

Abstract Submitted  
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**Very-high-energy Observation of the Stellar Superbubble in the Cygnus Region** BINITA HONA, University of Utah, HAWC COLLABORATION — Stellar superbubbles powered by massive stellar associations have been postulated to be cosmic-ray factories and possible PeV accelerators. The Cygnus Cocoon near the OB2 stellar association is the first stellar superbubble detected in gamma rays. The Fermi-LAT observation up to 100 GeV finds a young cosmic-ray population, either protons or electrons, that are freshly accelerated in the Cocoon. The conclusive proof of PeV acceleration in the Cocoon will identify the OB2 stellar association as a PeV cosmic-ray accelerator. However, the Cocoon has been studied only up to 10 TeV. To understand the PeV physics, we need studies beyond 10 TeV. In this study using 1343 days of HAWC data, the Cygnus Cocoon is observed at the highest photon energy. The particles accelerated in the Cygnus Cocoon are identified as protons with energies up to hundreds of TeV and we present a spectral energy distribution of the Cocoon up to 200 TeV. In our study, we find a spectral softening above 1 TeV, which can either be due to the leakage of cosmic rays from the superbubble or an upper limit to particle acceleration energy by the stellar winds.

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