

# Workshop on opportunities for Finnish industry at CERN – 25.5.2022

## FIBRE OPTICS

D. Ricci, M. Parodi on behalf of EN-EL group



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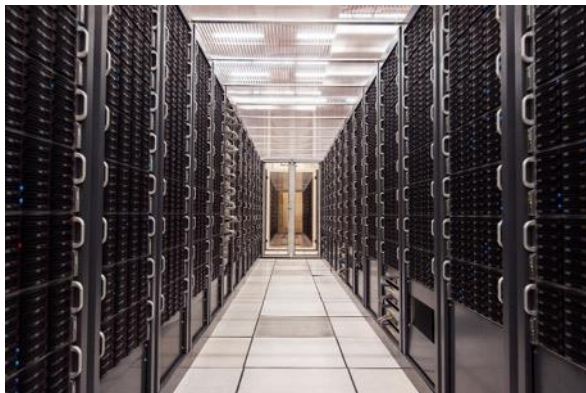
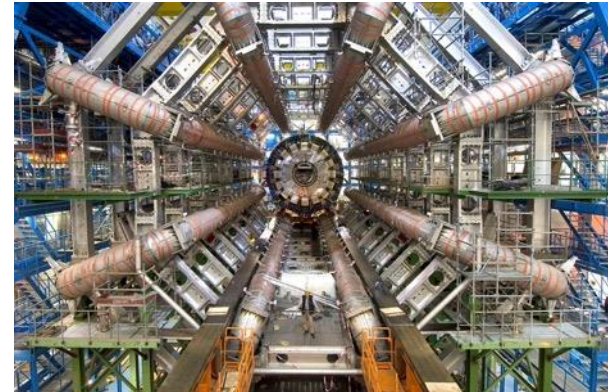
# Agenda

1. CERN optical fibre infrastructure
2. Type of Contracts and examples
3. Upcoming industrial opportunities

# Optical fibre infrastructure at CERN

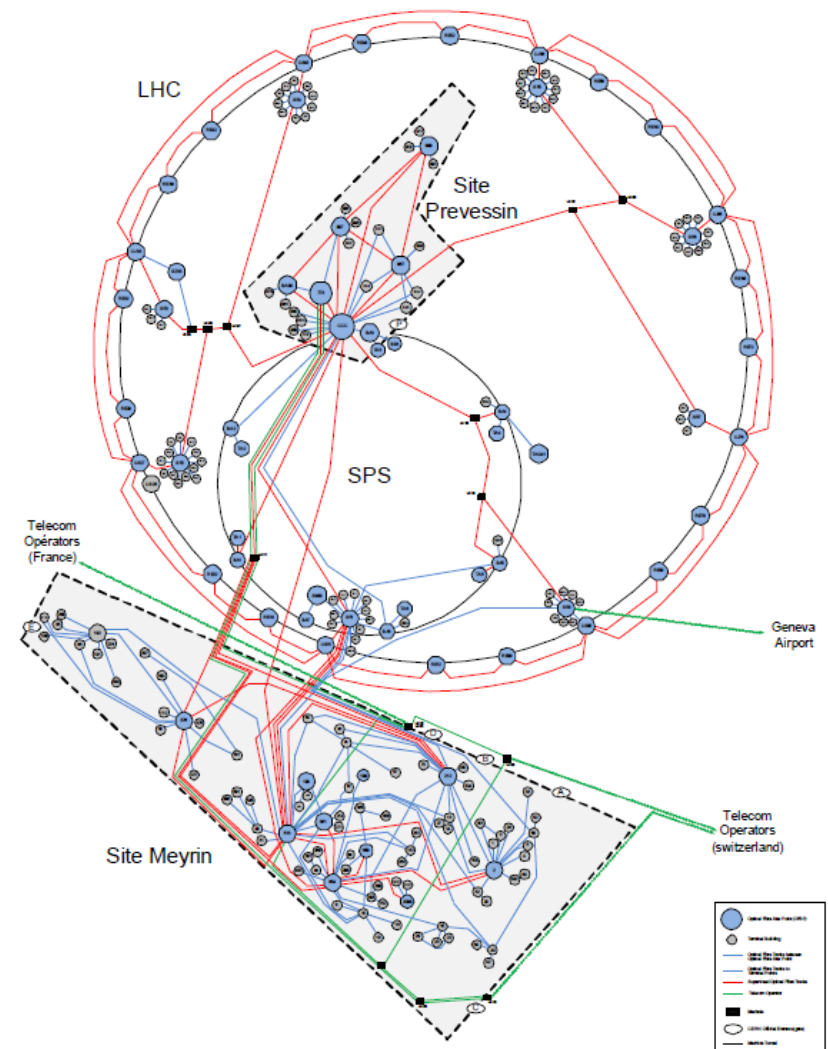
**Serving: accelerators, experiments, tertiary and IT networks**

- Single-Mode fibres, Multi-Mode fibres and special fibres for specific applications
- Projects, Consolidation & Maintenance



# Optical fibre infrastructure at CERN

- **Star point topology**
- **SMF, MMF, and special fibres**
- **Quantities**
  - Approx. 50'000 km of installed fibres
  - Approx. 200'000 connectors
- **Harsh environment with**
  - High radiation levels
  - Very low temperatures

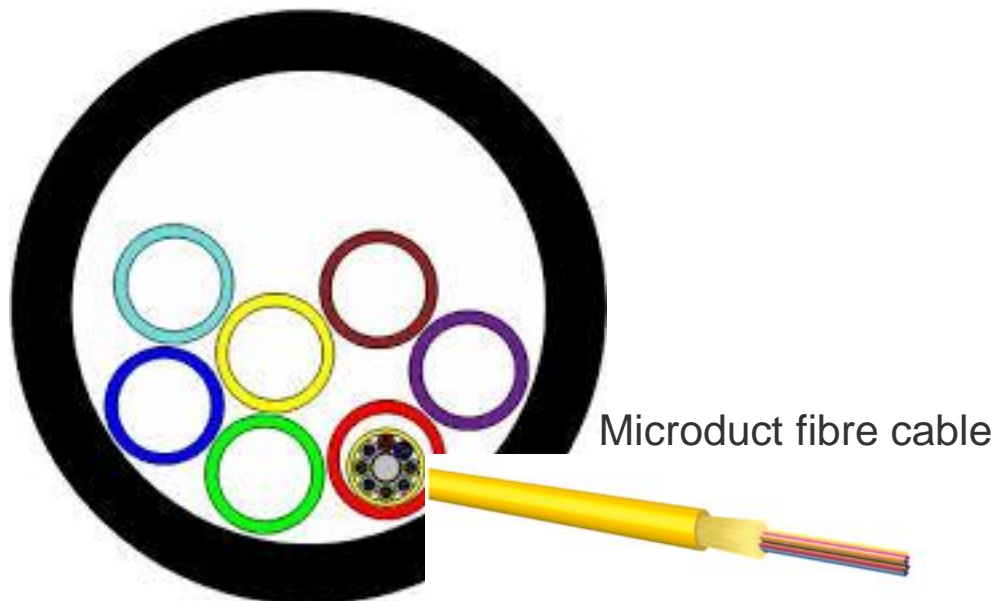


# Types of Contracts

- **In general:**
  - **Blanket** contracts for the supply of equipment
  - **Service** contracts for installation and maintenance
  
- **Supply contracts (blanket purchase)**
  - Supply of optical fibre cables, pre-terminated cables, terminal hardware, etc...
    - 2 currently in place, 1 completing tendering process**
  - Supply of optical fibre ducts for cable blowing
    - 1 to tender soon**
  
- **Service contract**
  - Installation (by both air-blowing and conventional cable pulling )
    - 1 currently in place**



# Example – Optical fibre duct & cable blowing



# Upcoming industrial opportunities

## ▪ Supply contracts (blanket purchase contracts up to 5 years)

Contract description	Comments	Market Survey	Invitation to Tender	Estimated volume
Supply of optical fibre ducts and microducts	New contract	Q3 2022	Q4 2022	200 km
Supply of optical fibre patch cords and assemblies	New contract	<i>Completed</i>	<i>Ongoing</i>	6500 pcs
Supply of radiation resistant single mode optical fibres (Specialty)	New contract	2023		1500 km

Concerning Specialty Fibres, we are also keen to explore opportunities with sufficiently experienced companies, for manufacturing:

- radiation-sensors (e.g. with Phosphorous-doped fibres or radio-luminescent fibres)
- Polarization maintaining fibres



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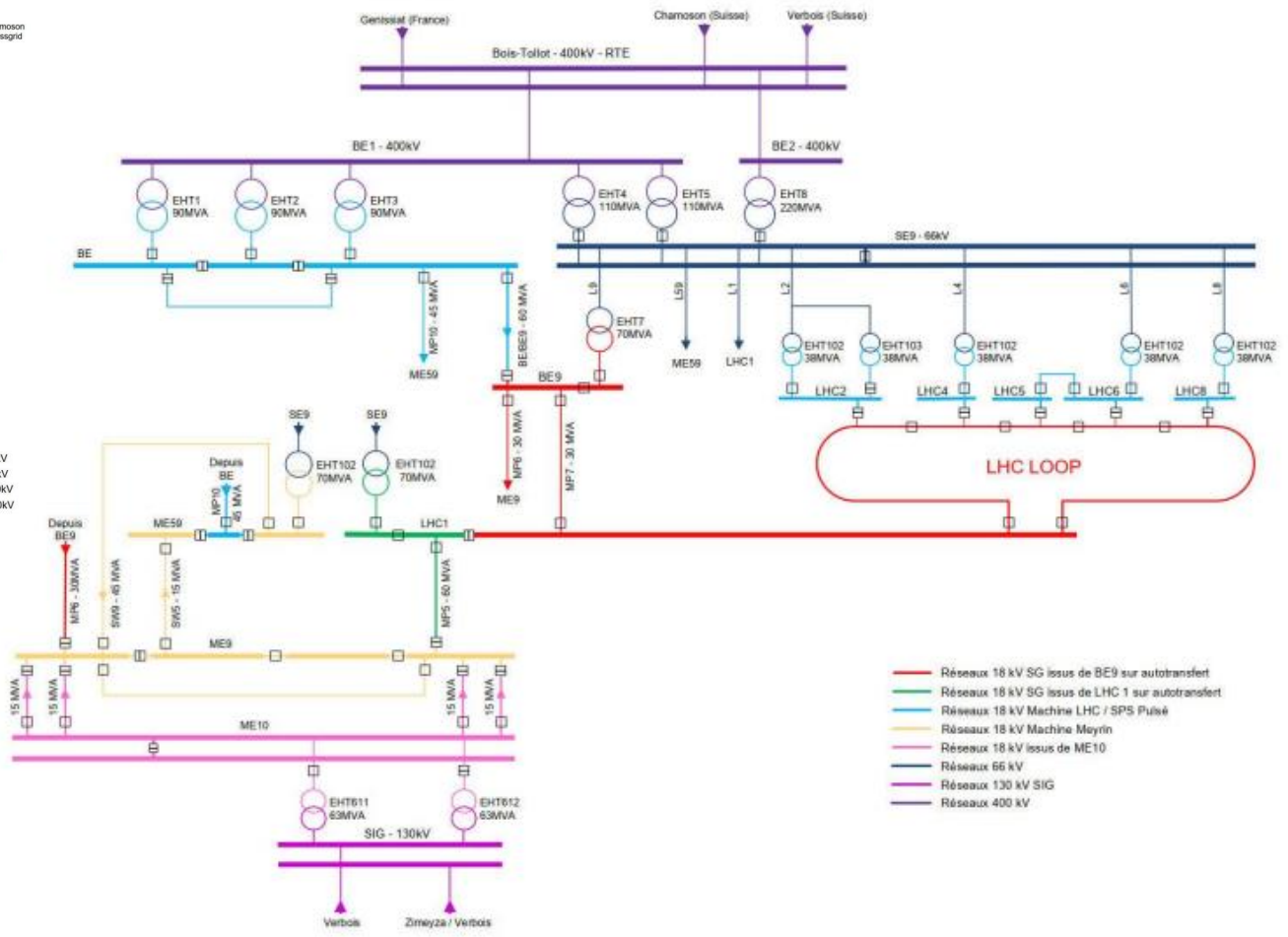
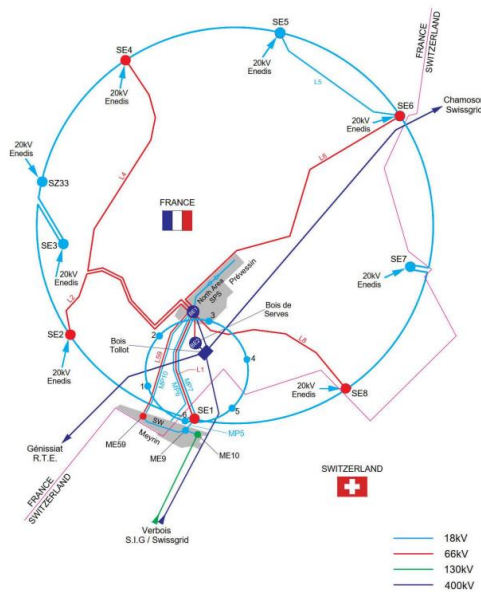
## Power Distribution

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# CERN HV Electrical Network



- Réseaux 18 kV SG issus de BE9 sur autotransfert
- Réseaux 18 kV SG issus de LHC 1 sur autotransfert
- Réseaux 18 kV Machine LHC / SPS Pulsé
- Réseaux 18 kV Machine Meyrin
- Réseaux 18 kV issus de ME10
- Réseaux 66 kV
- Réseaux 130 kV SIG
- Réseaux 400 kV

# Upcoming Industrial Opportunities

Type of Contract	Description	Adjudication
Supply	Supply of water cooled cables	Mar-23
IS	Maintenance transformateurs HTB	Mar-23
IS+Supply	Supply, installation, commissioning & maintenance of electrical switchgear (18 and 3.3 kV)	Jun-22
IS+Supply	Supply, commissioning, operation and maintenance of modular power converter systems (UPS 48 V & Central safety power supply systems 230 V)	Sep-22
Supply	Supply installation of UPS	Jun-23
IS+Supply	Supply, Installation, Acceptance Tests, and Maintenance of modular metal-enclosed, 400/230 V low voltage switchboards for indoor use (type 1 & 2)	Dec-22
Supply	New 66 kV line LHC5-LHC6	Mar-23
Supply	66 kV substation LHC5 and LHC6	Jun-23
Supply	66/18 kV transformer LHC5	Jun-23
Supply	New LHC5 emergency gensets	Mar-24
Supply	UPS for Hostlab 2	Mar-24

Target: Standard industrial materials/services

# Future Opportunities

- We are keen to explore opportunities with sufficiently experienced companies for Super-Conductivity applications (particularly HSC) in AC power distribution domain.
- Strong experience on SC magnets and SC DC links at CERN, not in specific HSC AC distribution applications.
- Potential impact:
  - Existing infrastructures
  - Future facilities under conceptual study
- No specific initiatives on this topic are active at the moment in EN-EL group