

# Full simulation of the Terzina telescope

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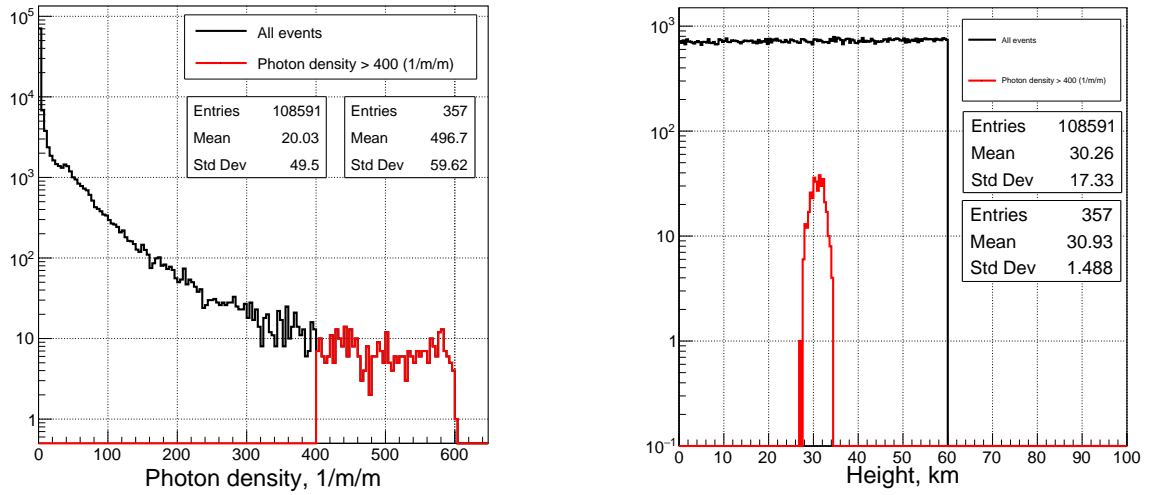
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**Abstract.** Some first seed :-) .... Terzina is a satellite base Cherenkov telescope designed to operate at  $\sim 535$  km altitude with sun-synchronous orbit. Its primary goal is to probe the new concept of detecting ultra high energy cosmic rays and neutrinos by observing Cherenkov light from an extensive shower produced in the atmosphere. It is part of the NUSES space mission with a wide scientific program. Also, the mission includes the ZIRÈ apparatus for flux measurements of electrons, protons, light nuclei with energies spanning from a few to hundreds of MeV's and MeV gamma rays.

The telescope is composed of a spherical primary mirror, a small spherical mirror, a corrector lens, and Photon detection plane. The optical system can fit the tube-like envelope with 394 mm diameter and 350 mm length. It is inclined by  $67.5^\circ$  with respect to nadir, having an optical axis pointing towards the Earth limb. The photon detector plane is conceived to detect the photons from below and above the limb. It has a rectangular shape with a  $2 \times 5$  aspect ratio. The camera is composed of 10 SiPM arrays ( $8 \times 8$ ) pixel each and  $3 \times 3$  mm<sup>2</sup> pixel size. The telescope have  $7^\circ$  Field-of-View this corresponds to  $0.18^\circ$  per pixel. It can observe the vast volume of the atmosphere with  $140 \times 360$  km in cos-section.

To estimate expected signal we develop full Geant4 based simulation of the Terzina telescope. It takes into account mirror and corrector lens reflectivity and transparency, quantum efficiency and geometry of the photon sensitive camera. We use Emission for Extensive Air Showers Cherenkov Simulation (EASCherSim) as event generator.



**Figure 1.** Always give a caption.

| x        | y       | x and y              |
|----------|---------|----------------------|
| a        | b       | a and b              |
| 1        | 2       | 1 and 2              |
| $\alpha$ | $\beta$ | $\alpha$ and $\beta$ |

**Table 1.** We prefer to have borders around the tables.

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## Contents

|          |                      |          |
|----------|----------------------|----------|
| <b>1</b> | <b>Intro.</b>        | <b>1</b> |
| <b>2</b> | <b>The telescope</b> | <b>1</b> |
| 2.1      | The telescope sim.   | 1        |
| 2.1.1    | The telescope sim.   | 1        |
| <b>A</b> | <b>Appendix</b>      | <b>2</b> |

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## 1 Intro.

For internal references use label-refs: see section 1. Bibliographic citations can be done with cite: refs. [1-3]. See figure 1 and table 1.

## 2 The telescope

### 2.1 The telescope sim.

#### 2.1.1 The telescope sim.

Up to paragraphs.

## A Appendix

Please always give a title also for appendices.

## Acknowledgments

This is the most common positions for acknowledgments. A macro is available to maintain the same layout and spelling of the heading.

**Note added.** This is also a good position for notes added after the paper has been written.

## References

- [1] Author, *Title*, *J. Abbrev.* **vol** (year) pg.
- [2] Author, *Title*, arxiv:1234.5678.
- [3] Author, *Title*, Publisher (year).