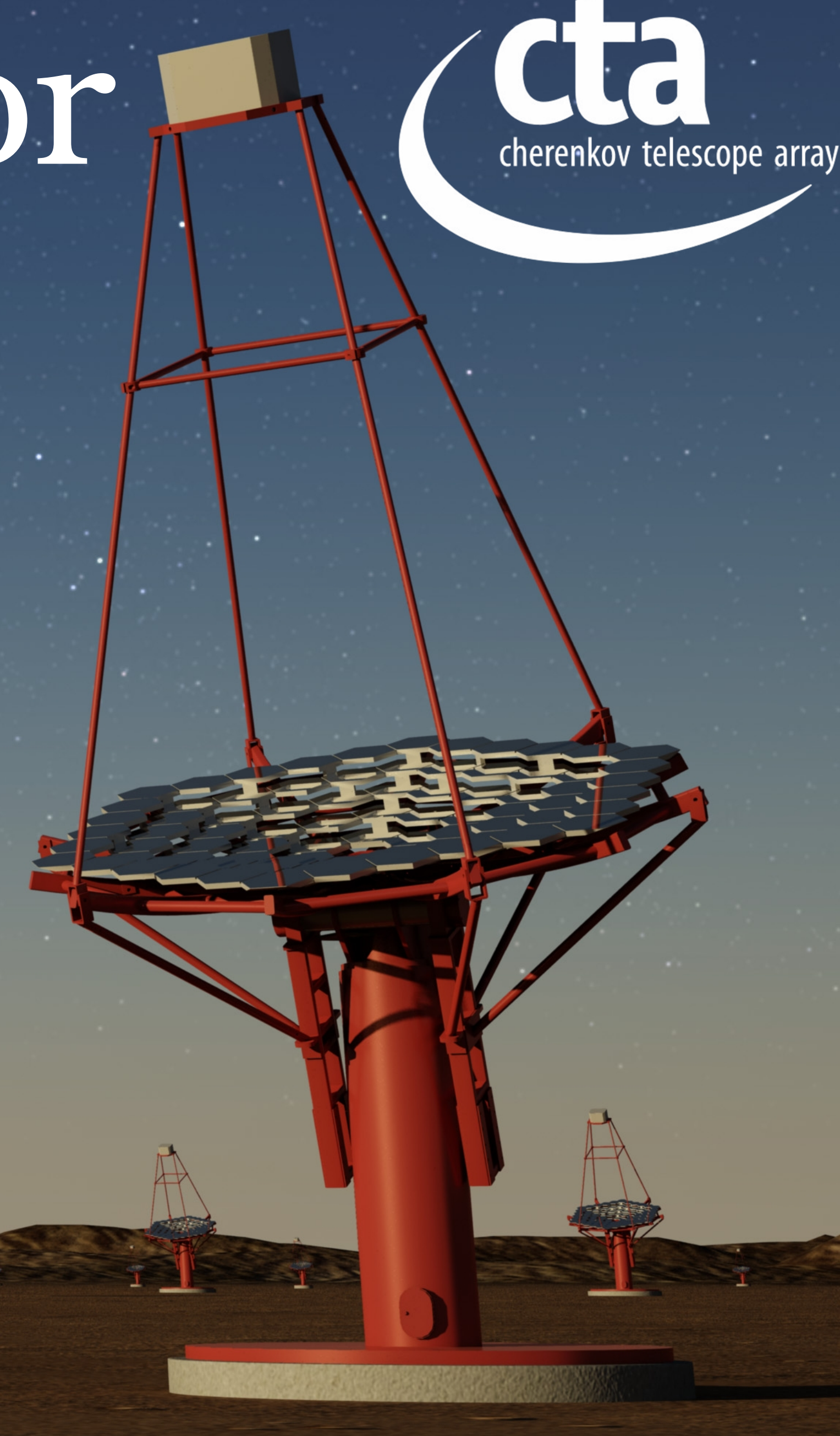


Central Acceptance Testing for Camera Technologies for the Cherenkov Telescope Array

A. Bonardi¹, T. Buanes², P. Chadwick³, F. Dazzi⁴, A. Förster⁵, J. R. Hörandel¹, M. Punch⁶, R. M. Wagner⁷ for the CTA Consortium⁸

¹Radboud University Nijmegen, ²University of Bergen, ³Durham University, ⁴Max Planck Institute for Physics, ⁵Max Planck Institute for Nuclear Physics, ⁶Linnaeus University & APC-CNRS/IN2P3, ⁷Oskar Klein Centre & Stockholm University, ⁸See www.cta-observatory.org for full author & affiliation list



ABSTRACT

The Cherenkov Telescope Array (CTA) observatory will employ several different technologies for the cameras detecting the Cherenkov light from the observed air showers. The Camera Test Facilities (CTF) work package is developing a detailed camera acceptance test program covering the most important performance, stability, and durability requirements, including setting up the necessary equipment. These tests will be performed on fully-integrated cameras or on camera sub-units, so to provide early feedback for camera development. The test procedures and the current status of the test facilities is here presented.



Central Acceptance Testing

Several different technologies for the Cherenkov light cameras have been developed for the three CTA telescope classes over the last years. Cherenkov light cameras are by far the most complicated and technologically challenging item for CTA, whose activities rely on their operating well. These cameras have to face harsh conditions, hence their resistance to environmental influences is a major concern. The Camera Test Facilities (CTF) work package has been put in place to perform a central, homogeneous and standardized technology evaluation for all technologies. The planned tests include:

- **Performance Tests**
Pixel resolution and timing, Pixel cross-talk, Trigger performance, Robustness to and recovery time after power-line variations, Robustness to accidental bright light exposure.
- **Mechanical Tests**
Test of movable components, Wind load test, Vibration test, Rain simulation test, Mechanical impact (hailstone) test.
- **Long-Term Durability Tests**
Temperature and humidity cycling, Solar radiation, Salt-fog exposure.

For each camera technology, tests will be carried out on camera prototypes and first sample from mass production (if deviates from prototype). Tests can be performed on preliminary camera sub-units, so to provide advance feedback for camera development.

ACKNOWLEDGEMENTS

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CTF Testing Facilities

CTF Common Light Source

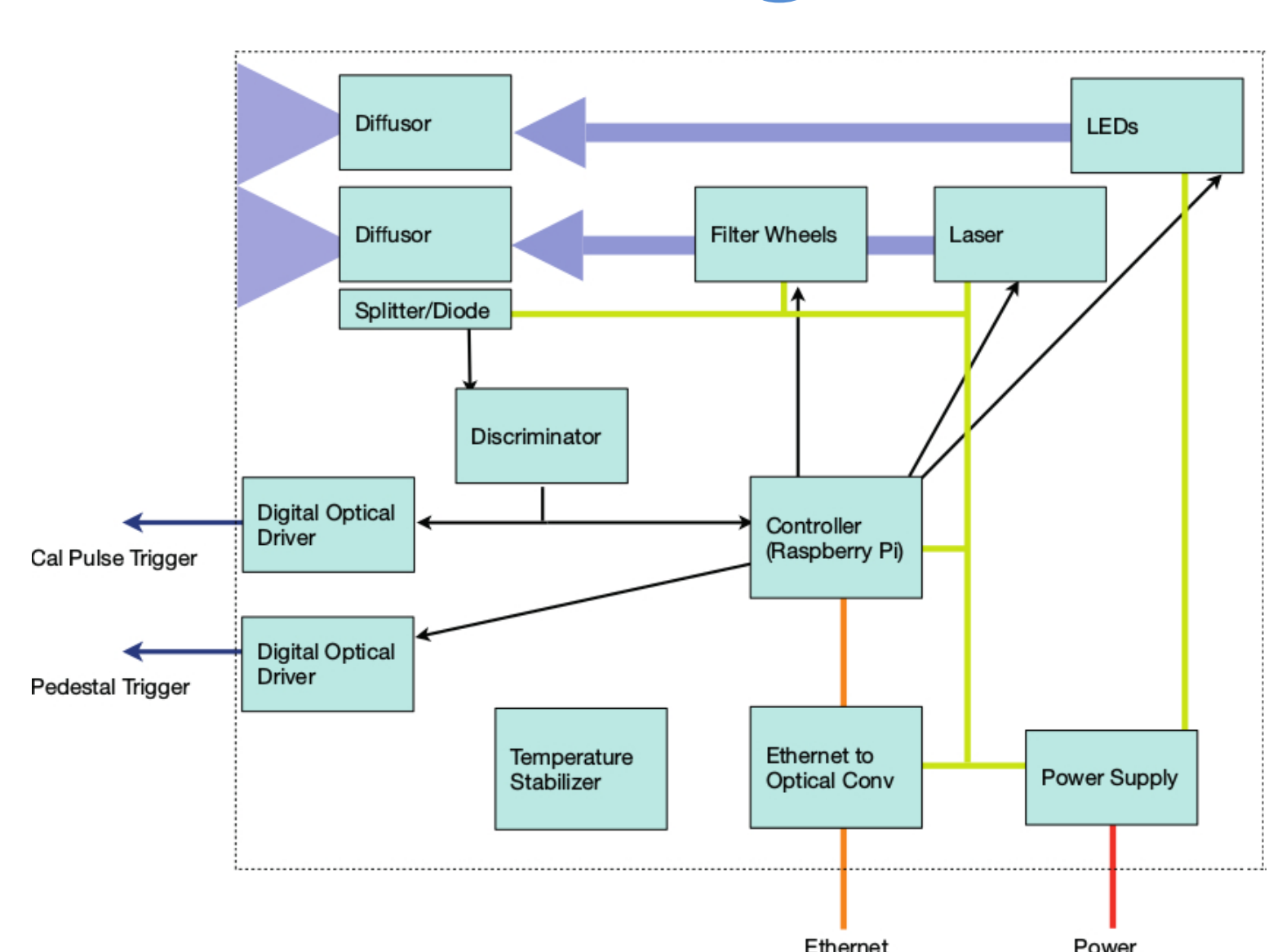


Fig. 1: Design scheme of the common CTF light source developed by SU.

Module Test Setup

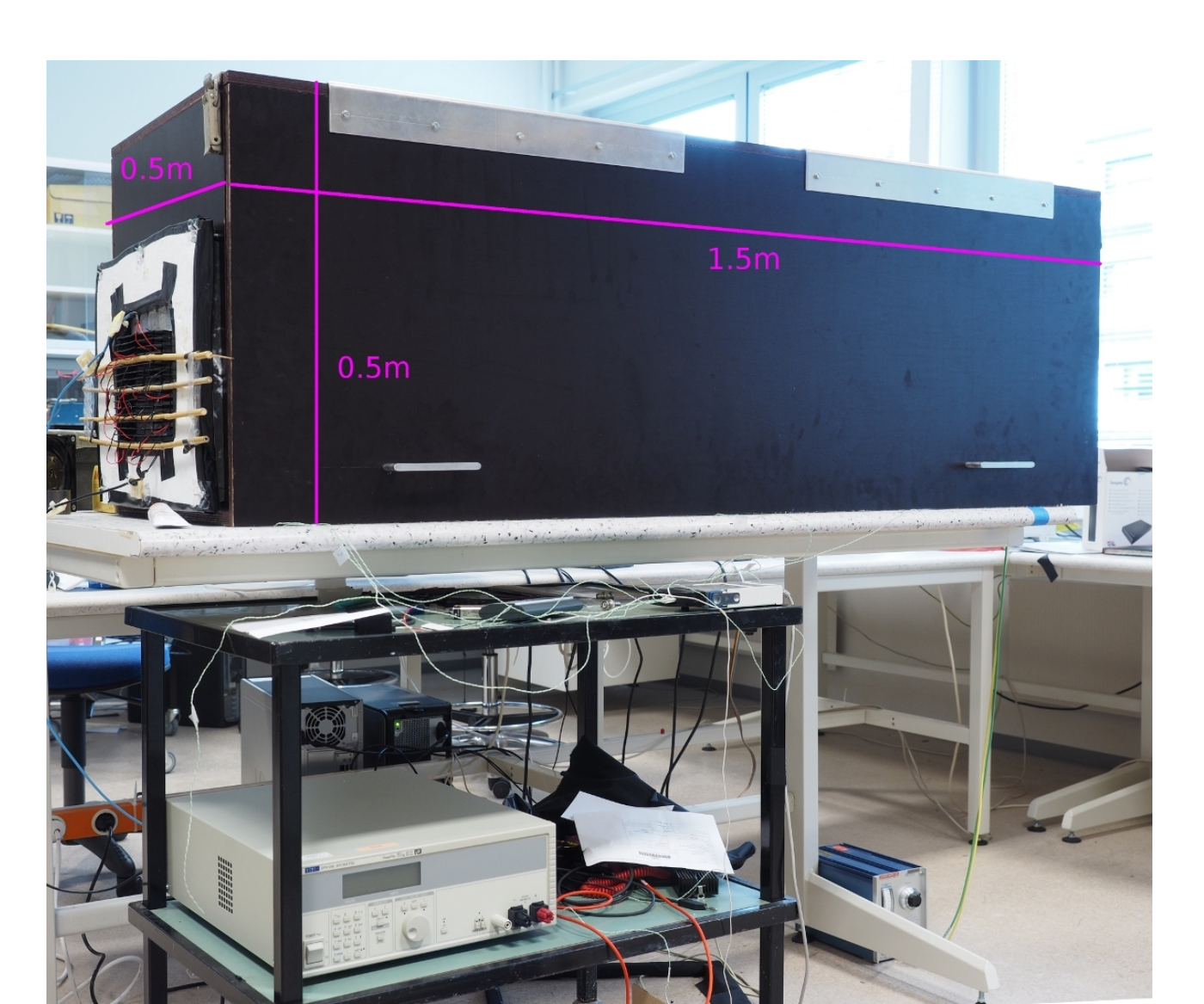


Fig. 4: The climate dark box for module testing at Bergen University

Cluster Test Setup

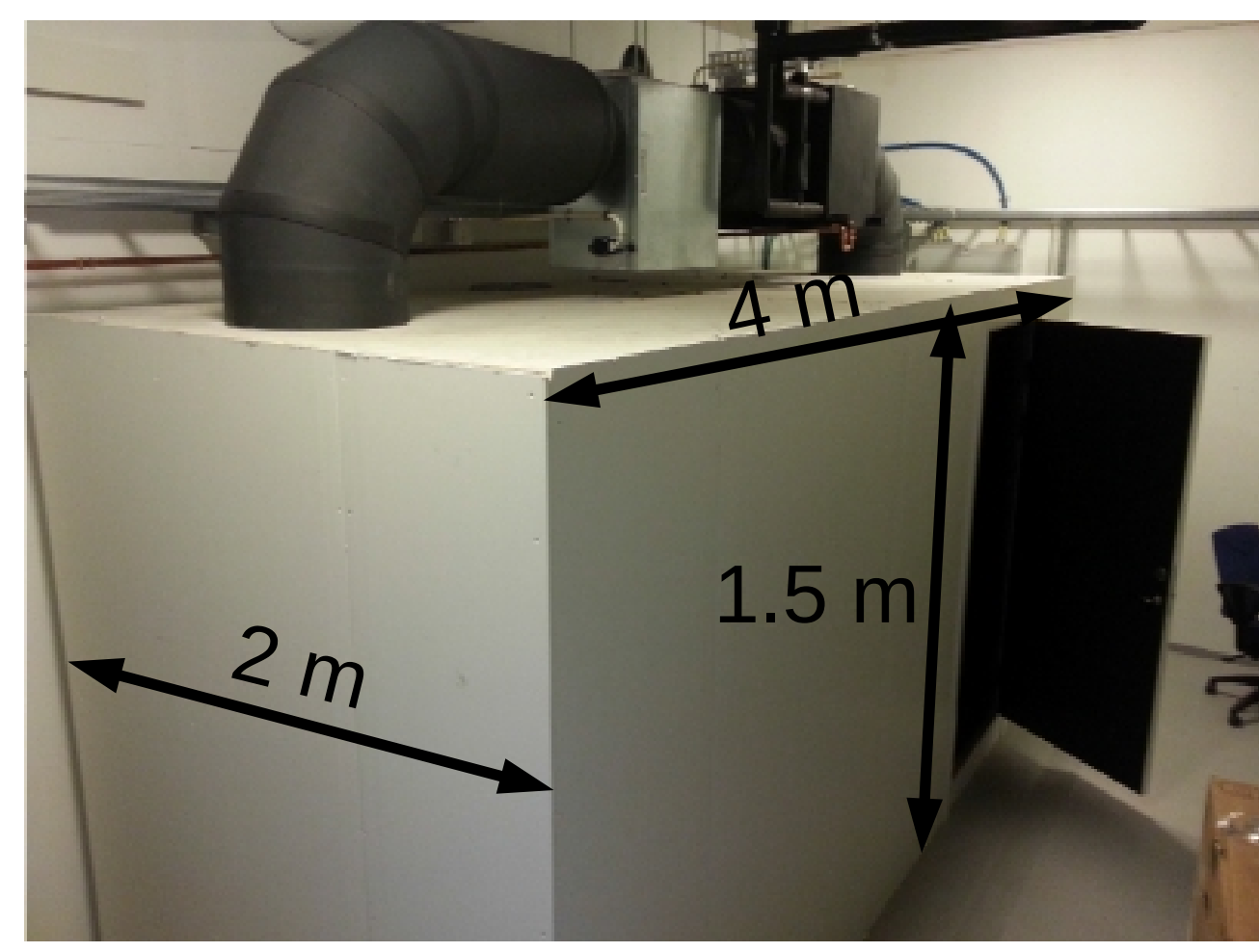


Fig. 2: The climate dark room for cluster testing at Linnæus University

Mobile Camera Test Setup

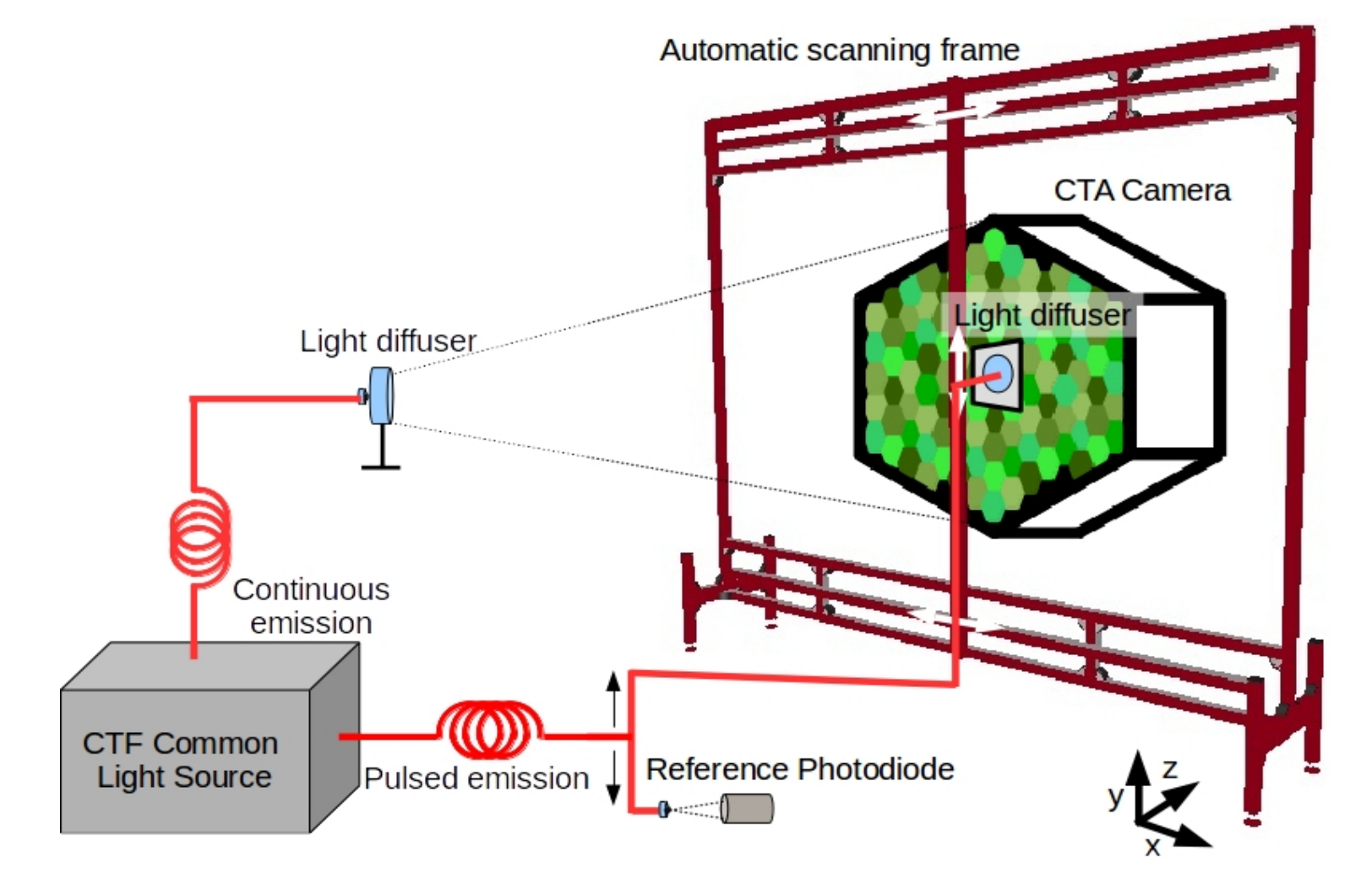


Fig. 5: Scheme of the mobile test setup developed by RU. Tests are performed at camera site

Climate Chamber

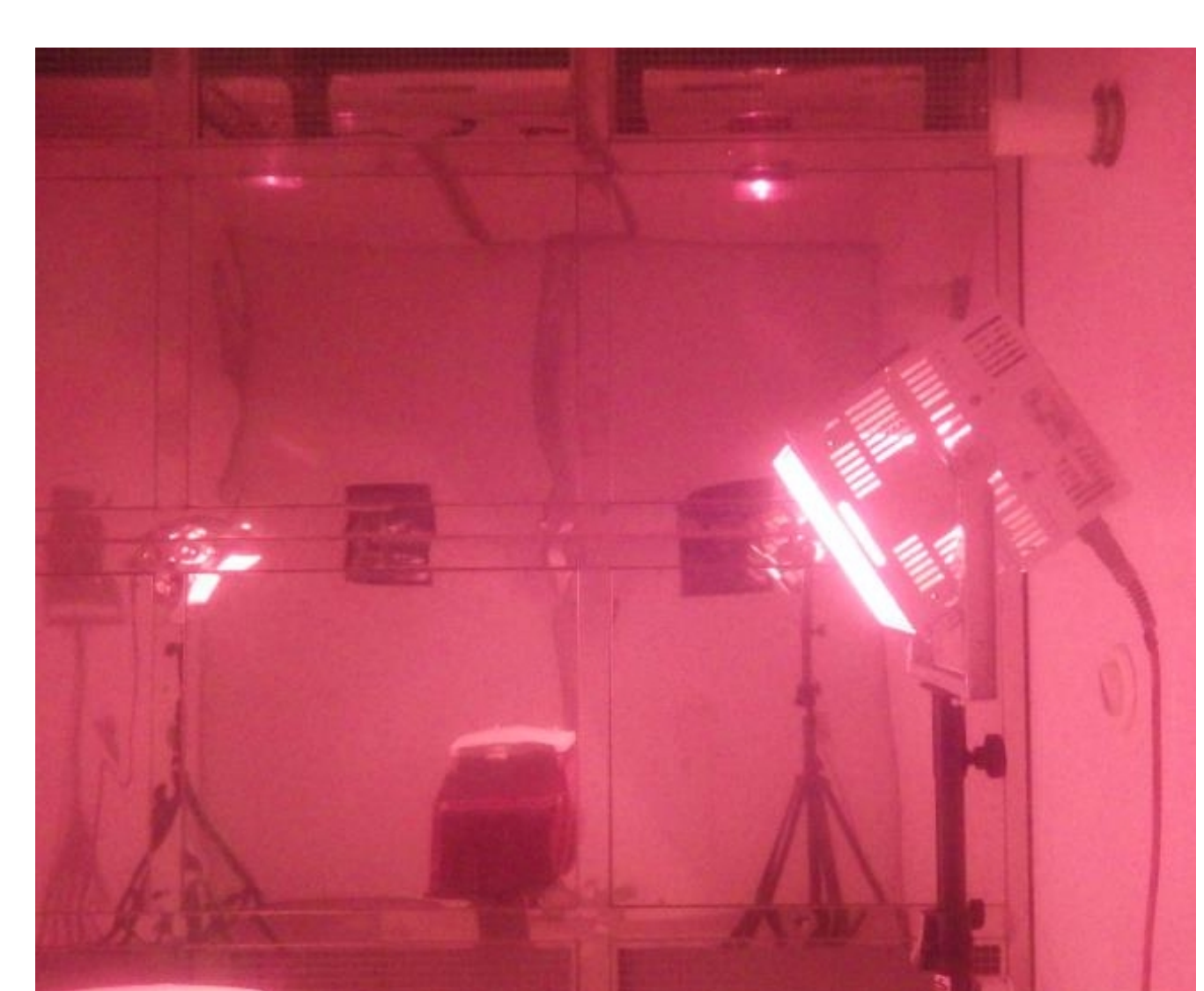


Fig. 3: Climate chamber at Durham University during solar irradiation test on a camera housing prototype

Salt-Mist Chamber

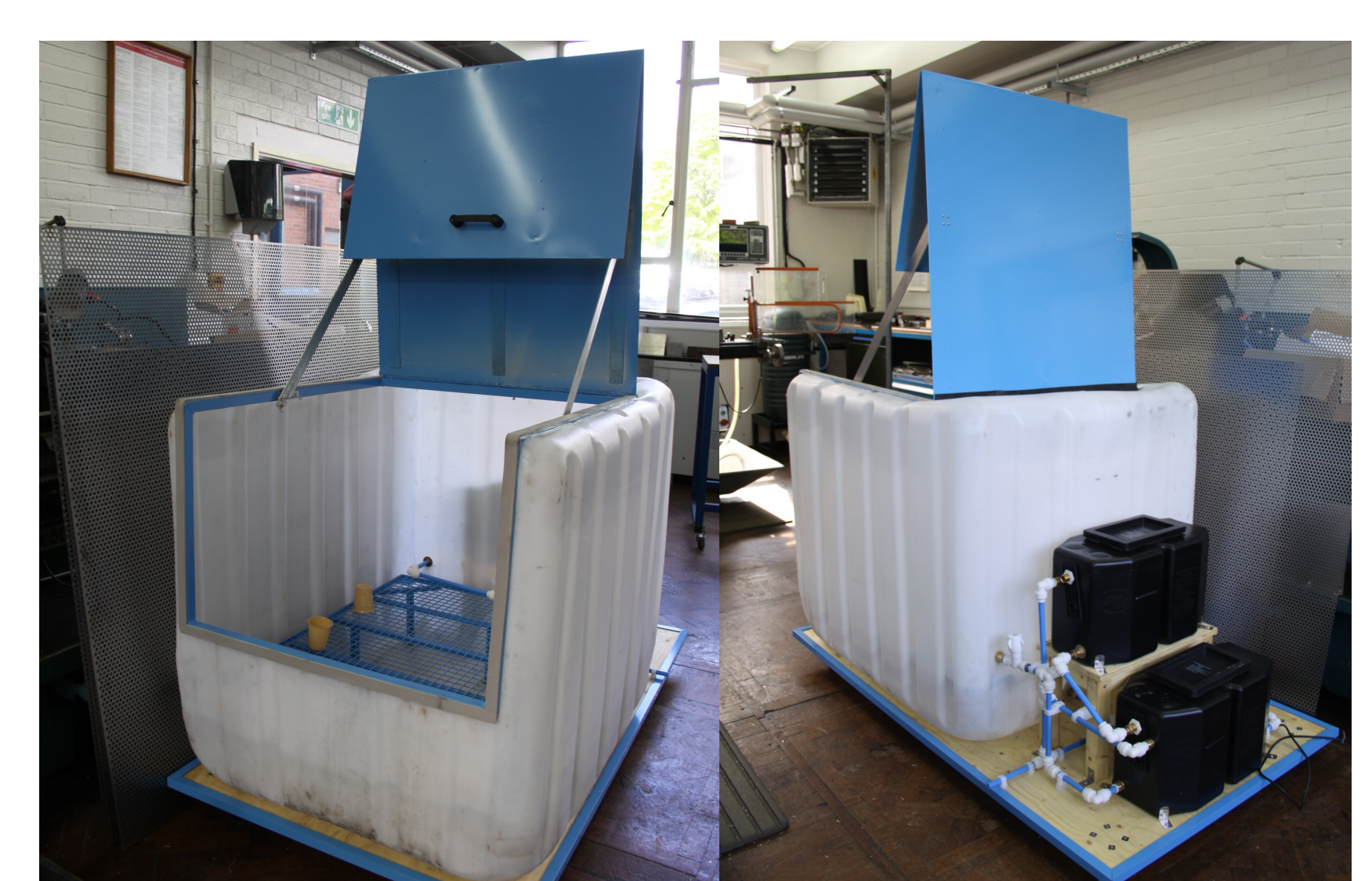


Fig. 6: Salt-mist chamber at Durham University for tests on camera housing samples