

FlatField Calibration Sources for the CTAO and H.E.S.S. cameras

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This project is a P.Brun and S.Rivoire one. Designed by P.Brun, assembled and tested by P.Brun/S.Rivoire. Saclay obtained results analysed by J.Devin.

Design Goals

Make a light source (@400 nm) able to generate a flat field pattern and a single photon pulse.

This light source “Calibration box” will be placed in the center of the dish at a distance of 16 m from the MST camera.

Requirements:

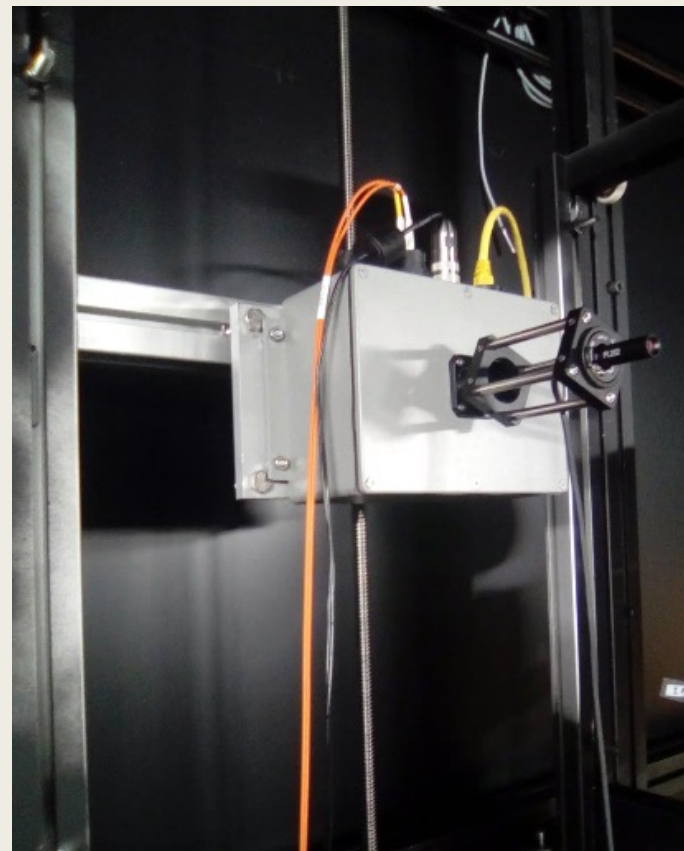
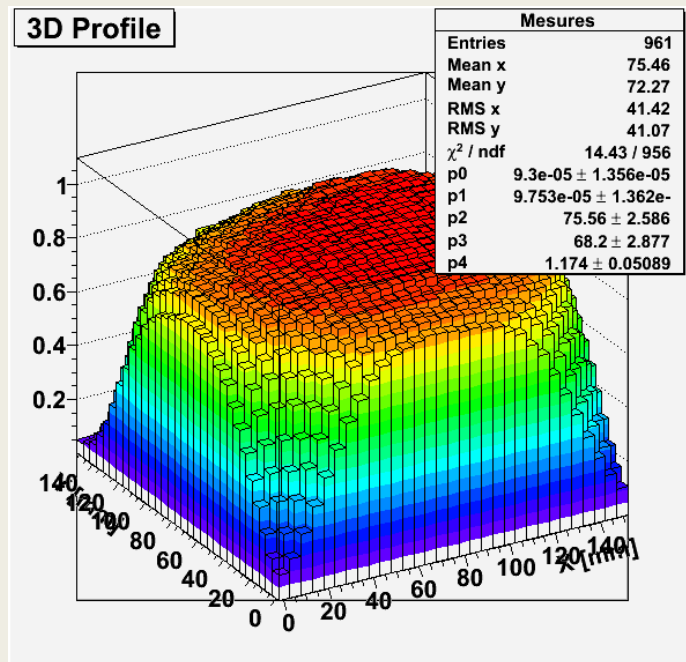
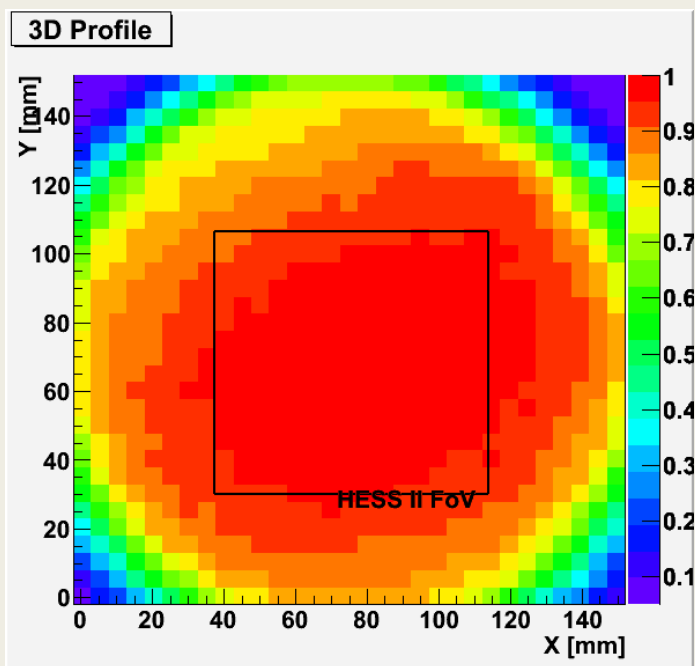
- 3-4ns FWHM pulses between 0.1pe and 1000pe.
- Flatness 3-5%.
- Relatively low cost(40-50 examples to be made).
- No movable parts if possible (reliability issues).
- Construction isolated from the environment.
- Easily replaceable.

Status

- Baseline design is validated for:
 - LED pulsers (12+1)
 - Power supply
 - Control and monitoring
 - Communication USB / Zigbee / Ethernet
- First full prototype ready.
 - ThornLabs diffuser
 - UV exit window



Measurements (Saclay)



Tests

Tests in Adlershof

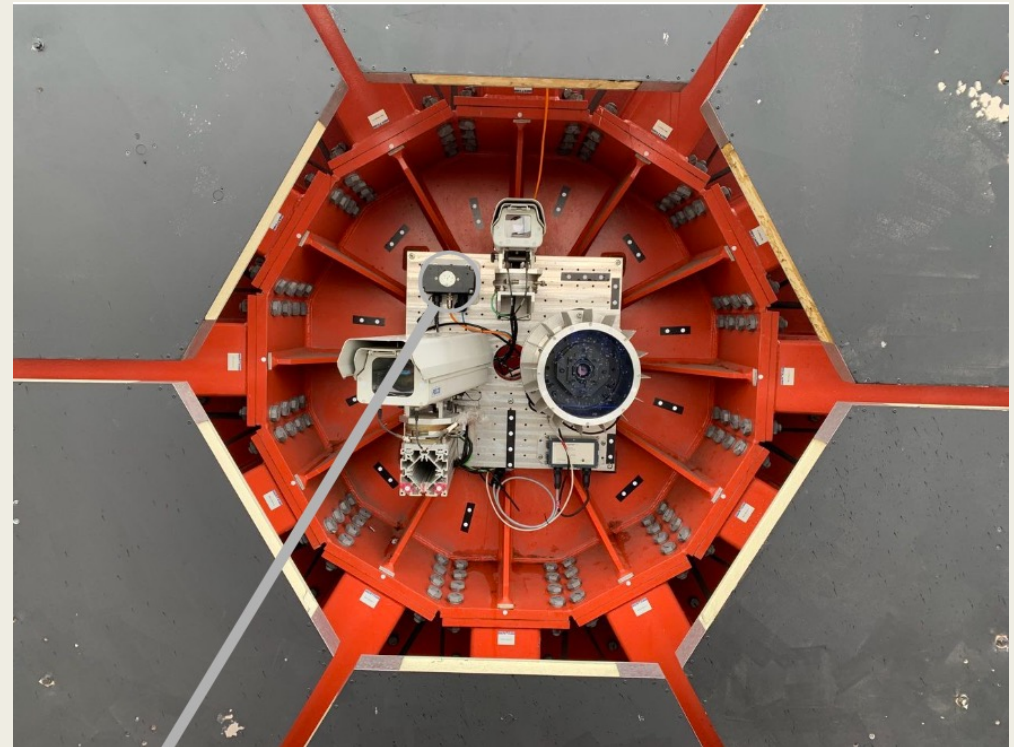
System installed on MST-STR

Specifications

- . 3-4ns FWHM pulses with 0.1-1000 p.e. intensity
- . Flatness: 5-8%, rate: 1 Hz-10 kHz
- . Electronic and software conformed to CTAO requirements

Fine-tuning for Adlershof

- . New connectors + mechanics slightly adapted at IPNO



STATUS

- All CTAO sources assembled and tested
 - *9 sources*
 - *Installation schedule for the CTAO North site*
 - *Ready to be delivered accordingly to the CTAO schedule*
 - *Spares to be assemble.*
- All H.E.S.S. sources installed at the H.E.S.S. site
 - *5 sources*
 - *In operation for the last 3-8 years*
 - *Spares to be assembled for 2026*
 - *Normally this activity ends 2029.*
- There are no plans to continue the Calibration source activity.
- If CTAO asks for modifications/spares after commissioning (-2030), improbable but..it is an open question since no electronic expert present on the lab.
- **Starting from -2030 no need for an IT on this subject.**
 - *Maintenance is part of CTAO responsibilty*