


# The XY Scanner – A Versatile Method of the Absolute End-to-End Calibration of Fluorescence Detectors

## Executive Summary



Christoph M. Schäfer<sup>a</sup> for the Pierre Auger Collaboration<sup>b</sup>

<sup>a</sup> Institute for Astroparticle Physics, Karlsruhe Institute of Technology , Germany

<sup>b</sup> Observatorio Pierre Auger, Av. San Martín Norte 304, 5613 Malargüe, Argentina

### What is this contribution about?

A novel technique for an absolute end-to-end calibration of large-aperture fluorescence telescopes is presented. For this technique, a portable, calibrated light source mounted on a rail system (*XY-Scanner*) is moved across the aperture of the telescope.

### Why is it relevant/interesting?

With this novel method the workload, time, and people needed for the absolute calibration of fluorescence telescopes can be reduced by a large margin. In addition, the versatile setup of the XY-Scanner allows the straightforward installation of basically any light source, which could be used to further study the imaging and aging properties of the telescopes.

### What has been done?

We installed several XY-Scanner systems at the fluorescence telescopes of the Pierre Auger Observatory. The first measuring campaigns employing a modified general-purpose integrating sphere as light source were already performed and analyzed.

### What is the result?

The analysis of the data taken during this first measuring campaigns indicates a reproducibility at a 1% level for this novel calibration technique over a time period of several months. The photon flux emitted by the light source can be estimated at a 3.5% accuracy level in a dedicated setup build in the laboratory.

