

Nikhef

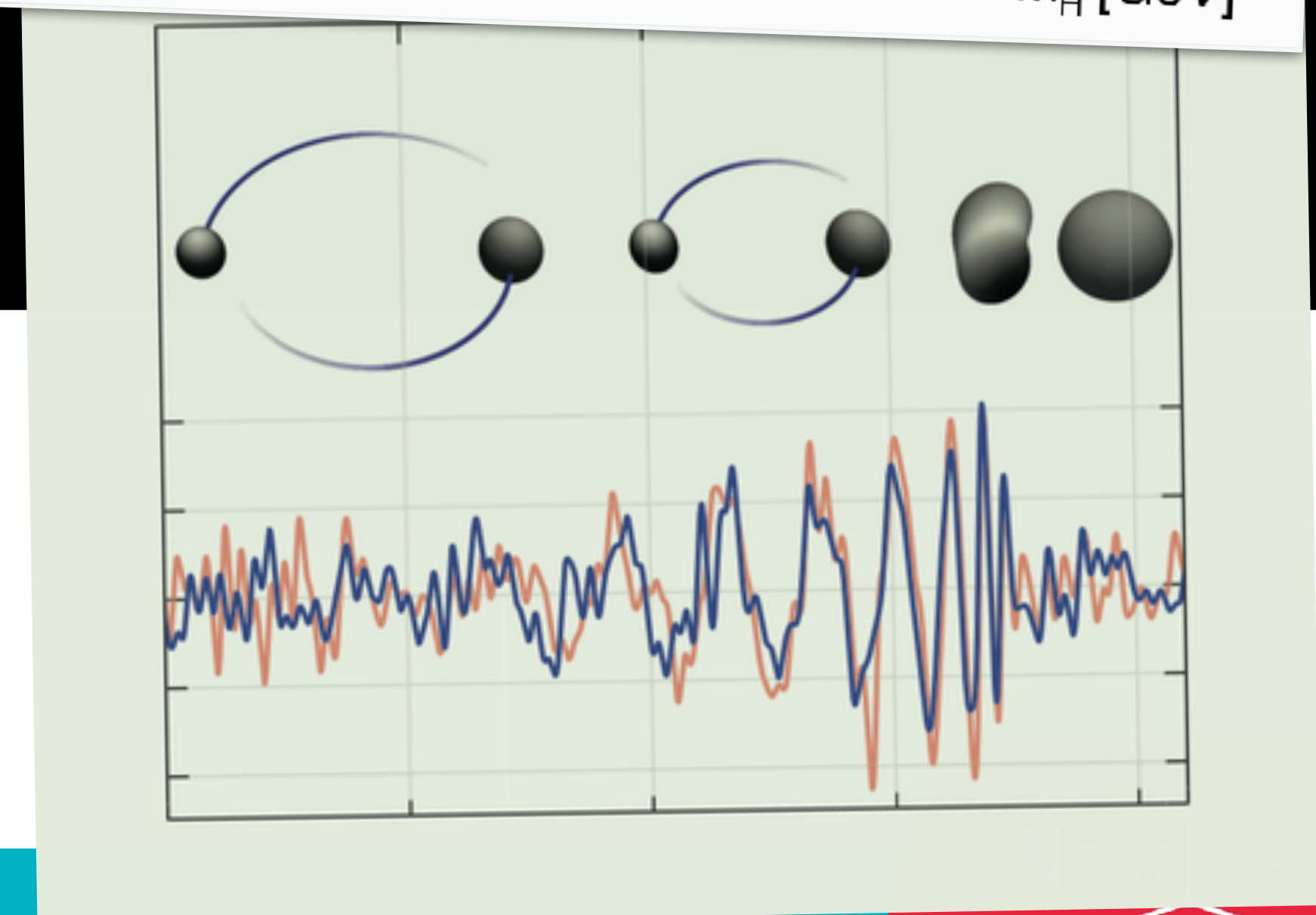
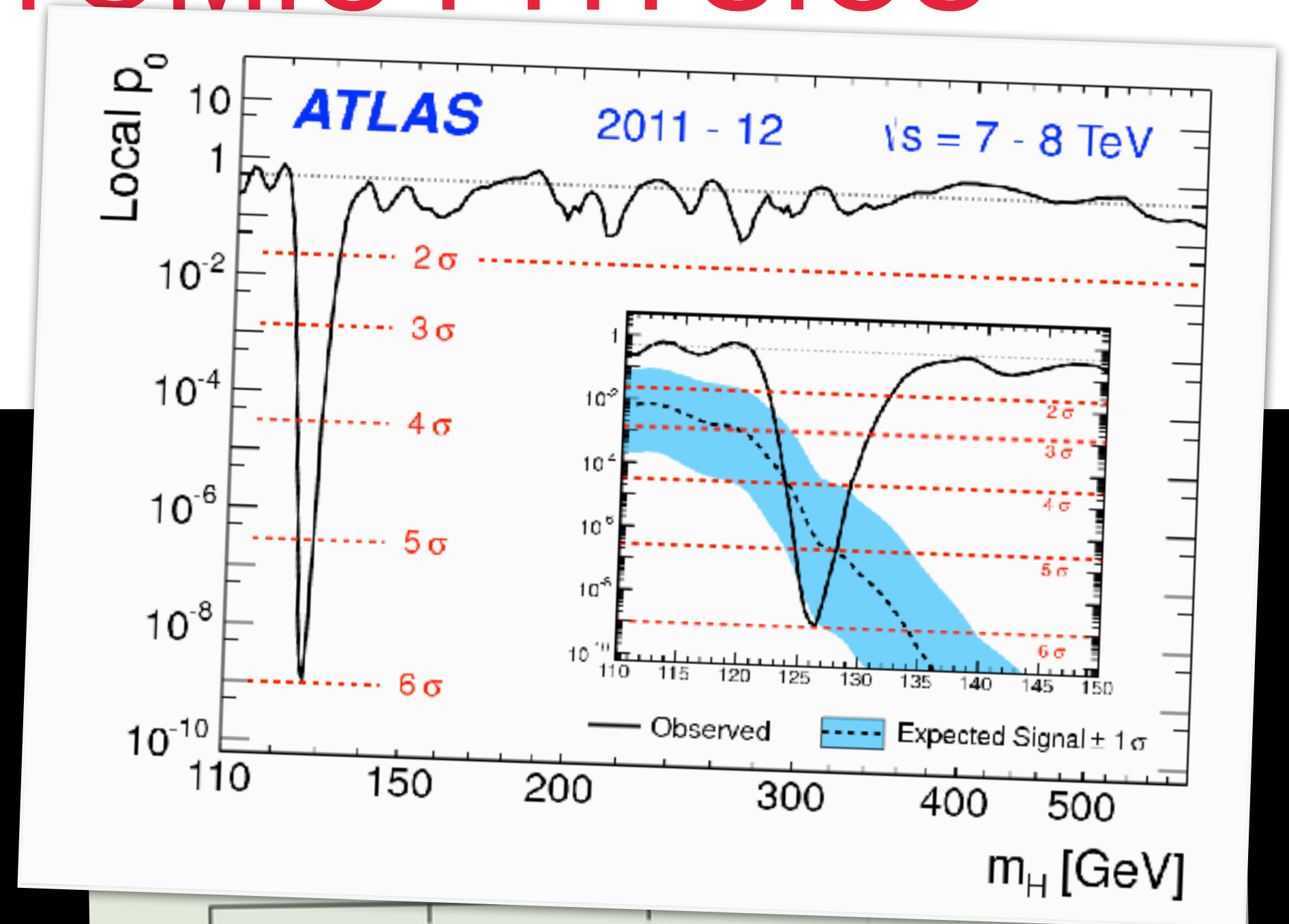
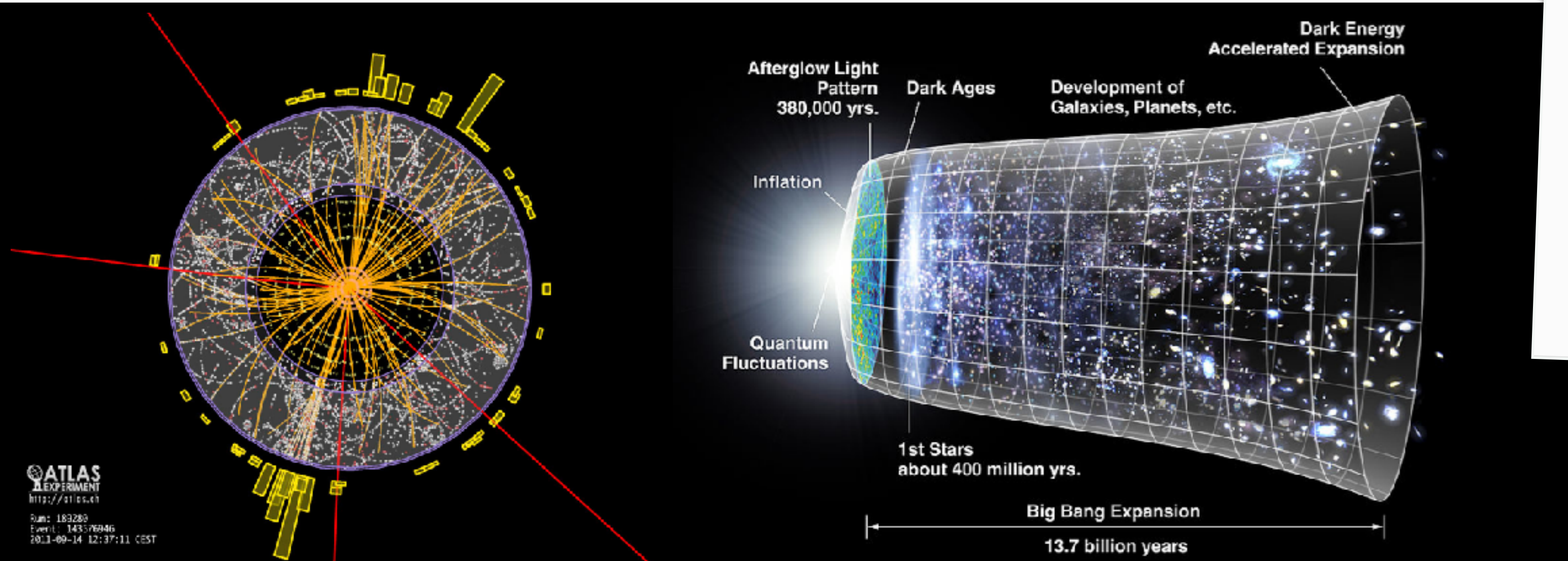
HOLLAND @CERN

25 June 2021
Mikrocentrum, Veldhoven

Stan Bentvelsen

NATIONAL INSTITUTE FOR SUBATOMIC PHYSICS

Study the interaction and structure of all elementary particles and fields



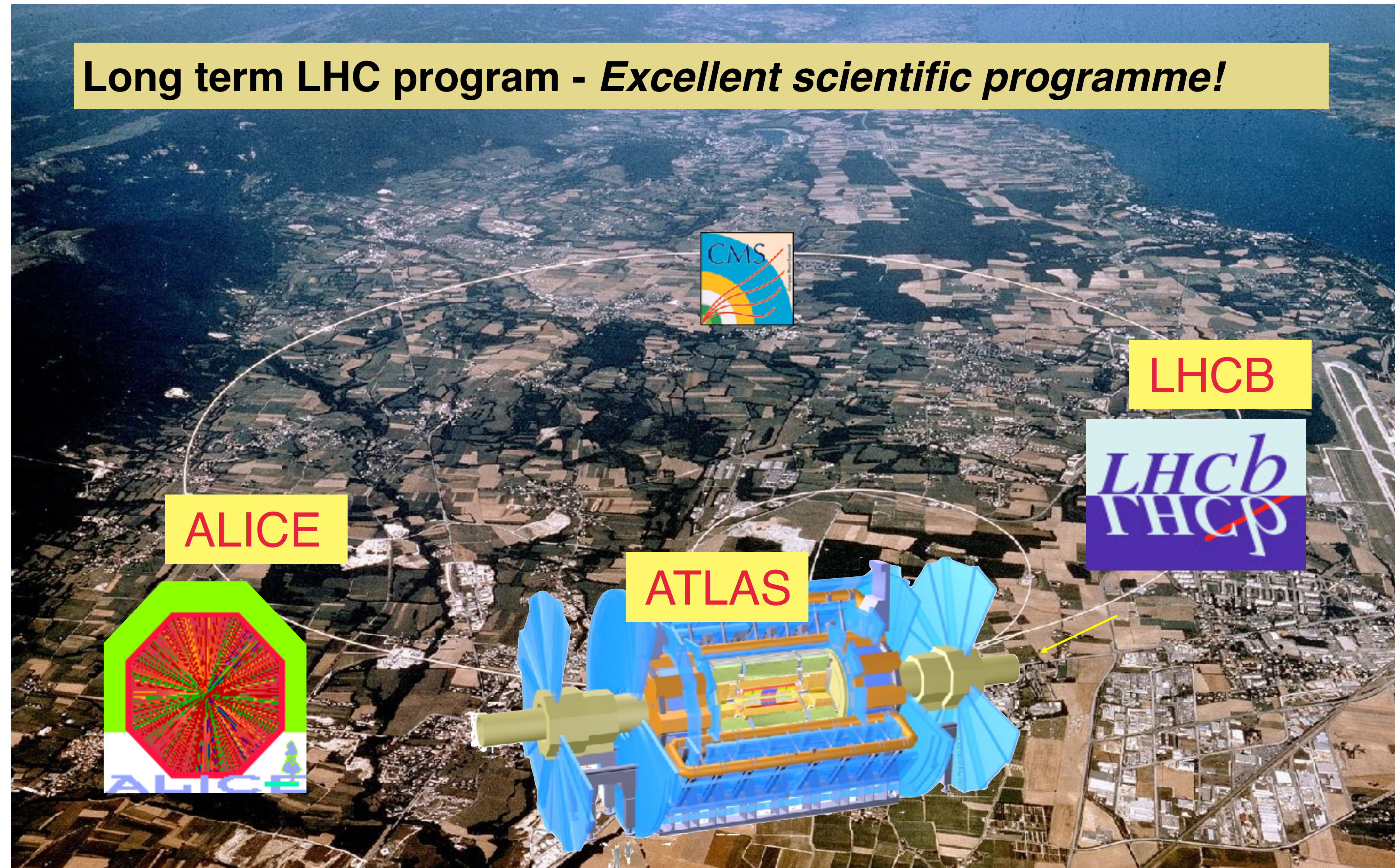
- Collider physics (i.e. CERN)
- Astroparticle physics

Knowledge and technology transfer

LHC PROGRAMME - DUTCH INVOLVEMENT

- **ATLAS**
 - Higgs physics
 - New particles beyond the Standard Model
- **LHCb**
 - Rare decays
 - Matter-anti-matter differences
- **ALICE**
 - Plasm of quarks and gluons
 - Phase transitions

Long term LHC program - *Excellent scientific programme!*



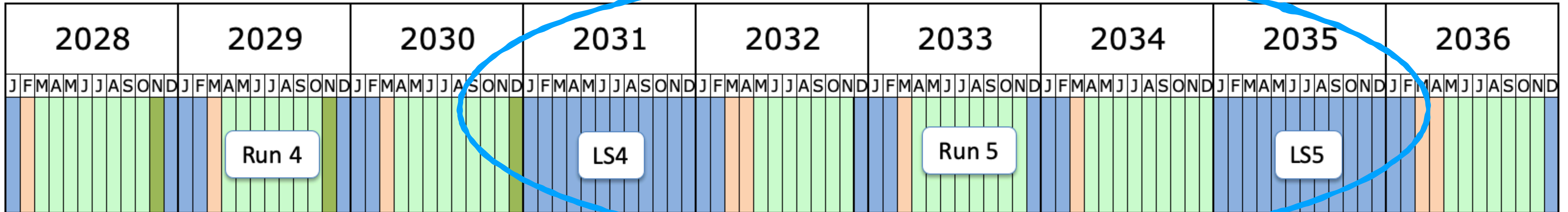
LONG TERM LHC ACTIVITIES



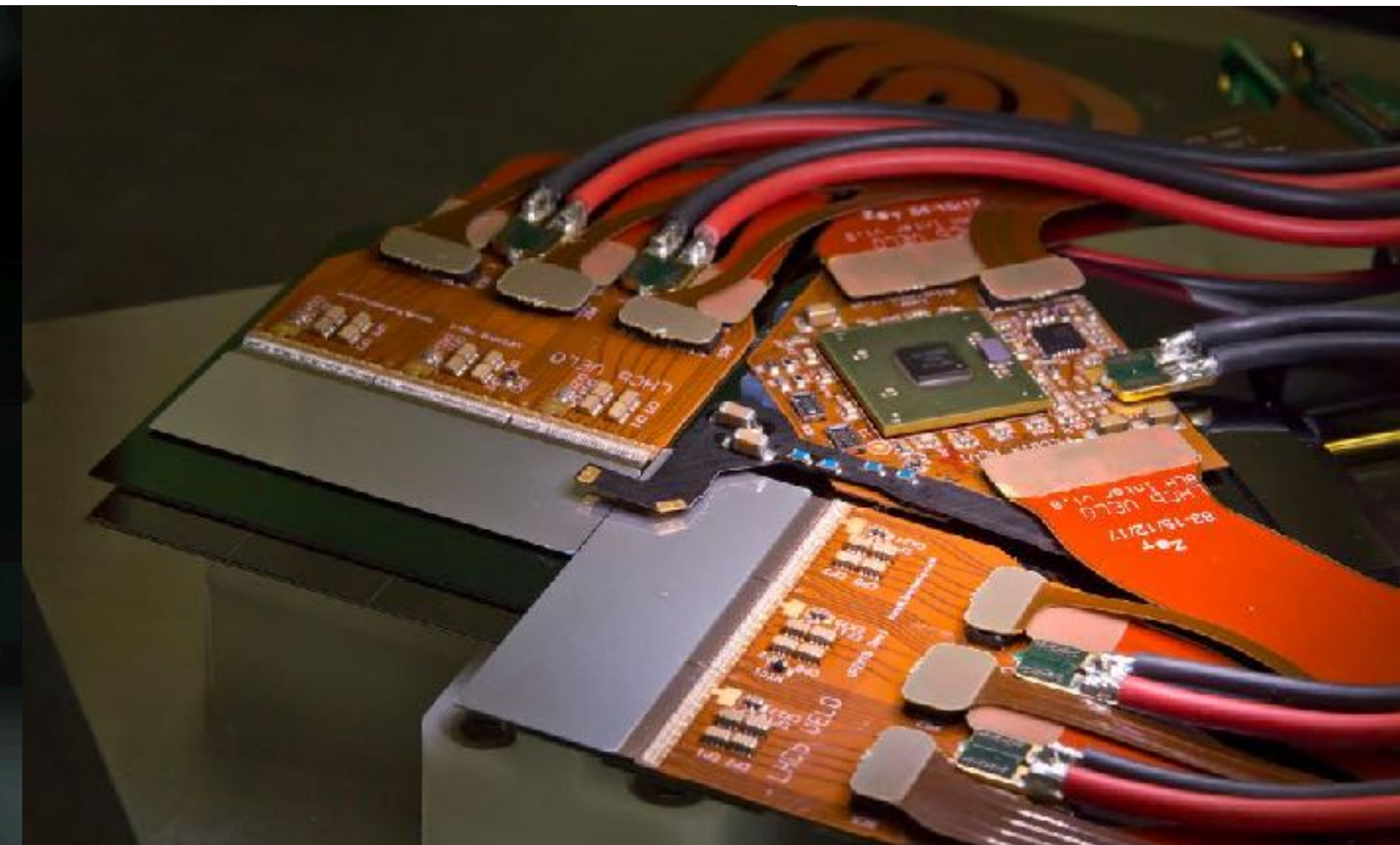
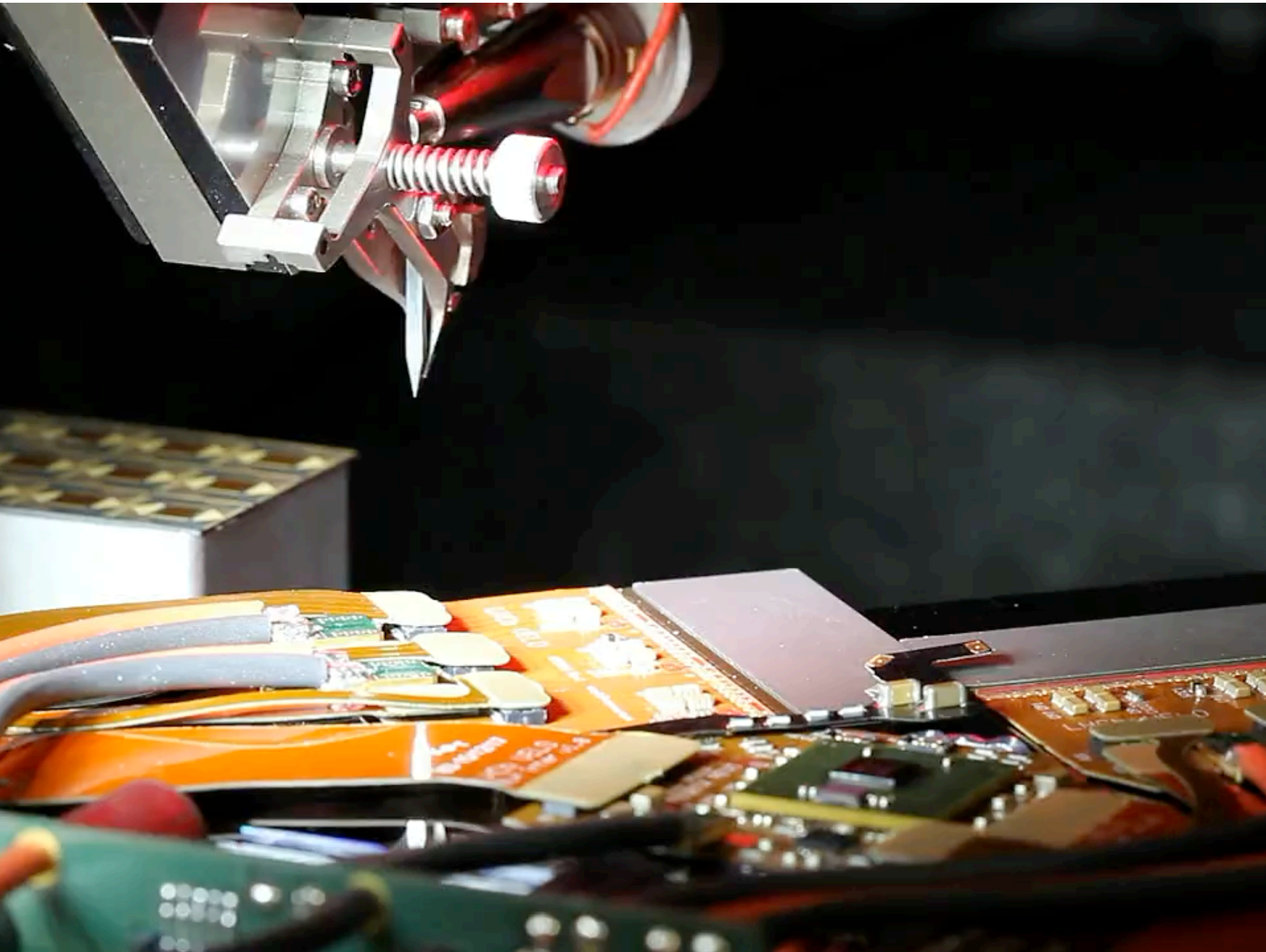
Current upgrade activities at CERN

Preparations at Nikhef for building detector parts

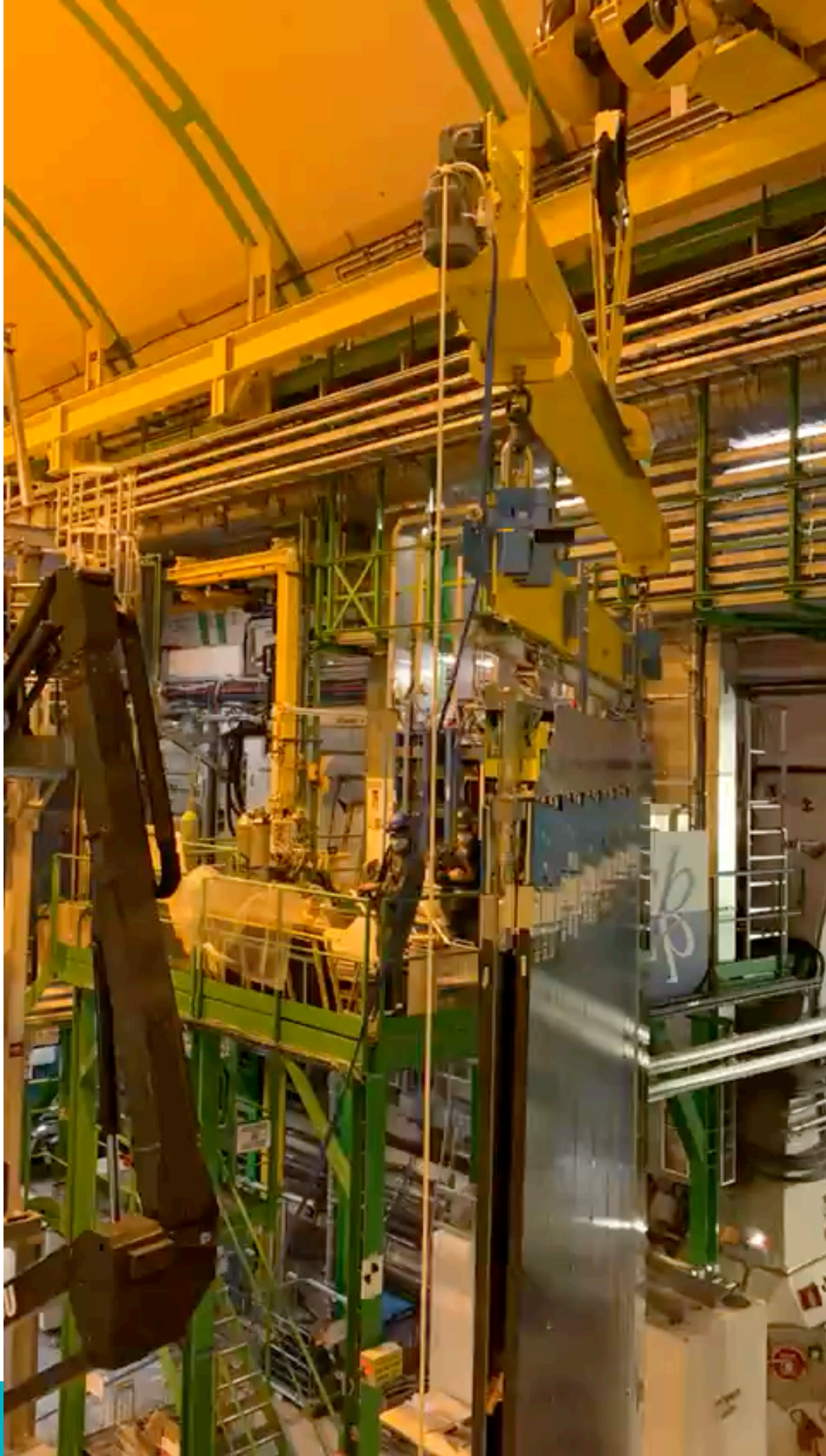
Strategy and R&D for highly challenging new (final) upgrades



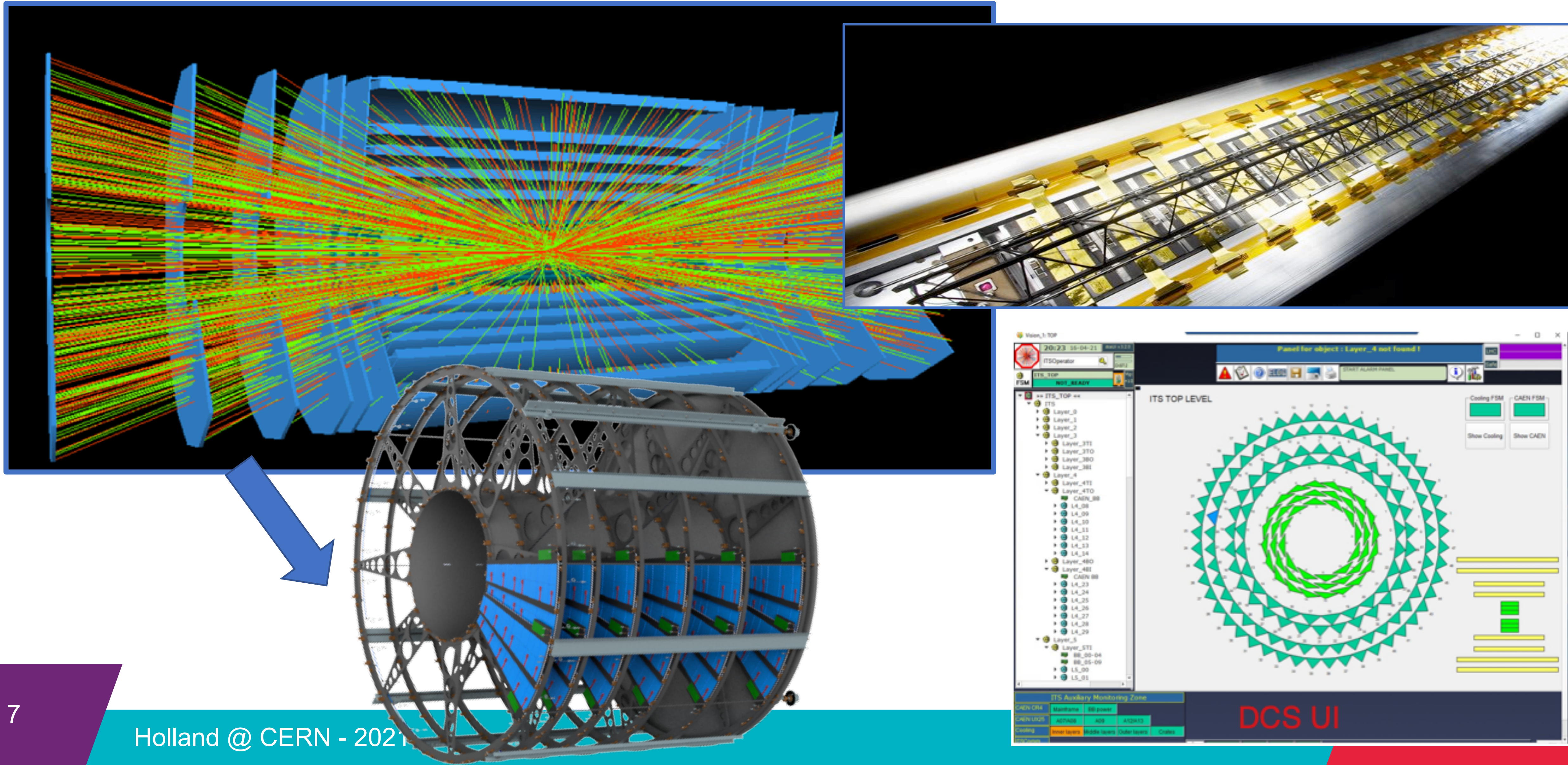
CURRENT UPGRADE ACTIVITIES - EXAMPLE LHCB



CURRENT UPGRADE ACTIVITIES - EXAMPLE LHCB



PREPARATION: EXAMPLE ATLAS & ALICE



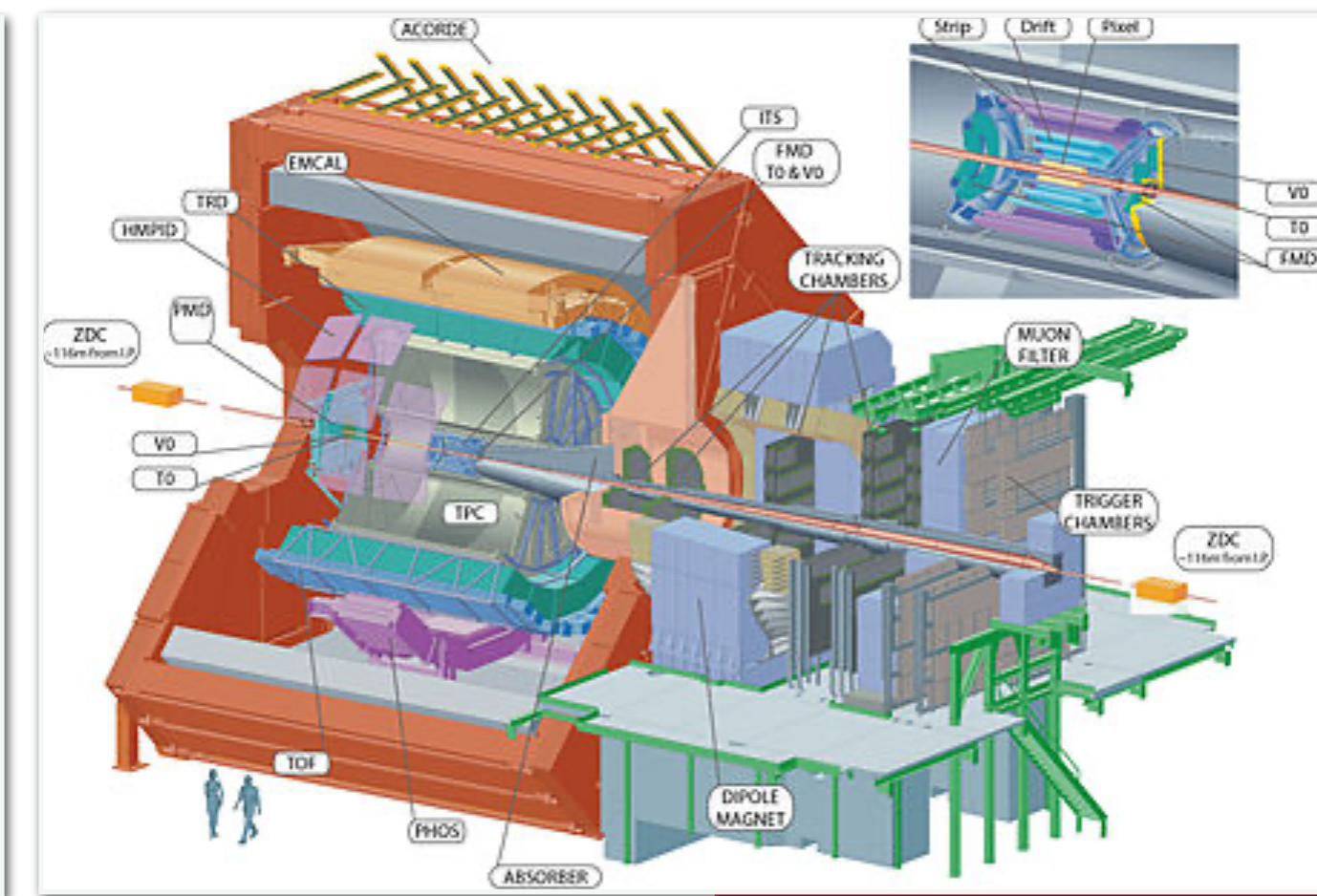
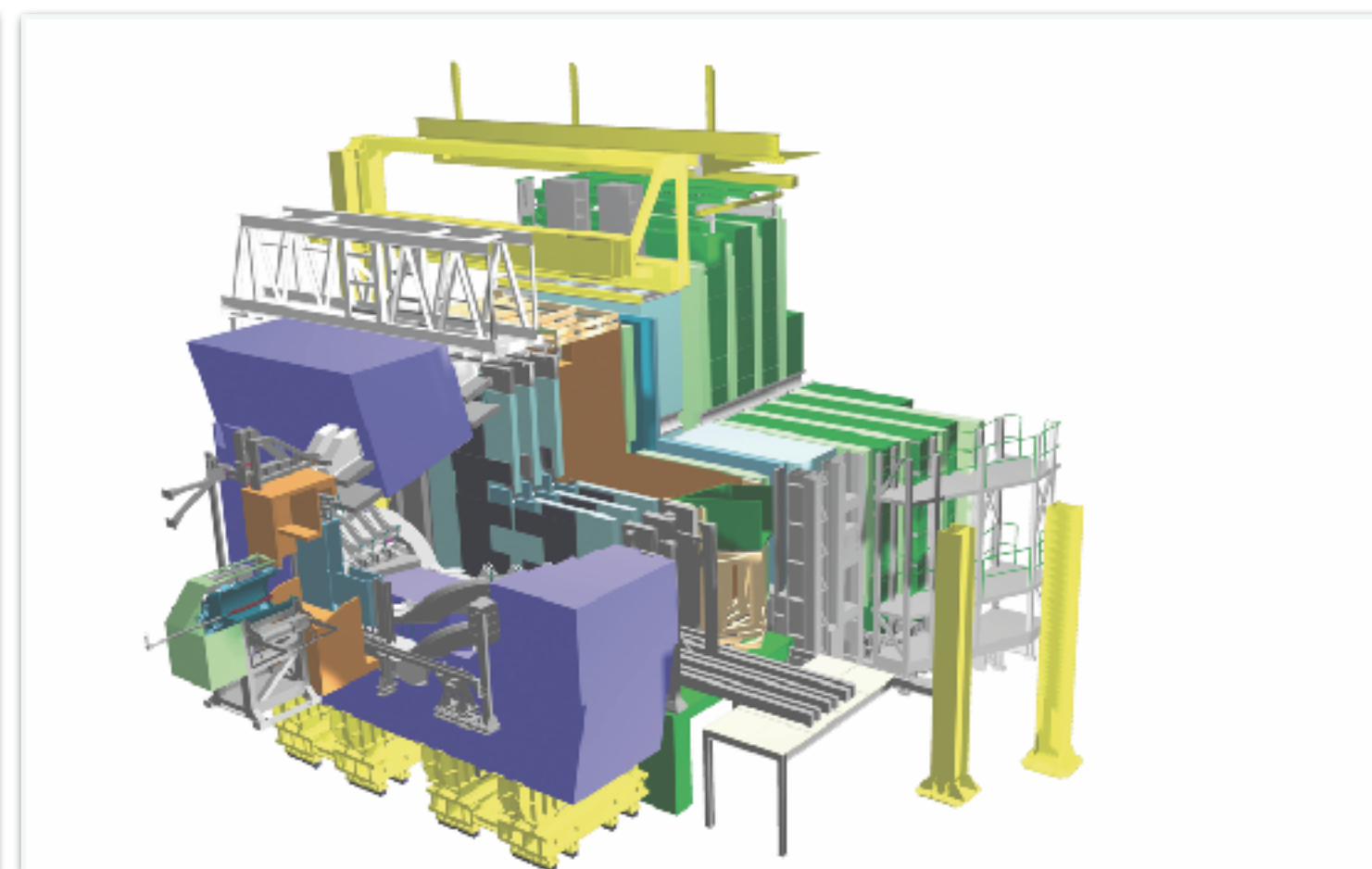
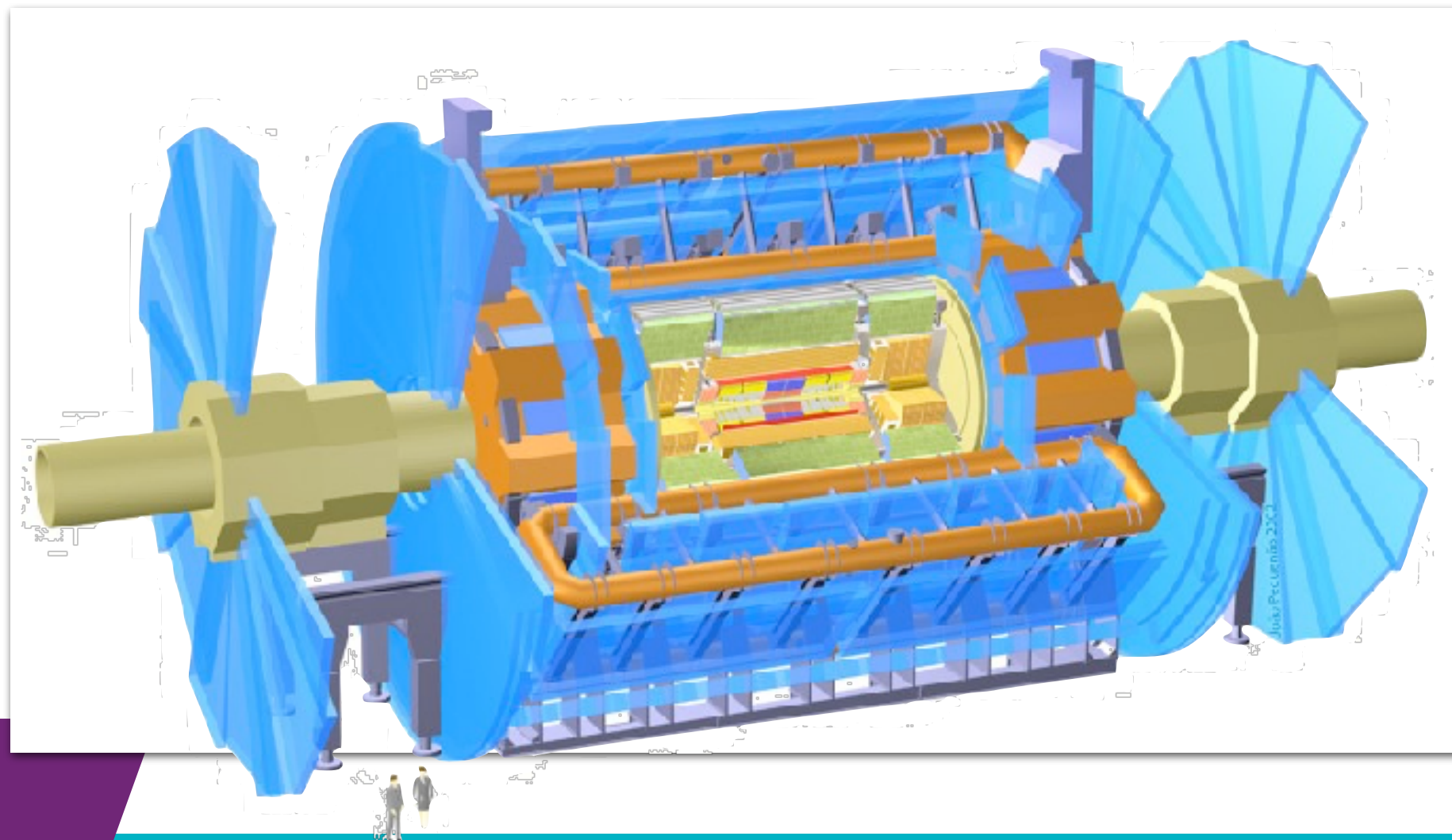
FUTURE OF HL-LHC > 2030

European Strategy:

- Full physics potential of LHC should be exploited, with all detectors running beyond 2030, after suitable upgrades

Nikhef

- Ambition to develop ultra-fast precision detector technology
- Applications in LHCb, ALICE and ATLAS around 2030



GRAVITATIONAL WAVES AT NIKHEF

Virgo

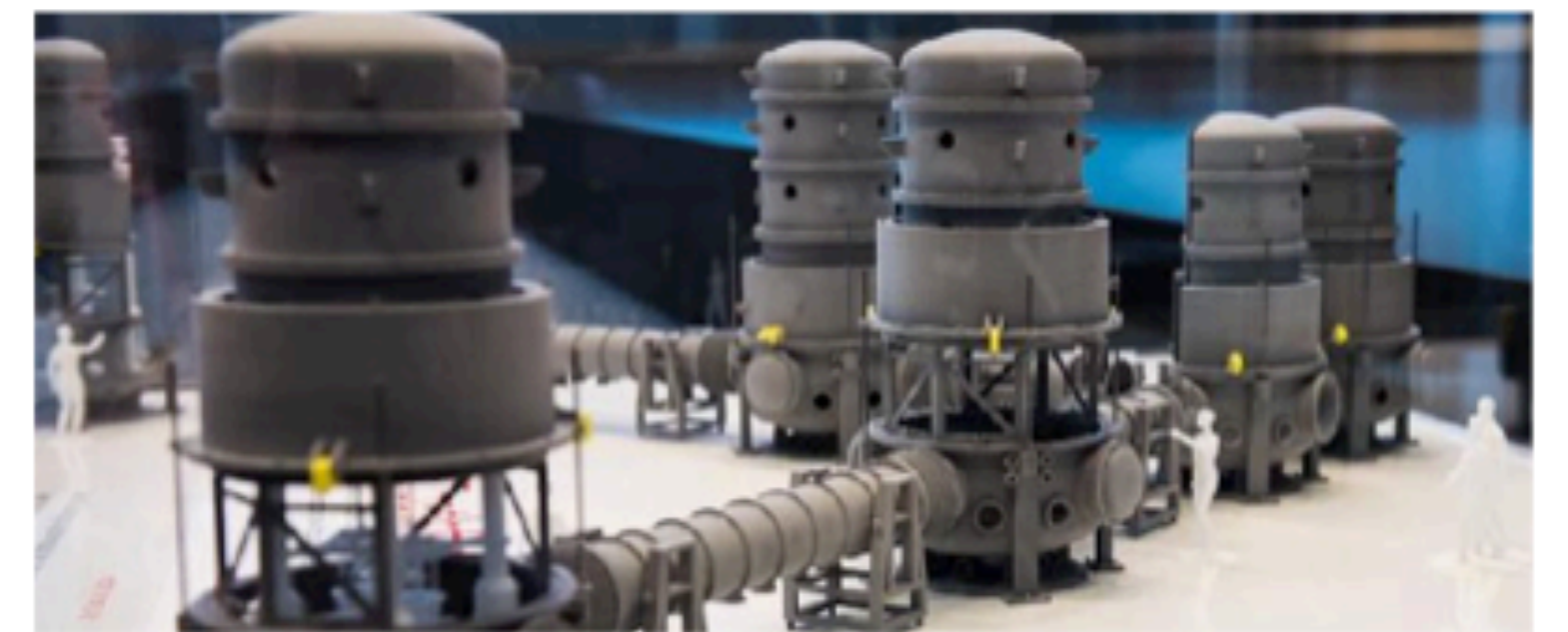
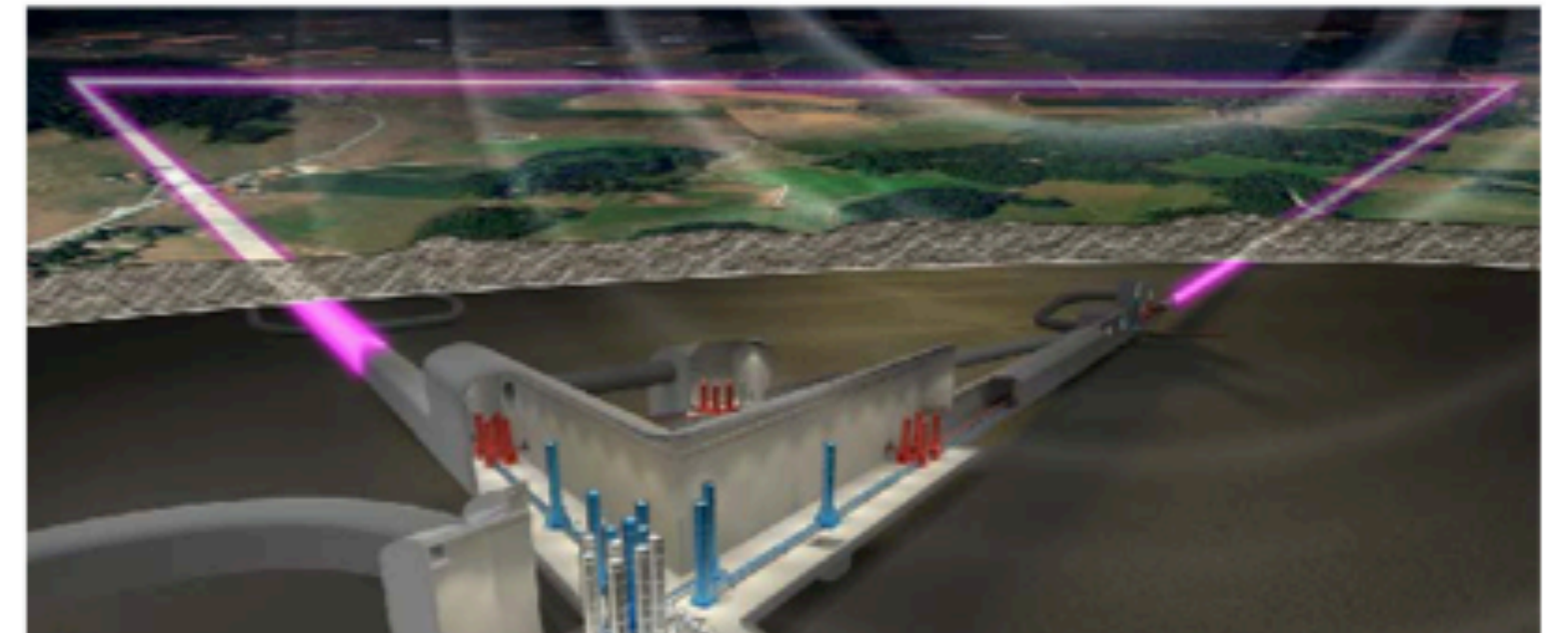
- Large scale detector in Italy, currently upgraded
- Nikhef installed detector upgrades (FDS)

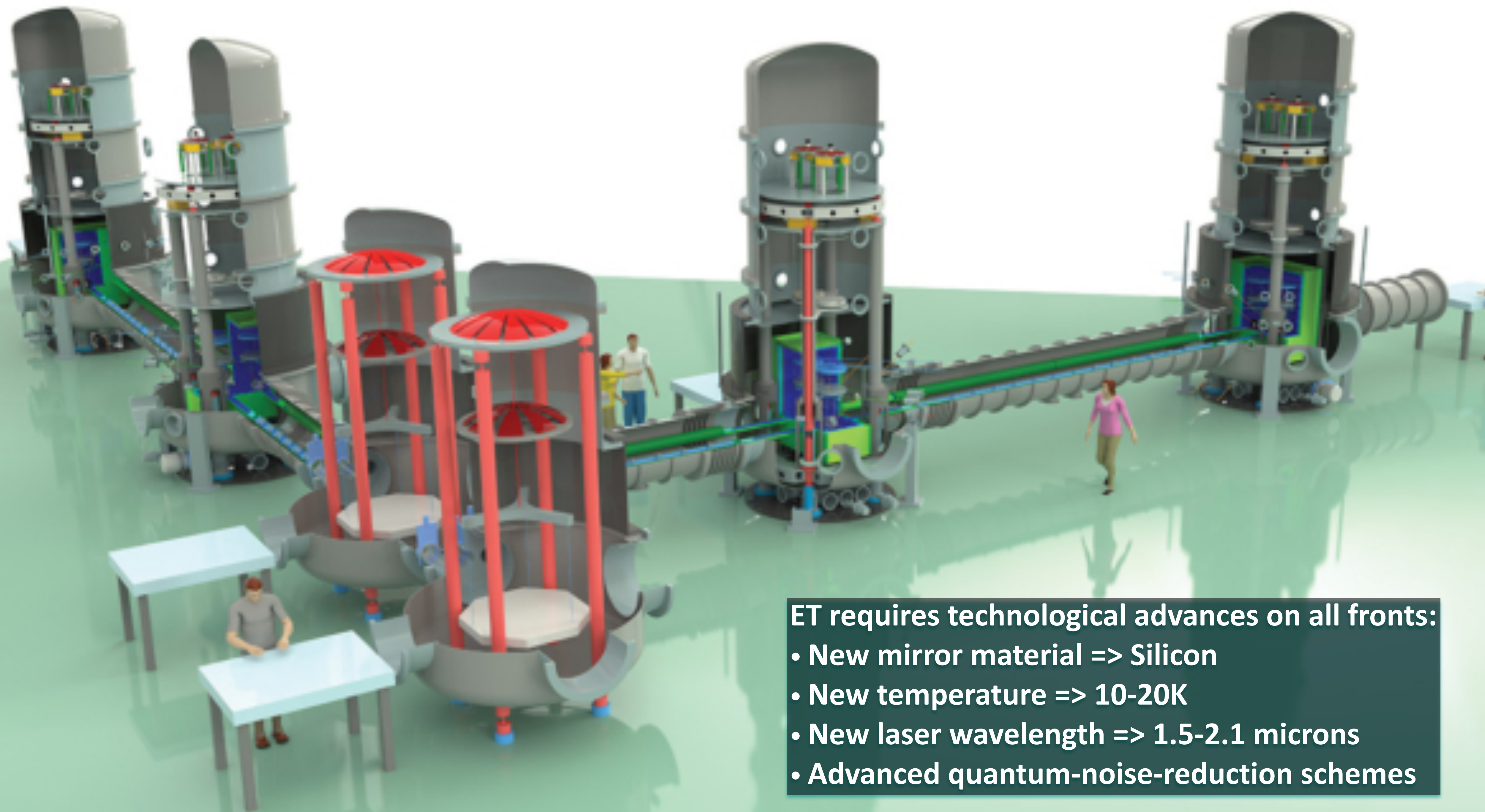
Einstein Telescope

- Plan for future facility in Europe. Currently design, site selection, technical development

ETpathfinder

- 10m scale prototype and R&D facility for future GW technologies. Under construction in Maastricht





ET requires technological advances on all fronts:

- New mirror material => Silicon
- New temperature => 10-20K
- New laser wavelength => 1.5-2.1 microns
- Advanced quantum-noise-reduction schemes

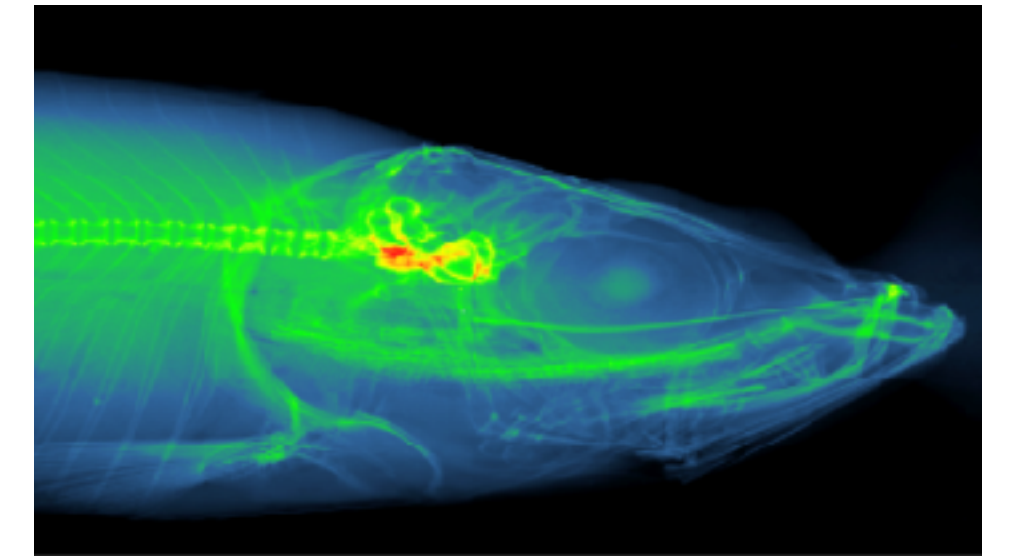
KNOWLEDGE TRANSFER

Social impact & KT increasingly important

- Lively ILO network - Jan Visser
 - Clear that the common way is not easy in our field
- Various flavors possible
 - Start from Nikhef knowledge
 - Co-development
 - Outsourcing
 - Facilities
 - Talent!

Nikhef supports every reasonable idea!

- Open to discuss with you all



technology

DUTCH CERN-BIC @ Nikhef

Three business incubators

- Large further potential



Coordinating Dutch research at CERN
-
Coordinating NL-CERN-BIC's



Amsterdam

ICT - AI -



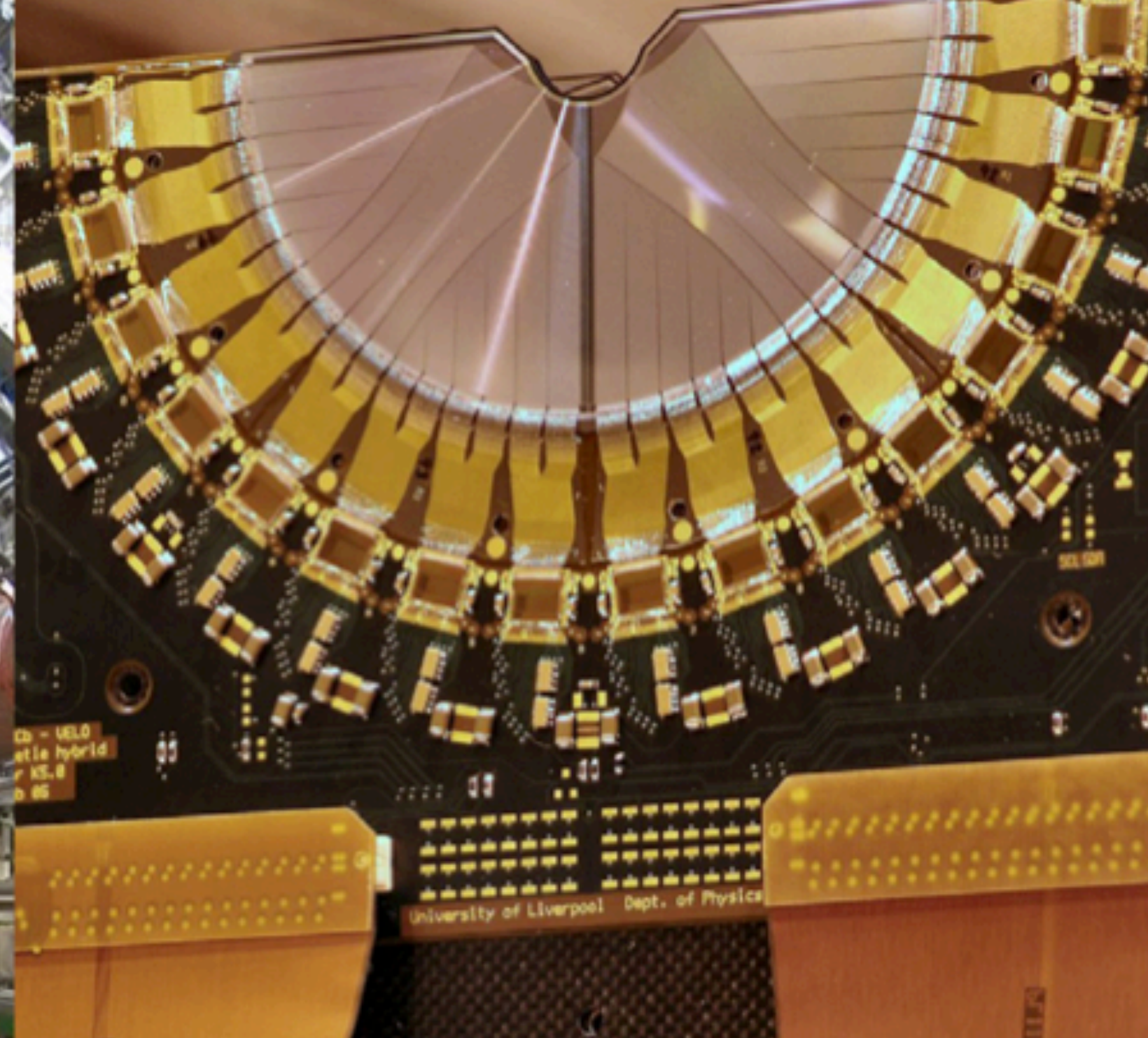
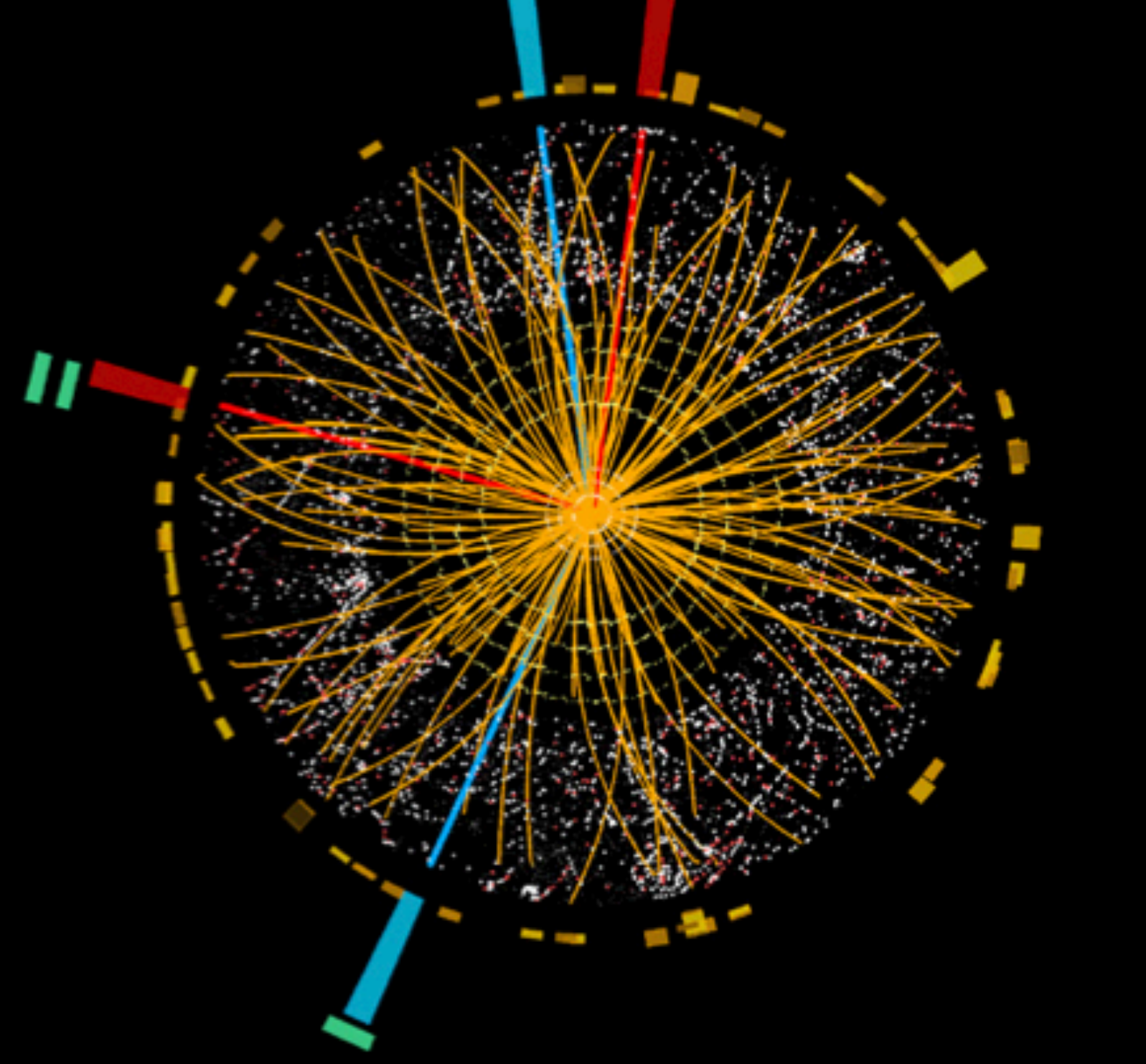
Eindhoven



New materials -



Geleen



HAVE A FRUITFUL HOLLAND@CERN!