

WP14 Deliverable 14.1



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DELIVERABLE REPORT

FIBRE TEST BENCHES

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1. INTRODUCTION

An essential part of the activities in WP14 is the development and construction of test infrastructures for calorimeter elements to support the R&D activities in the area of calorimetry for future collider detectors. Task 14.2 focuses on calorimeters with optical readout and is subdivided in two subtasks, subtask 14.2.1: *“Test benches for characterisation of organic and inorganic scintillator fibres for future calorimetry”* and subtask 14.2.2: *“Test Benches for the Characterisation of highly granular Calorimeter Elements with Scintillator and SiPM Readout”*.

In the frame of subtask 14.2.1, several test setups have been developed for the characterisation and performance study of different types of fibres (heavy crystal fibres and light fibres based on SiO₂).

- Attenuation length measurement benches at CERN at UNIMIB
- Uniformity measurement bench at ETHZ
- Pump and probe setup for timing properties investigation at Vilnius
- Test stand for the evaluation of light attenuation variation during irradiation at Brunel
- ⁶⁰Co irradiation bench at CERN
- A setup to study SiO₂:Ce fibres as wavelength-shifters at ETHZ
- An absorber made of 0.75W/0.25Cu to evaluate the calorimetric performance of scintillating fibres
- A data acquisition system for high energy beam tests

These different test benches provide an infrastructure for the in-depth investigation of optical and radiation hardness properties of all types of scintillating fibres as well as their test in a calorimeter prototype. In the following section a short description of these benches will be given. For a more detailed description of the individual setups refer to [AIDA-2020-NOTE-2019-004].

Table 1: list of benches of infrastructures developed in the frame of Task14.2.1

	Bench type	Place	Contact person
1	Light attenuation measurement	CERN	Etiennette Auffray
2	Optical absorption measurement	UNIMIB	Anna Vedda
3	Light uniformity response	ETHZ	Francesca Nessi-Tedaldi
4	Pump and probe test bench	Vilnius	Gintautas Tamulaitis
5	Light attenuation under radiation	Brunel	Peter Hobson
6	Irradiation facility	CERN	Etiennette Auffray
7	Test beam infrastructure	ETHZ	Simone Piggazini
8	SPACAL absorber	CERN	Etiennette Auffray
9	High-granularity readout with SiPM	Torino	Nazar Bartosik