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The Southern Wide-field Gamma-ray Observatory

Wednesday 8 September 2021 13:00 (20 minutes)

The Southern Wide-field Gamma-ray Observatory (SWGO) main scope is the observation of the Galactic centre region and other sky regions not accessible from the Northern hemisphere. The Observatory is being designed to detect atmospheric air showers over a wide energy range, from few hundred MeVs up to PeVs. Therefore, it will detect not only air showers initiated by gamma rays, but also initiated by charged nuclei (hadrons). The SWGO detector design is focusing on improving the gamma/hadron air showers discrimination. For that, water Cherenkov detectors (WCD) with two interior cavities are being designed. Each cavity will have its own photomultiplier. The top cavity is expected to be more sensitive to the electromagnetic component of the air shower, while the bottom cavity will be sensitive to the muonic component. The information of the electromagnetic and muonic air shower components are crucial for understanding the air shower physics. Furthermore, the time resolution will be improved to the order of sub nanoseconds allowing the extraction of information of the air shower atmospheric profile. Such information will improve our ability to discriminate between air showers initiated by different nuclei (i.e. cosmic ray composition). This talk will give an overview of SWGO, highlighting its capabilities for studying high energy hadronic interactions with air showers. SWGO observations analysed in conjunction with observations from even higher energies (such as observations from the Pierre Auger Observatory) will be critical for improving our knowledge at the high energy frontiers of particle and nuclear physics.

Authors: BELLIDO, Jose (The University of Adelaide); FOR THE SWGO COLLABORATION

Presenter: BELLIDO, Jose (The University of Adelaide)

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