



Towards a laser calibration of the Auger fluorescence telescopes

Joachim Debatin, for the Auger Collaboration | October 10, 2014

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Outline







2 Setting of the measurements





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An Auger Event





Motivation

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Analysis and Results

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The Pierre Auger Telescopes





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Calibration

Absolute calibration: Drum



typically done once a year

Motivation



Relative calibration: LED and xenon flashers at different positions of the telescope.

Cross check:

Use a laser outside the FD-Building for relative calibration of the whole telescope?

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Importance of dust on telescope filters

Motivation Joachim De



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The Measurements



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Measurements from 2nd to 10th March 2014. HEAT cleaned after 04th of march Coihueco cleaned after 07th of march



Laser energy and atmospheric variation identical for Coihueco and HEAT.

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Position on Camera





Position on camera influences the measurement.

 \rightarrow Small difference expected.



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Results for dust study



 $\zeta = \mathbf{1}^\circ$



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Energy



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200



If the effect was caused by diffraction on the dust grains it should disappear with growing $\zeta.$

 \rightarrow Absorption

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Point spread function





dust negligible to atmosphere, dominated by multiple scattering

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Measurements with a roving laser:

- 1-2 km distance to the telescope
- Less atmospheric influence
- Multiple scattering negligible

Planned for November. Might be an alternative method for calibration. \rightarrow Auger analysis module (Offline)!

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Outlook

Laser reconstruction in Offline



 $S = C_{Atm} \cdot E_0$



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