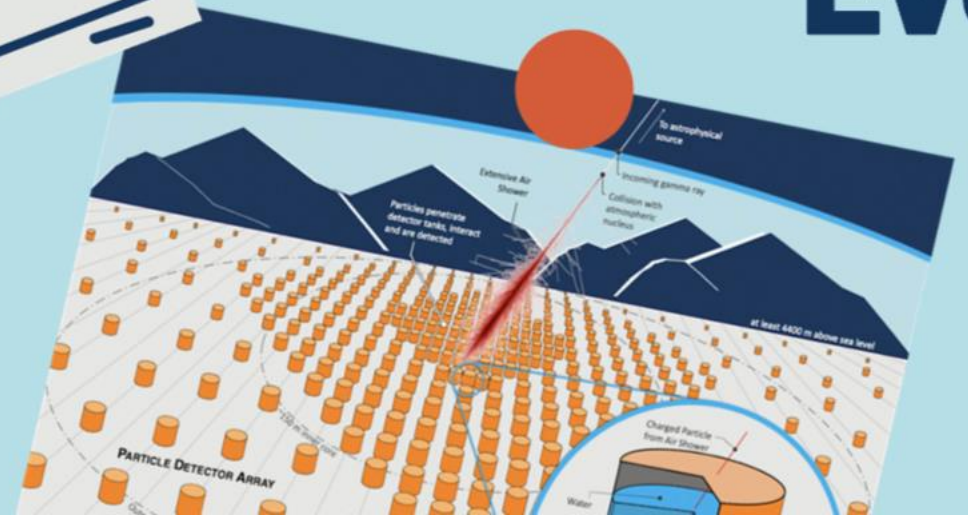
SWGO
The Southern Wide-field Gamma-ray Observatory

TÉCNICO LISBOA

LIP

Characterization of Anomalous Air Shower Events in SWGO



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Aim of the Project

- *Analysis of Cosmic and Gamma Ray **simulations**;*
- *Study of **significant parameters** to the shower development;*
- *Study **Anomalous showers;***
- *Optimization of γ/h discrimination methods for the future **"Southern Wide-field Gamma-ray Observatory" (SWGO).***

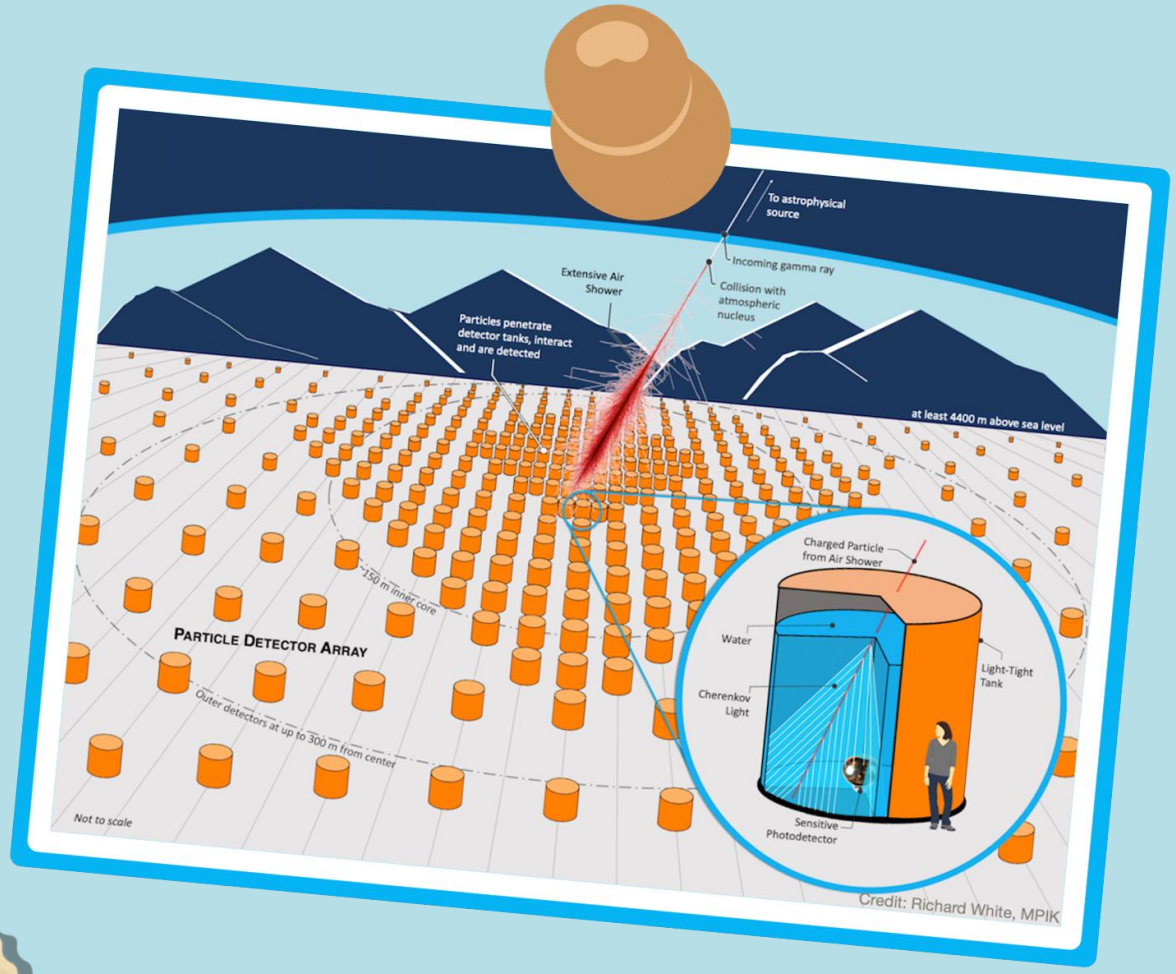

***Fig. 1** -Representation of the operation of the Observatory, with its WCDs filled with ultra-pure water.*

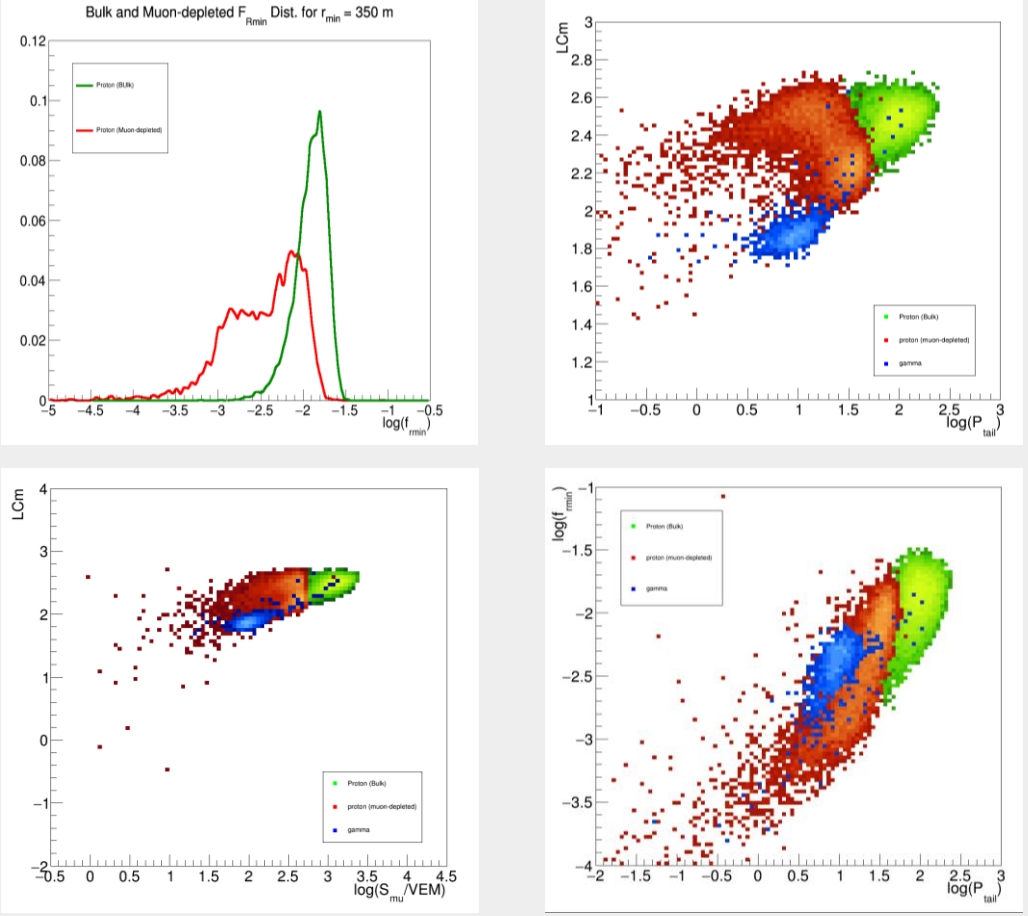

Fig. 2 *– Graphs produce from a previous simulation set where two log(f_{rmin}) histograms (top left), the correlation between log(Ptail) and LCm (top right), the correlation between log(Sμ) and LCm (bottom left) and the correlation between log(Ptail) and log(f_{rmin}) (bottom right), for the 3 data samples.*

Project Development

- *Establishing the simulation framework;*
- *Analysis of* ***γ/h discriminator parameters****:*

$f_{r_{min}}$	LCm	N_μ	X_{max}
P_{tail}	C_k	S_μ	E_0

- *Characterization of rare events;*
- *Reduction of the* ***gamma background****.*

The future of the Project

- Study the link between the anomalous air showers and the **hadronic multiparticle production properties** of the first interaction;
- Study of **deep penetrating showers;**
- Establish a connection between anomalous events and the **longitudinal development of the shower**.

Fig. 3 *-Artistic impression of an air shower, detected by a ground-based observatory.*