

LABORATÓRIO DE INSTRUMENTAÇÃO E FÍSICA EXPERIMENTAL DE PARTÍCULAS

# LOMaC

Laboratory of optics and scintillating materials



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LIP Advisory meeting, April 24th 2025

# **MAIN ACTIVITIES**

#### Sets of fibres for NEXT

Preparation and aluminisation of sets of optical fibres with different lengths.

Fibers prepared for

- NEXT-100 muon veto
- HD-Demo prototype panels

New sets foreseen for 2025







### **ATLAS/TileCal Phase II upgrade - entering production**

#### **HVbus distribution boards**

- Connectors successfully irradiated recently
- Pre-production of 100 boards done
- Production of ~900 units will start this year





# **MAIN ACTIVITIES**

#### ATLAS/TileCal Phase II upgrade

#### Prototyping of HV generation, regulation & control boards for TileCal

- Design improved
- Producing new set of prototypes
- Pre-production will follow during 2025









#### **HV cables**

- Prototypes of HV Cables developed with PT branch of General Cable
- Final design established
- Cables passed test fire requirements
- Pre-production will follow during 2025





### **MAIN ACTIVITIES**

### **TileCal radiation hardness studies**

Submitted to: JINST

23rd December 2024

Study of the Radiation Hardness of the ATLAS Tile Calorimeter Optical Instrumentation with Run 2 data

A dedicated study of TileCal radiation hardness was accepted for publication

- Model of scintillator degradation and dose rate dependence agrees with CMS
- Extrapolations for HL-LHC



# **TOWARD FUTURE DETECTORS**

#### New scintillators based on PEN and PET

Follow up ScintiLink proposal submitted early 2024: • towards injection moulding of real size +::-• set basis for it.

- set basis for industrial production
- No news since submission, keeping the project alive with alternative funding (small mould/production improvements)

#### **Participation in the DRD6 collaboration**

in the proposing team of a TileCal-like HCAL within the ALLEGRO detector concept for FCC-ee

Rute Pedro, contact person for the DRD6 TileCal subtask

Preparing prototype construction for testbeam

R&D on plastic routers (profiles) for fibers Performance simulation studies



# **NEW ACTIVITIES**

### **AntiMatter-OTech**

EIC project (on hold), led by CNRS Liquid-opaque scintillator for antimatter detection in nuclear industry

- ~20 000 fibers (1 mm diameter)
- readout by SiPMs

Construction moved to Lisbon - CTN

Entering consortium

 Responsibility for the optical fibers assembly (R&D and production)

### Boneoscopy

EIC project for radiotherapy in bone cancer

- Contributing to a scintillating timing tracker for real-time monitoring of radiotherapy
- Based on sub-mm wide scintillating fibers





### **SWOT** analysis

#### **Strengths**

Long-standing expertise in the test, preparation, and aluminization of plastic optical fibres for detectors. Frequently requested to contribute to other experiments (e.g. NEXT, AntiMatter-OTech, Boneoscopy).

#### Weaknesses

Difficulty to keep regular funding (no news from an application to a PTDC project from early 2024)

Great part of the team members are spread across multiple groups and research projects.

#### Opportunities

New multi-year programmatic funding recently approved for LIP will help in reequipment Newly established international collaborations (DRD6) may be leveraged to attract new funding New projects/collaborations (AM-OTECH, Boneoscopy) open new research areas

#### **D** Threats

The closure of the PT-CERN PhD programme will most probably affect the incoming of new students.