

Preliminary Cosmic Ray Results from the HAWC's Eye Telescopes

Wednesday, 14 July 2021 13:18 (12 minutes)

The compact imaging air-Cherenkov telescope HAWC's Eye was developed to operate together with the High-Altitude Water Cherenkov Gamma-Ray Observatory (HAWC). The combination of both detection techniques in a hybrid setup provides a significant improvement in energy and angular resolution, aiming for improved measurements of the cosmic ray composition above 10 TeV and contributing to the physics program of the observatory. Preliminary results of the first hybrid measurements of the cosmic ray spectrum are presented. A second HAWC's Eye telescope was successfully commissioned at the HAWC site in 2019. Two measurement nights since then recorded the data used in this analysis. The HAWC's Eye events were successfully synchronized with HAWC and further used to characterize the hybrid system. A complete simulation of the hybrid configuration was used to develop algorithms to reconstruct the energy and arrival direction of proton-induced air showers. Those algorithms were successfully applied to the measured cosmic ray events to analyze the improved performance of the hybrid detection. The spectrum reconstructed with HAWC's Eye is compatible with the spectrum reconstructed solely from the coincident HAWC data.

Keywords

EAS Array; IACT; hybrid

Collaboration

HAWC

other Collaboration

HAWC's Eye Project

Subcategory

Experimental Results

Primary author: REHBEIN, Florian (RWTH Aachen University)

Co-authors: Mrs DO, Giang (RWTH Aachen University); GONZALEZ, Maria Magdalena (Instituto de Astronomía, UNAM); Dr ALFARO, Ruben (Instituto de Física, UNAM); BRETZ, Thomas (RWTH Aachen University); IRIARTE, Arturo (Instituto de Astronomía, UNAM); Mr PEREZ, Yunior (Instituto de Astronomía, UNAM); GONZALEZ, Francisco Javier (Instituto de Astronomía, UNAM); MASLOWSKI, Frank (RWTH Aachen University); SCHAUFEL, Merlin (RWTH Aachen University); SERNA-FRANCO, José (IF-UNAM); TISCHBEIN, Franziska (RWTH Aachen University); TORRES, Ibrahim (UNAM); MARTINEZ-CASTRO, Jesus (Centro de Investigación en Computación, Instituto Politécnico Nacional); CHAPARRO-AMARO, Oscar (Centro de Investigación en Computación, Instituto Politécnico Nacional); MARTINEZ-FELIPE, Miguel (Centro de Investigación en Computación, Instituto Politécnico Nacional)

Presenter: REHBEIN, Florian (RWTH Aachen University)

Session Classification: Discussion

Track Classification: Scientific Field: CRI | Cosmic Ray Indirect