Contribution ID: **702** Type: **Talk**

Particle Acceleration in the Cygnus Superbubble

Thursday 15 July 2021 19:18 (12 minutes)

The Cygnus Cocoon is the first gamma-ray superbubble powered by a massive stellar association, the OB2 association. It was postulated that the combined effects of the stellar wind of the massive type O stars of the OB2 association can accelerate the cosmic rays to PeV energy in the Cocoon. The conclusive proof of acceleration to PeV energy in the Cocoon will identify the stellar association as a PeV cosmic-ray accelerator. However, the Cocoon has been previously studied only up to 10 TeV. In this contribution, using 1343 days of High Altitude Water Cherenkov (HAWC) observatory data, we present the morphological and spectral study of the Cocoon above 1 TeV to beyond 100 TeV. The analysis at higher TeV energies reveals a softer spectrum compared to the GeV gamma-ray observation. This result suggests that either the accelerator's efficiency decreases significantly around hundreds of TeV, or after being accelerated, the highest-energy protons escape the region. The study above 10 TeV presented here demonstrates how CR accelerators operate in these extreme energies and how particle transport impacts high-energy emission.

Keywords

Very-high-energy gamma-ray

Collaboration

HAWC

other Collaboration

Subcategory

Experimental Results

Primary authors: HONA, Binita (University of Utah); FOR THE HAWC COLLABORATION

Presenter: HONA, Binita (University of Utah)

Session Classification: Discussion

Track Classification: Scientific Field: GAI | Gamma Ray Indirect