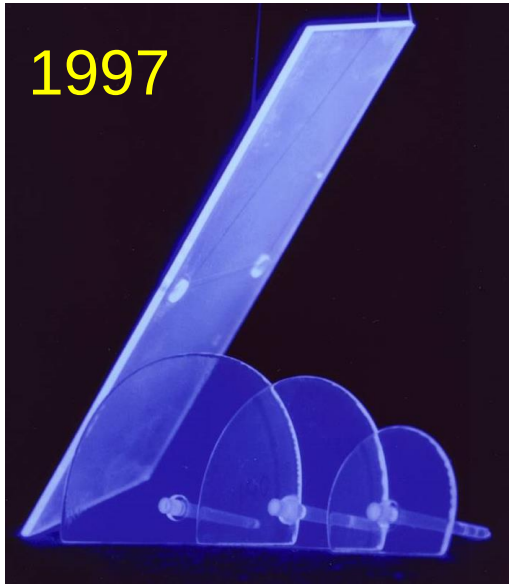
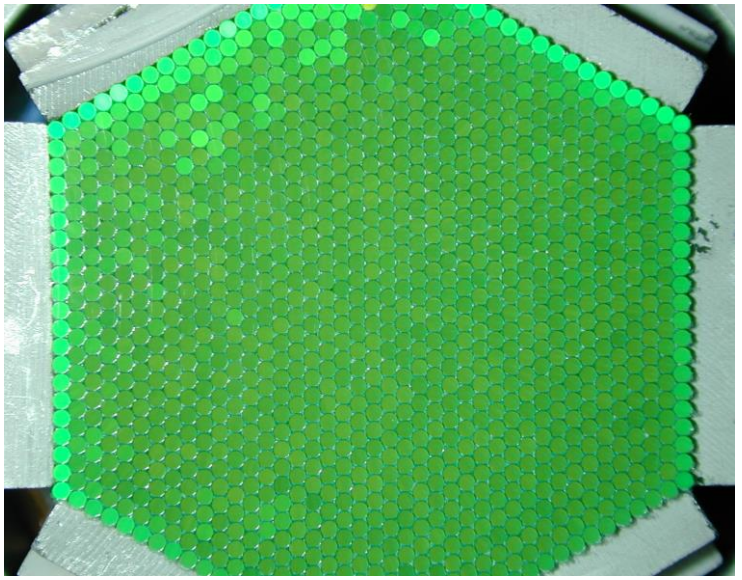
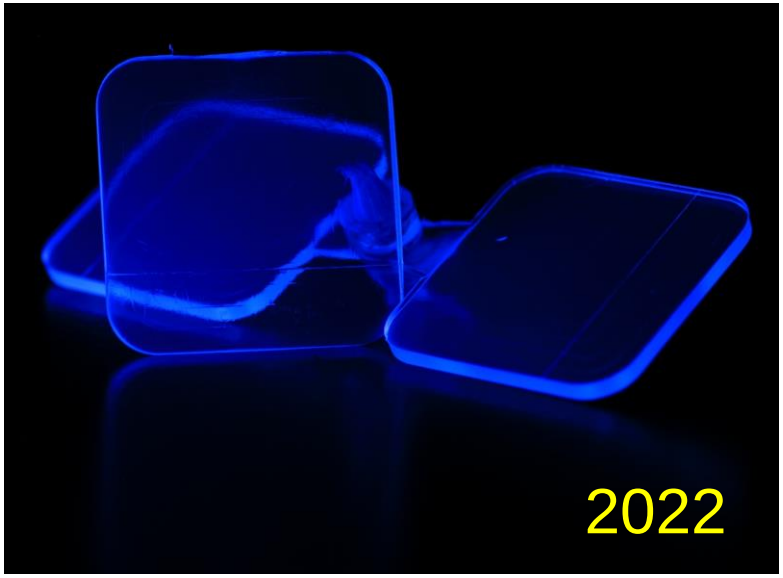
LABORATÓRIO DE INSTRUMENTAÇÃO
E FÍSICA EXPERIMENTAL DE PARTÍCULAS

LOMaC

Laboratory of optics and scintillating materials







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ECFA Detector R&D Roadmap DRD6
2nd Community Meeting, CERN, 20 April 2023
DRD6 Track 3 Proposals
slide from presentation by Marco Lucchini & Philipp Roloff

Scintillating Tile HCAL for future colliders with TileCal like geometry and SiPM photodetectors

Detector concept: Hadron calorimeter with scintillating tiles and WLS fibre readout

Target application: FCC-hh and FCC-ee

Unique challenges: Cost-effective production of tiles, radiation hardness for FCC-hh

Technology: Organic scintillating tiles, Steel (+Pb for FCC-hh) absorber, readout by WLS fibres and SiPMs

Next 3+ year goals: Performance studies using simulations, R&D on PEN and PET scintillator, mechanical design and construction of test-beam modules

*CERN (**Switzerland**)*

*LIP (**Portugal**)*

*FZU (**Czech Republic**)*

*Universitetet I Bergen (**Norway**)*

*IFIC - Valencia University (**Spain**)*

*INCDTIM (**Romania**)*

*Charles University (**Czech Republic**)*

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Included in our intentions: design optimisation, using Machine Learning techniques, of a high granularity calorimeter for a future lepton collider

SWOT analysis

- **Strengths**

Long-standing expertise in the test, preparation, and aluminization of plastic optical fibres for detectors.

Only a few facilities of this kind exist in the world.

LOMaC is fundamental for the ATLAS TileCal upgrades.

- **Weaknesses**

Aging equipment needing replacements and upgrades (reequipment in progress).

- **Opportunities**

The FCC-hh Conceptual Design Report has demonstrated that the TileCal design is still one of the best for a hadronic calorimeter. This opens the opportunity to participate in new detectors in HEP or related fields.

The ECFA Detectors R&D Roadmap implementation, with the new Detector R&D Collaborations, opens new opportunities to boost our R&D on scintillators and calorimetry for the future colliders and attract new funding to support them.

The LIP Internship program and the PT-CERN Ph.D. grants started to attract people interested to work in the areas of activity of LOMaC.

- **Threats**

Lack of sustained operations of the main fibre preparation facilities is possible.