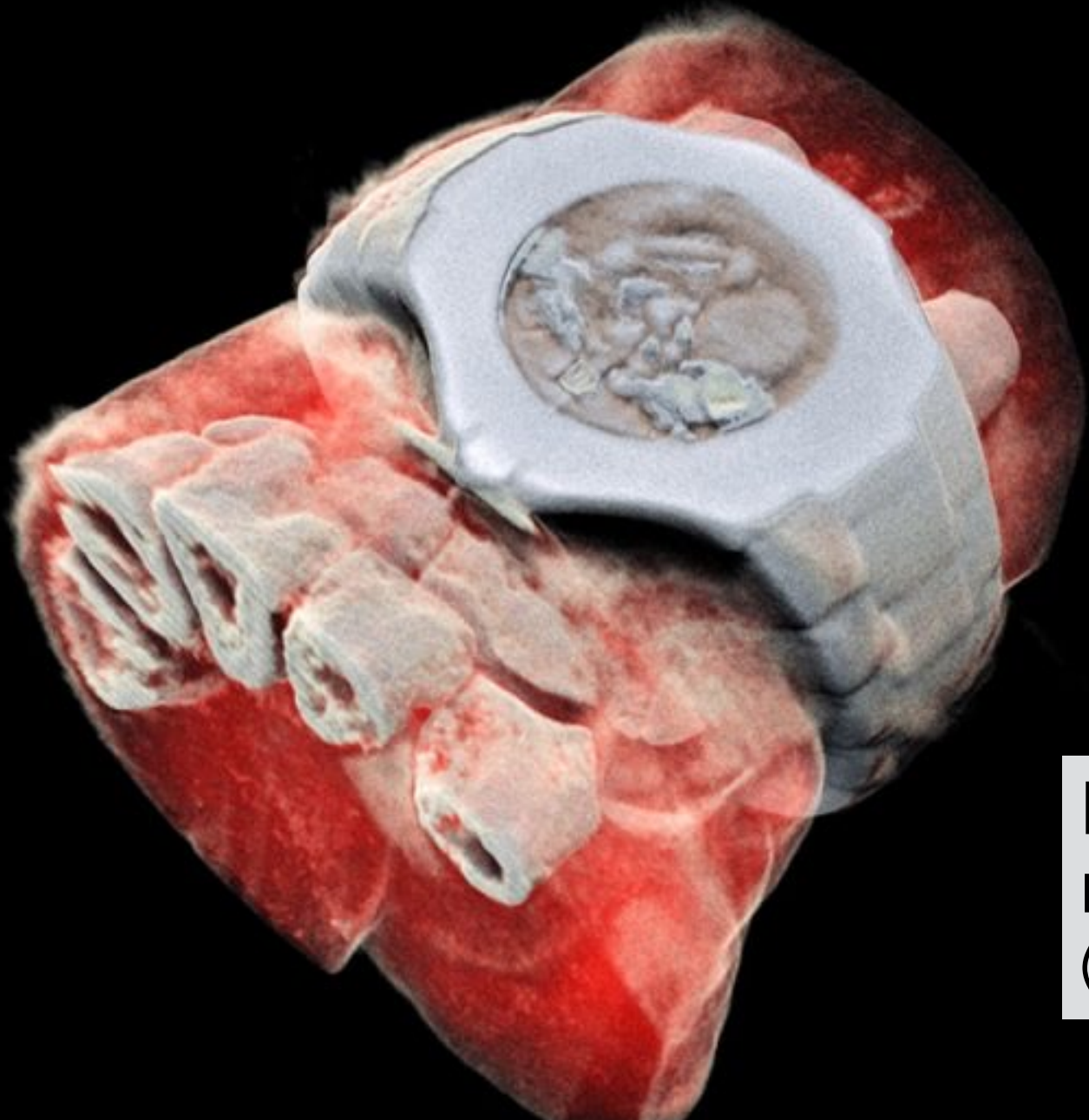
TIMEDIAX3
CHIPBOARD

DET. BIAS
EXT. PL
CLK
GND

C17
C16
C15
C14
C13
C12
C11
C10
C9
C8
C7

Spectral imaging -
Medipix chip






Next generation X
ray finally in color
(MARS Bio Imaging).

From the LHC to space -
Timepix chip



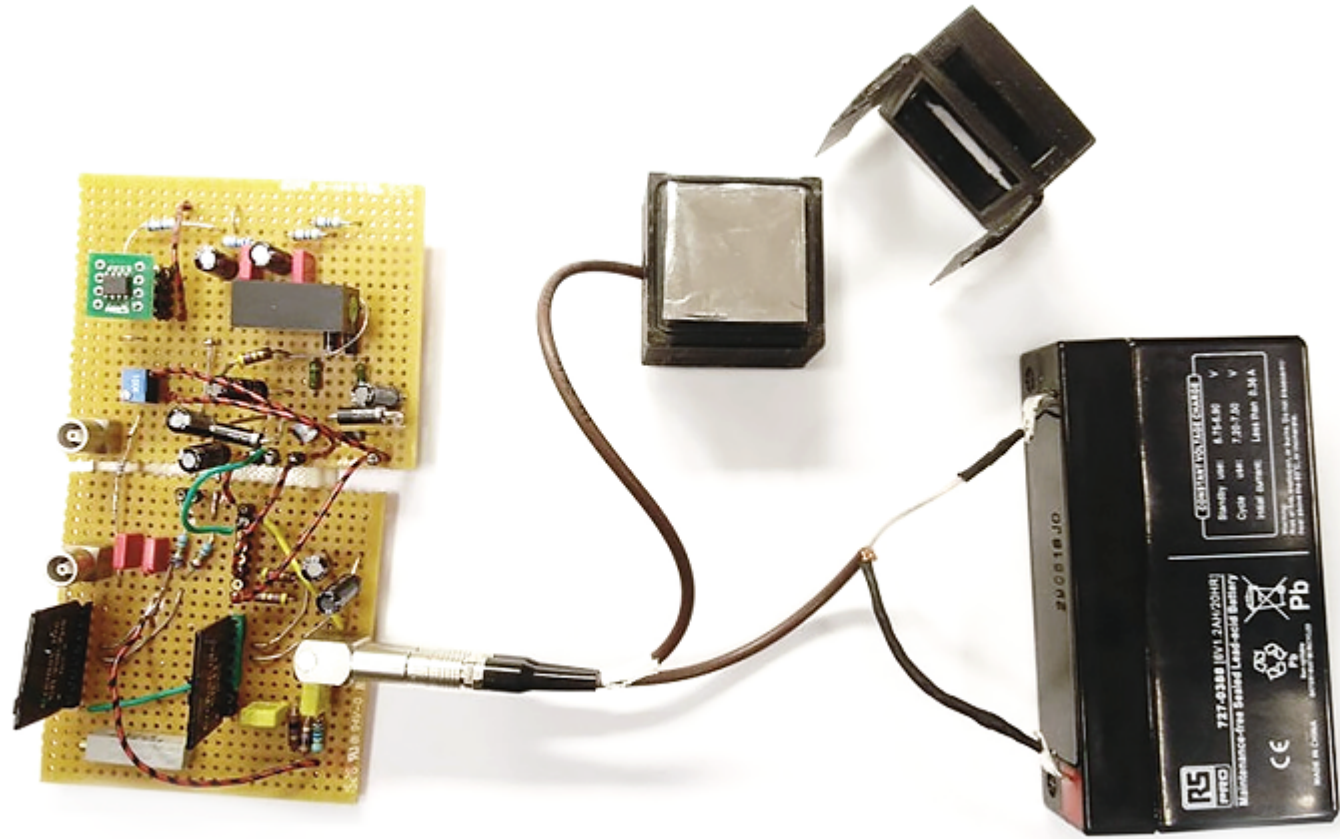


X-ray eyes for cultural heritage – Medipix chip



Machine learning to improve
vaccine production

CERN - Sanofi



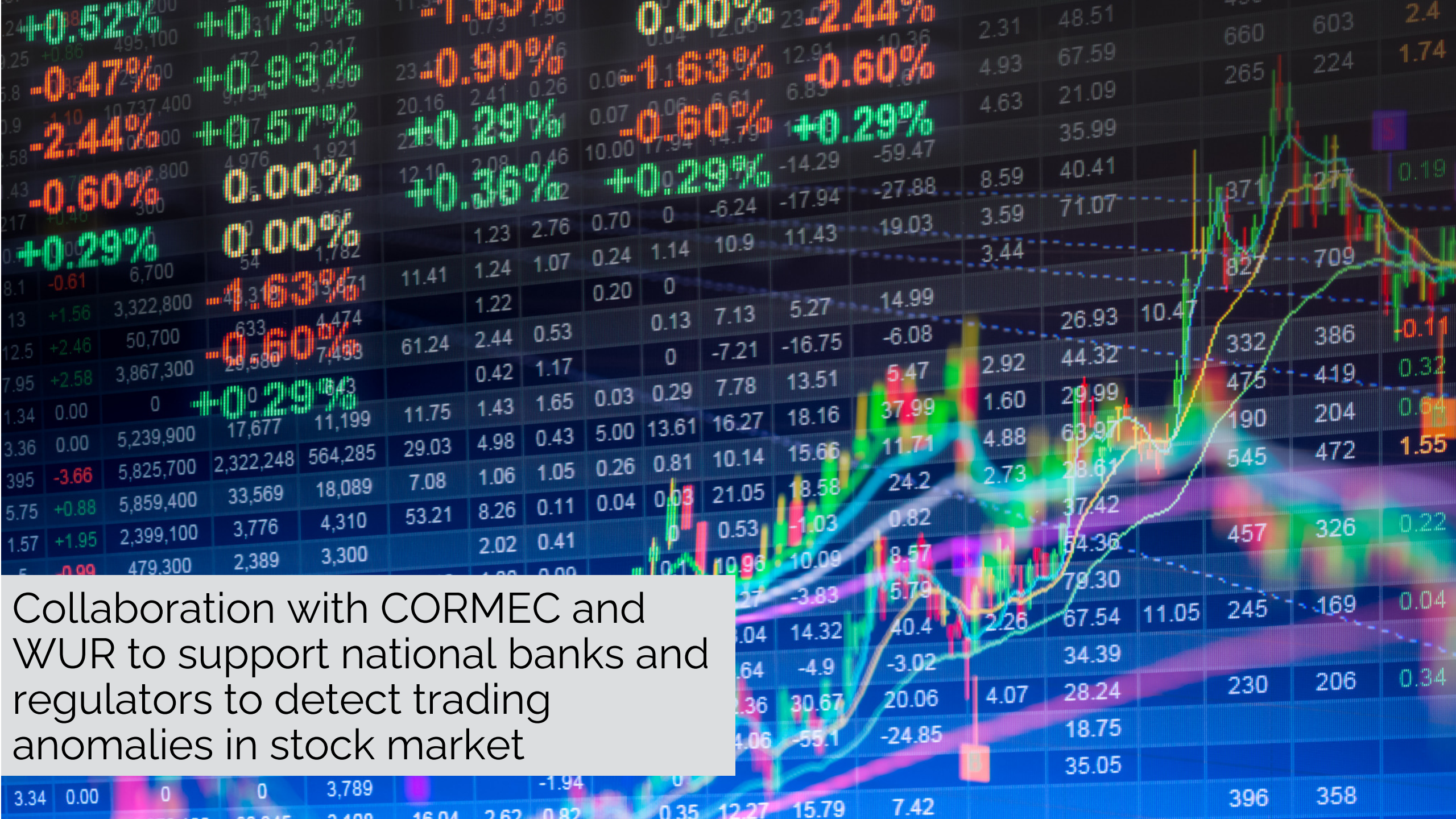
Tackling the risk of radon gas (BAQ)



Bundesdruckerei (Berlin) works with CERN on next generation ideas for identity management and cryptography



CERN's controls
middleware software
for worldwide factory
automation.

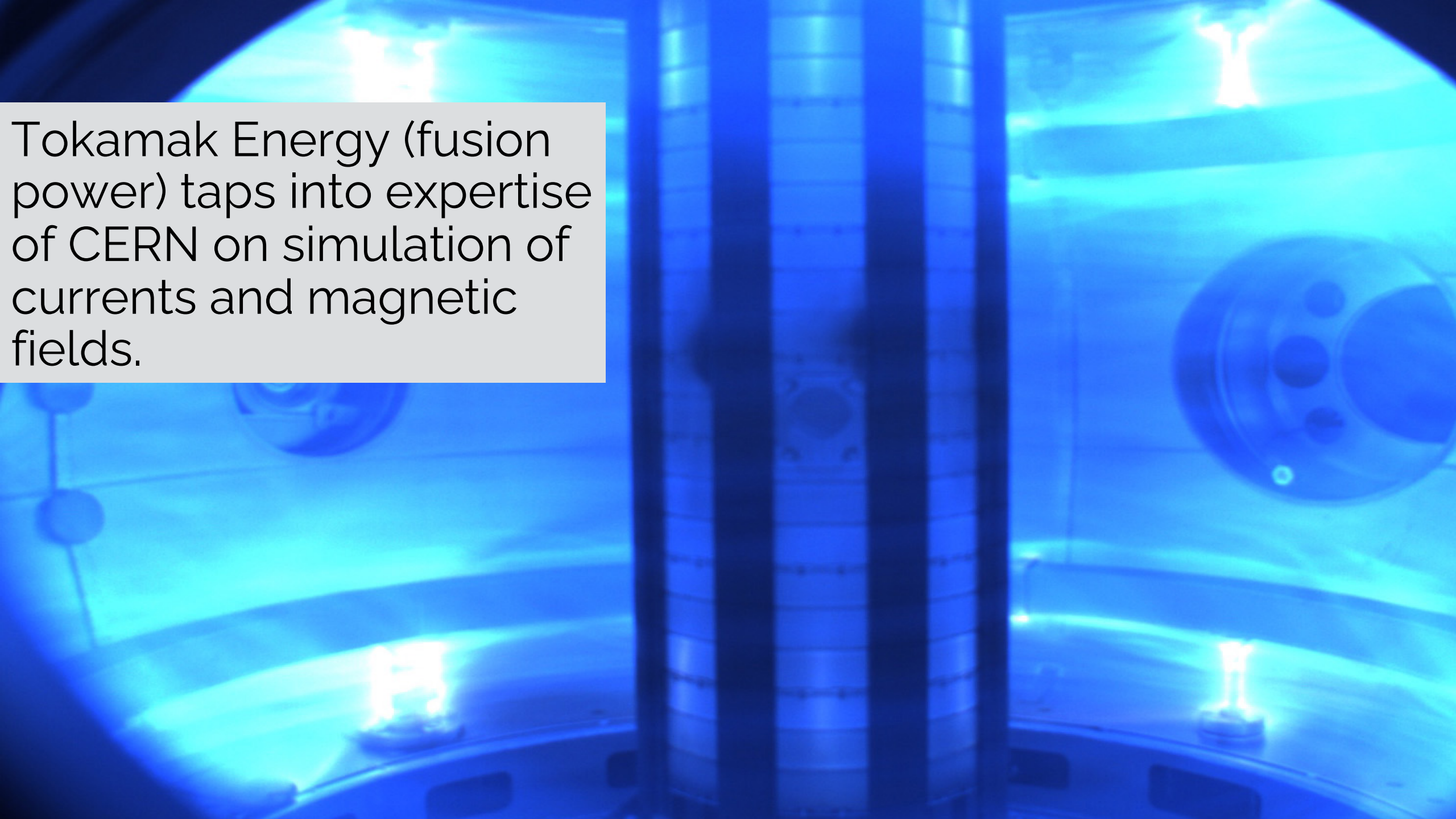


Collaboration with CORMEC and WUR to support national banks and regulators to detect trading anomalies in stock market

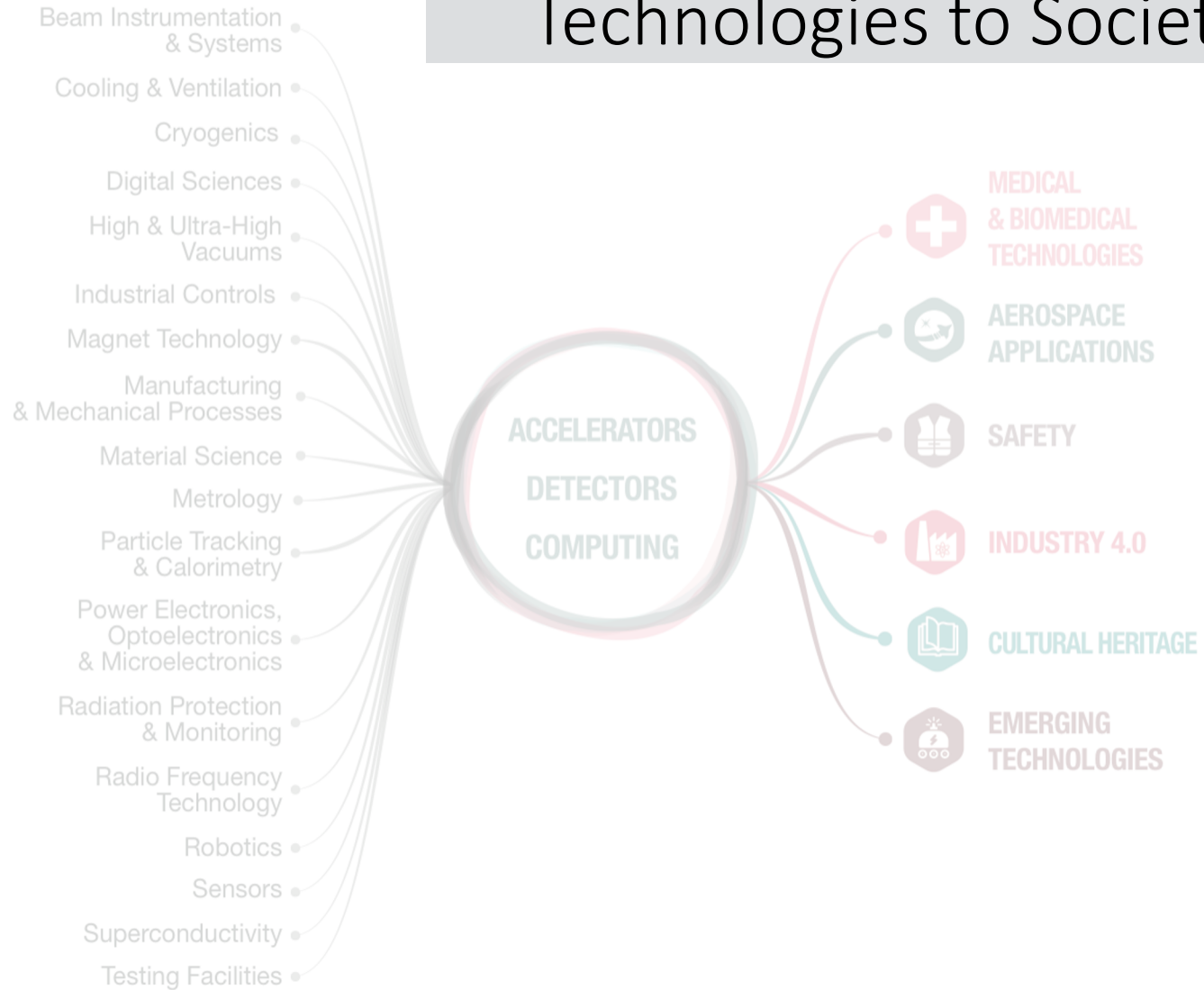
Zenuity (Volvo Cars /
Veoneer) teams up with
CERN on fast machine
learning using FPGAs .



Tokamak Energy (fusion power) taps into expertise of CERN on simulation of currents and magnetic fields.



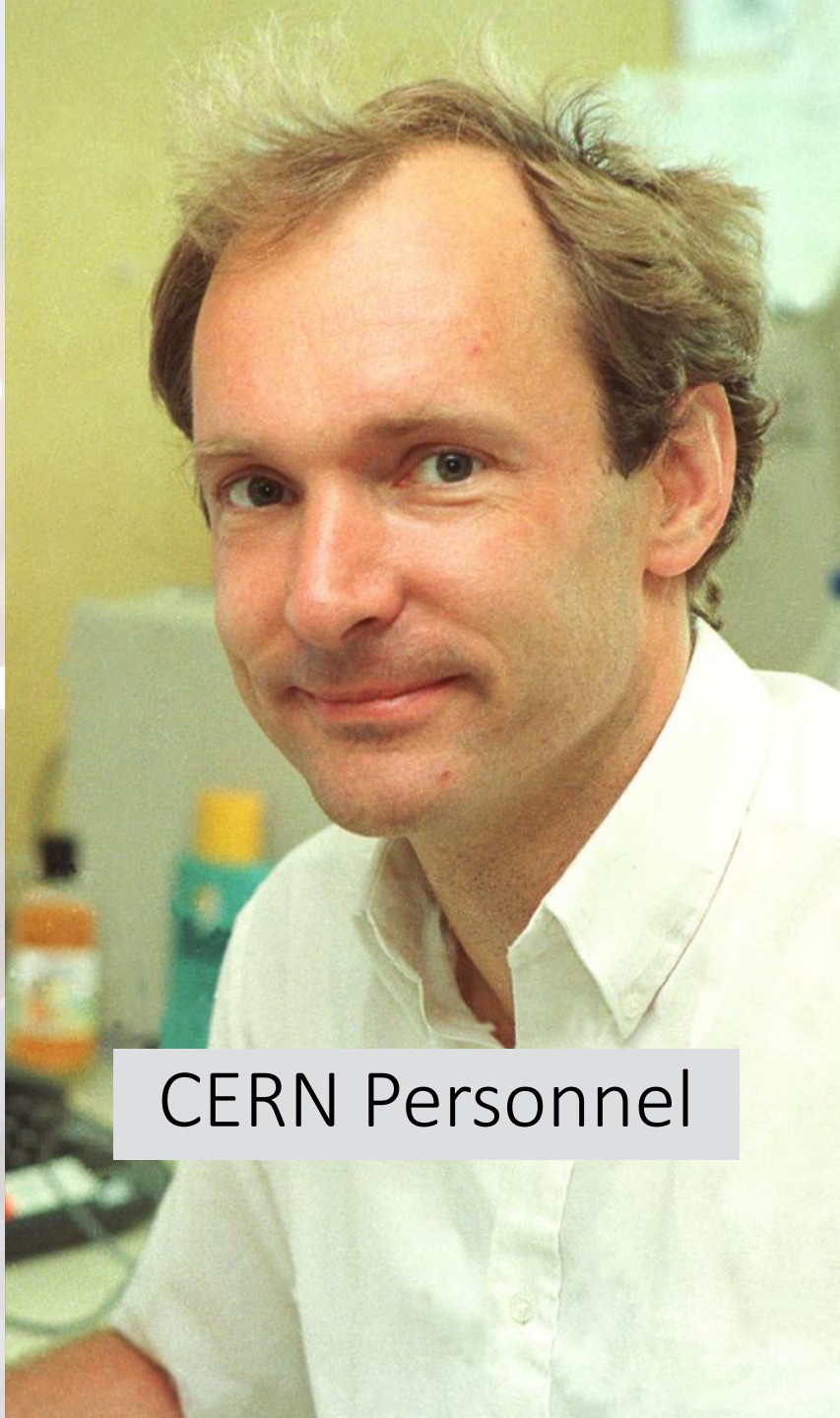
How do we transfer CERN Technologies to Society?





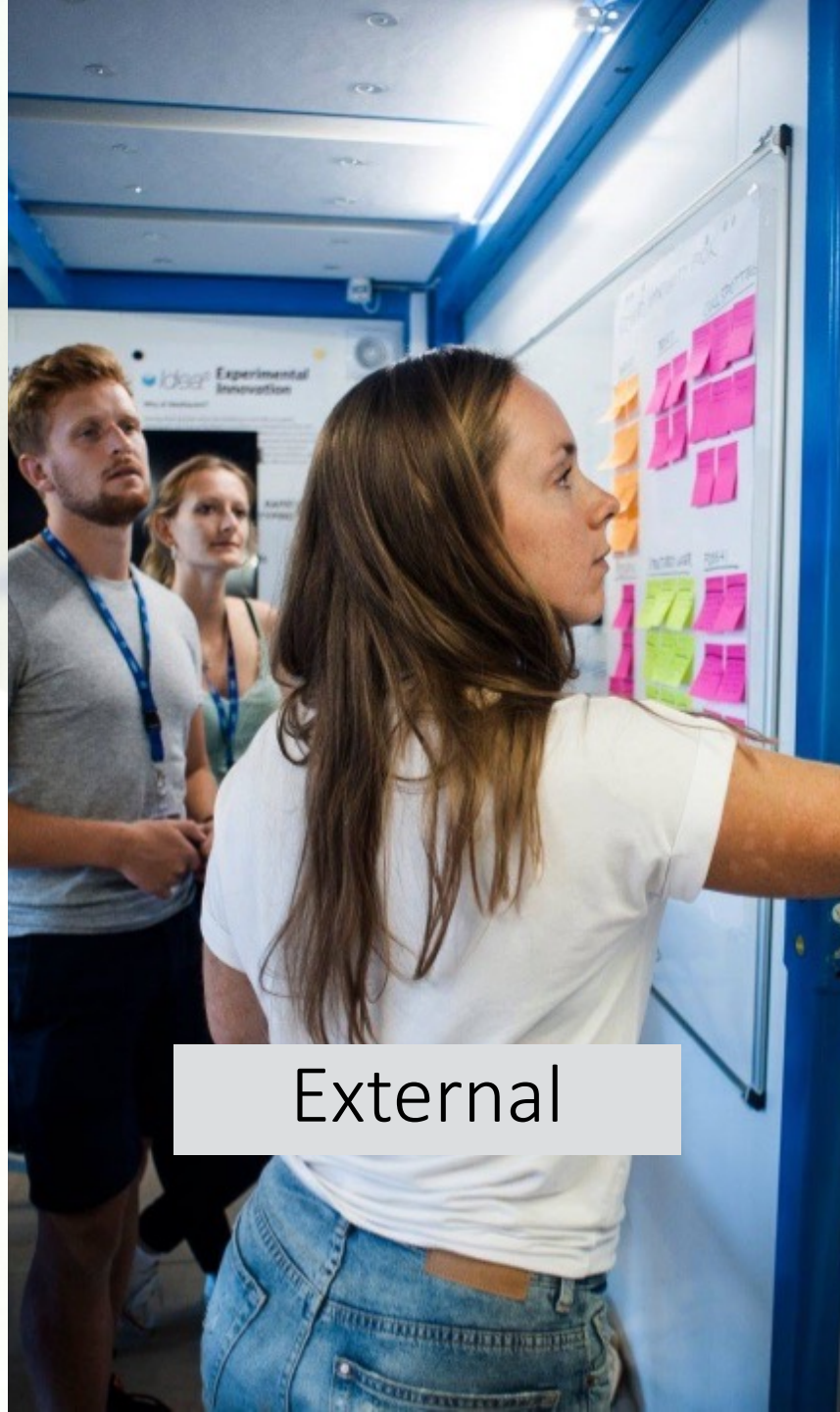
Industry





CERN Personnel





External

**Funding Opportunities for
CERN Projects**

**Collaborations and
Networks**

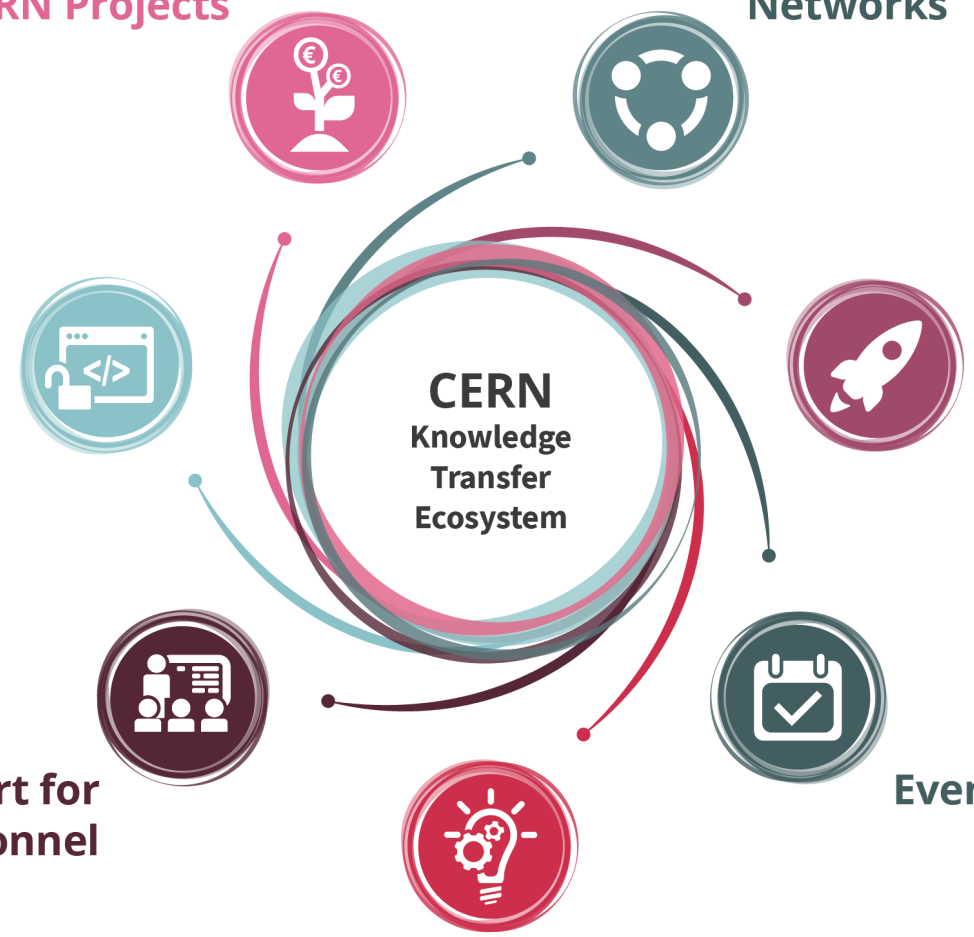
Open Source

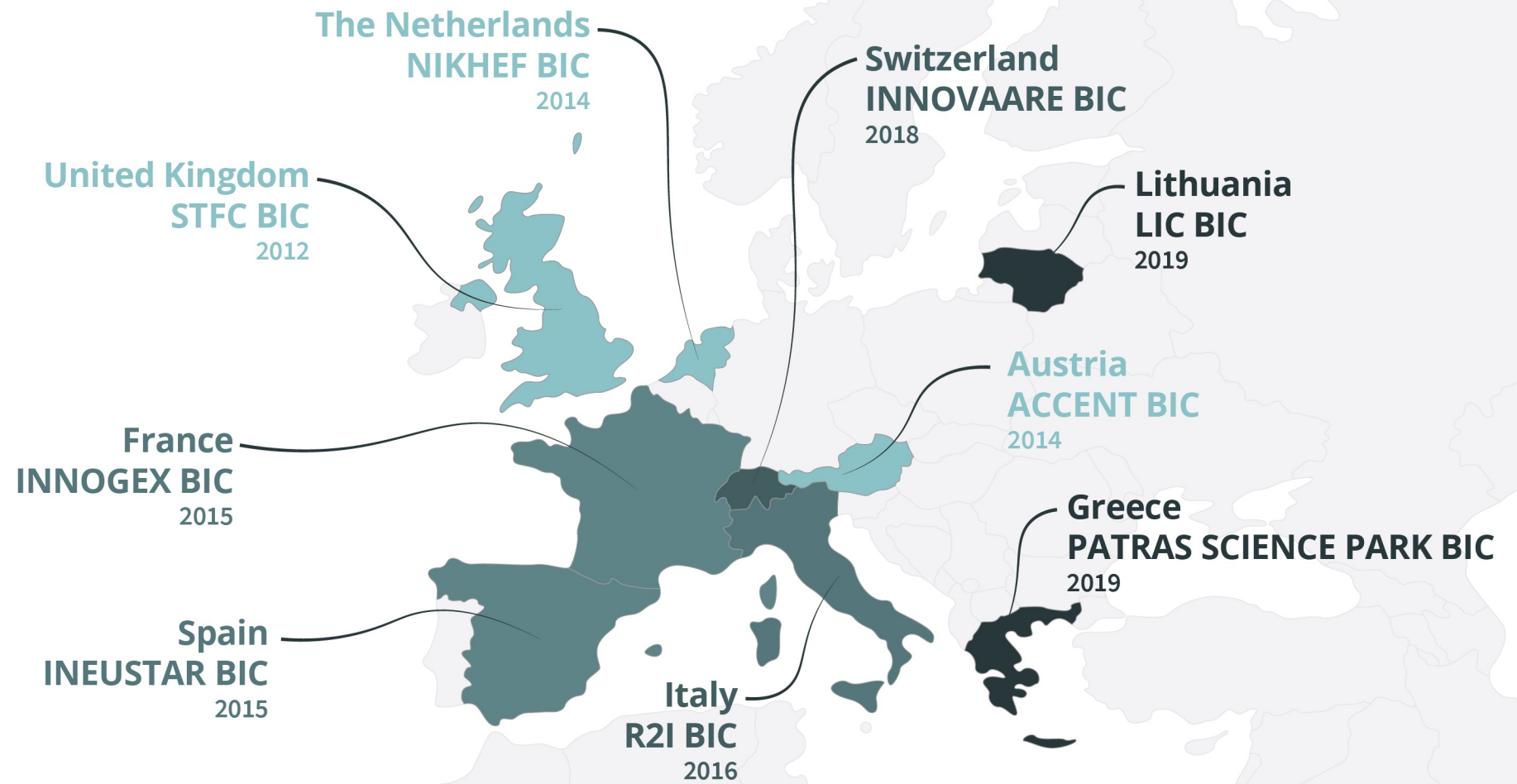
Entrepreneurship

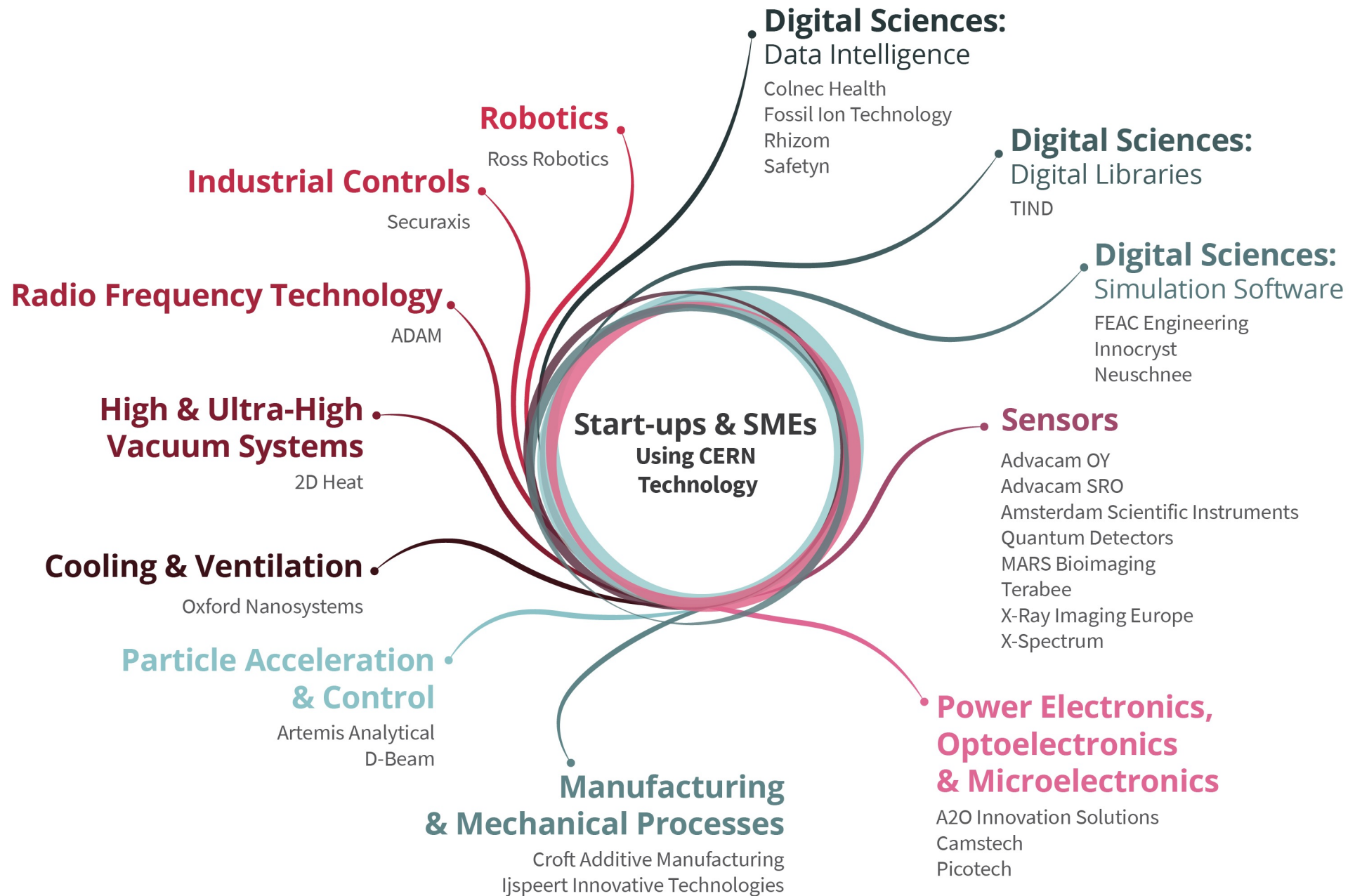
**Support for
CERN Personnel**

Events

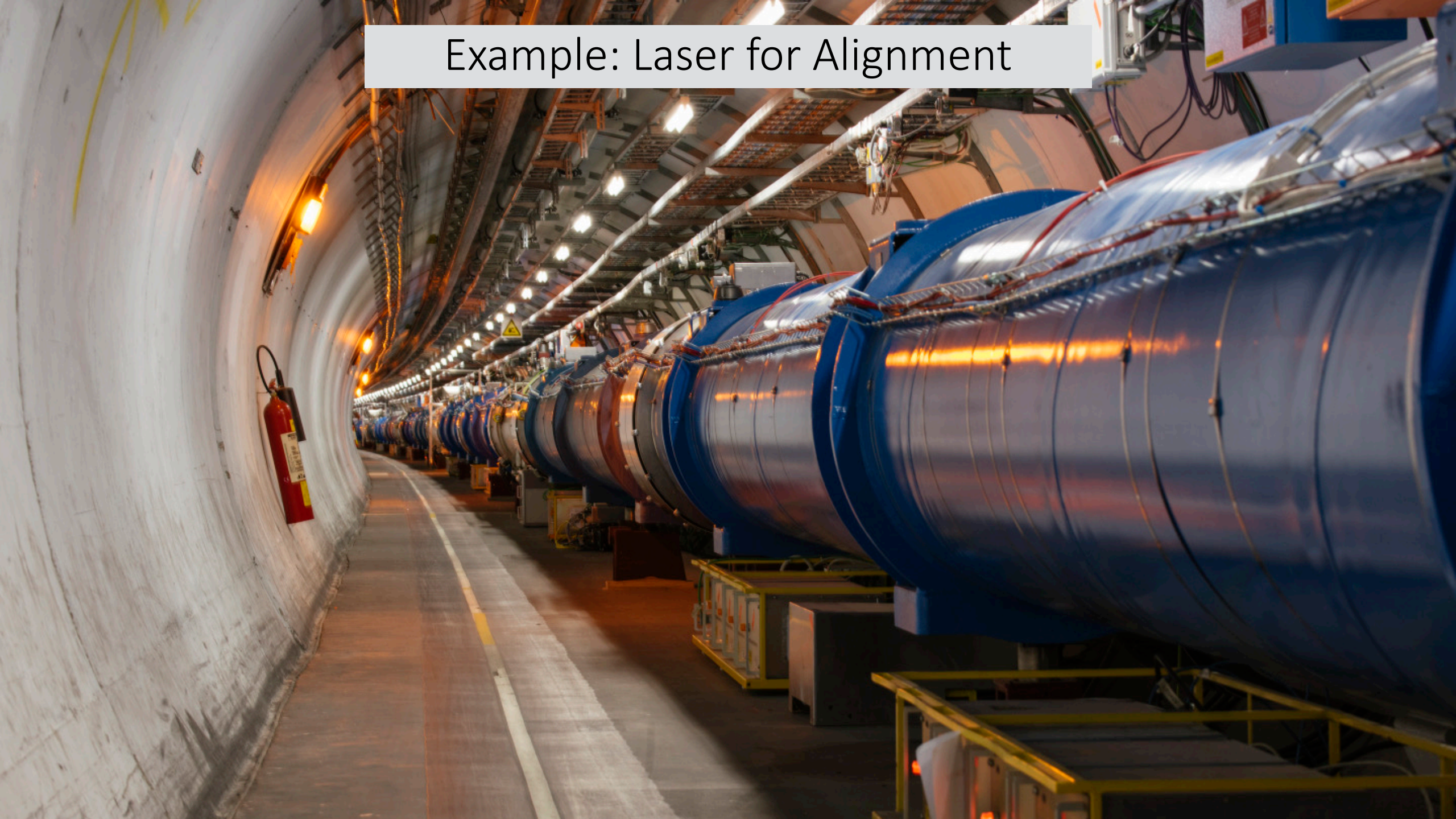
**Intellectual Property
Management**



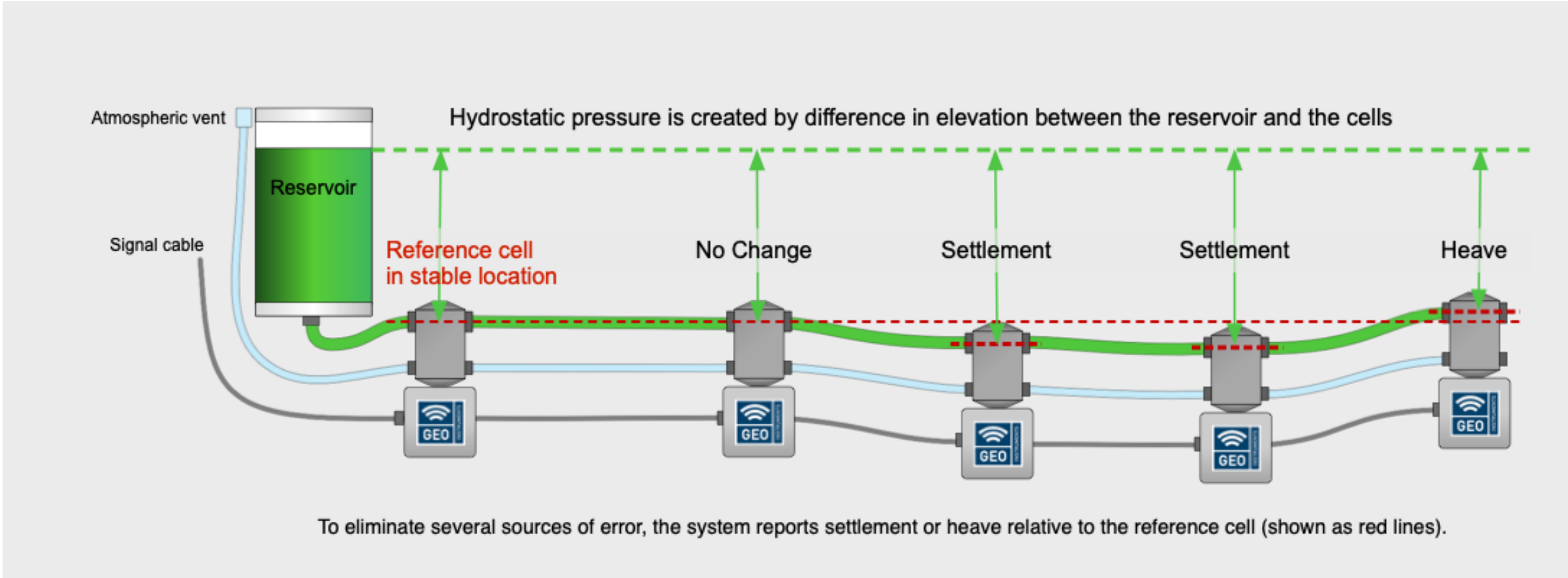




Example: Laser for Alignment



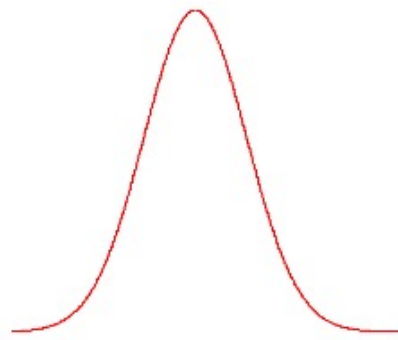
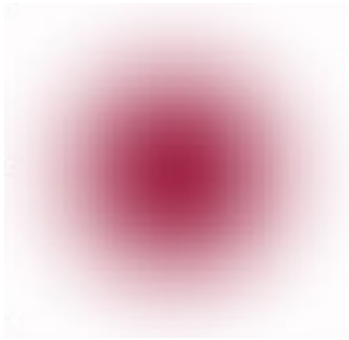
Example: Laser for Alignment



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Example: Laser for Alignment

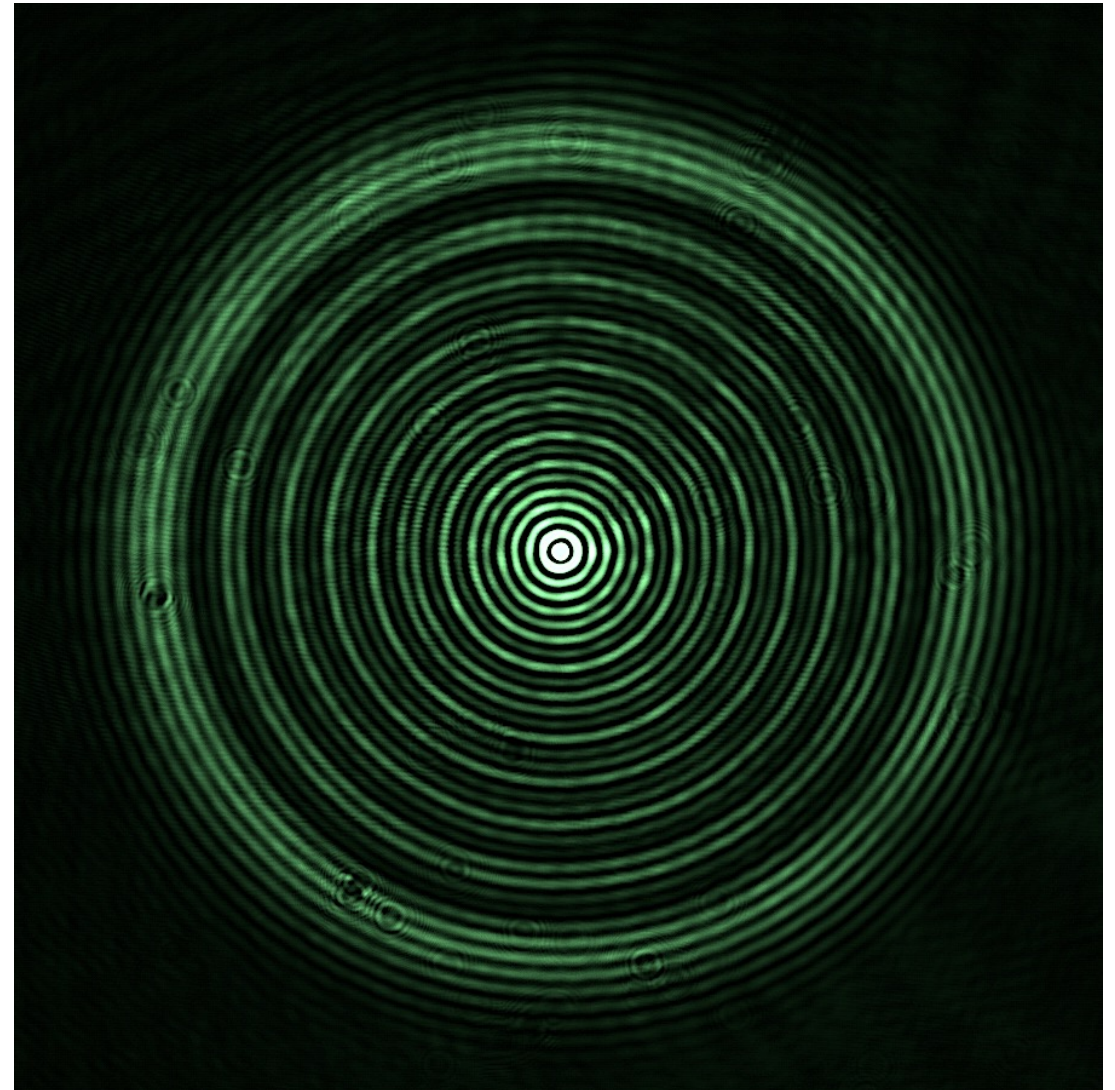
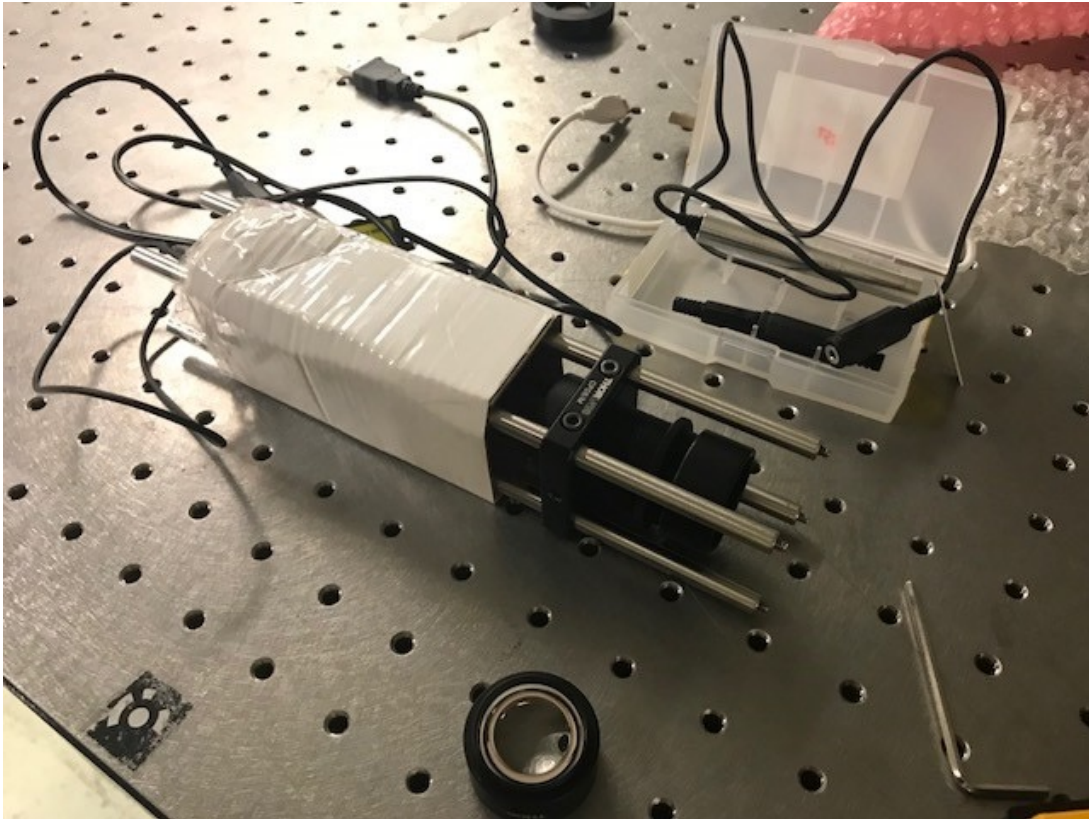


Gaussian beam and its intensity distribution



Structured beam and its intensity distribution

Example: Laser for Alignment

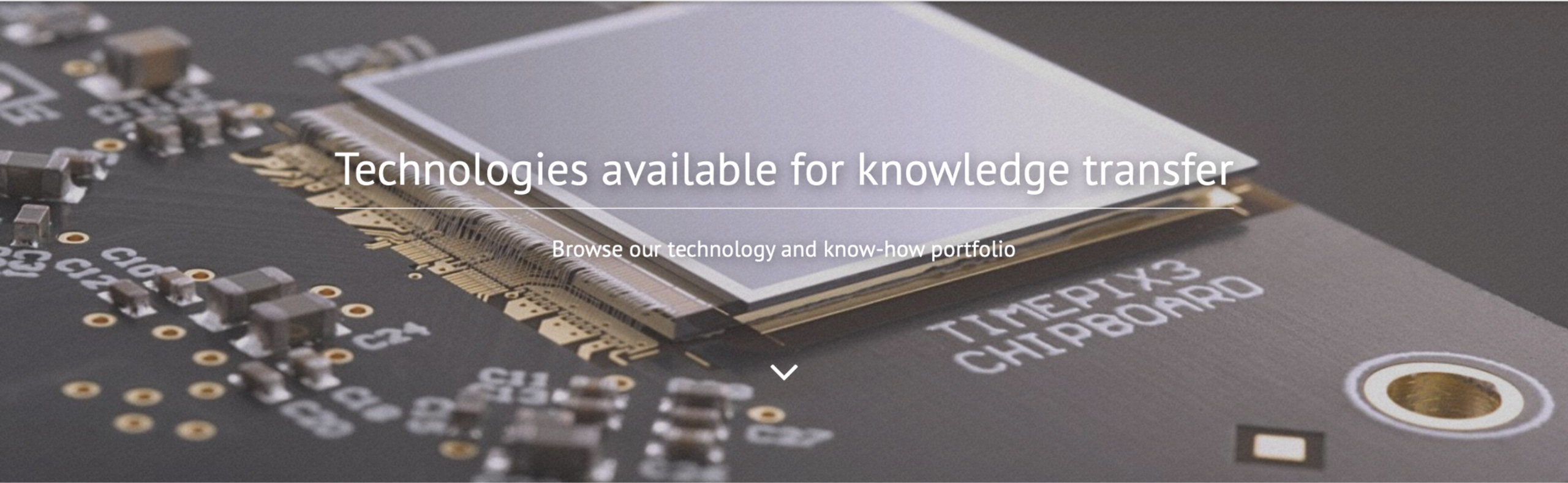


NTNU Screening Week



Knowledge Transfer

- About us
- Activities & Services
- Technology Portfolio
- Applications of CERN Technologies in Society
- Who are you?
- News
- Events & Deadlines



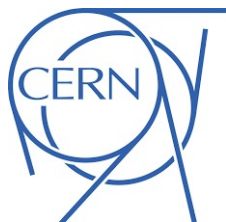
Technologies available for knowledge transfer

Browse our technology and know-how portfolio

CERN's technical expertise and most innovative technologies are available for scientific and commercial purposes through a variety of technology transfer opportunities: R&D collaborations, [CERN technology in your start-up](#), service and consultancy and licensing. Read more about these opportunities [here](#), or just [contact us](#) if you have any inquiries.

Work at CERN? [Learn more about getting involved in Knowledge Transfer at CERN here.](#)

Thank you
Questions?



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Business Development
CERN Knowledge Transfer