



Contribution ID: 358

Type: **Poster contribution**

Analysis of GeV-band gamma-ray emission from SNR RX J1713.7-3946

Thursday, 30 July 2015 15:30 (1 hour)

RX J1713-3946 is the brightest shell-type supernova remnant (SNR) of the TeV gamma-ray sky. Earlier Fermi-LAT results on low energy gamma-ray emission suggested that, despite large uncertainties in the background determination, the spectrum is inconsistent with a hadronic origin. We update the GeV-band spectra using improved estimates for the diffuse galactic gamma-ray emission and more than double the volume of data. We further investigate the viability of hadronic emission models for RX J1713-3946. We produced a high-resolution map of

the diffuse Galactic gamma-ray background corrected for the HI self-absorption and used it in the analysis of more than five years worth of Fermi-LAT data. We used hydrodynamic scaling relations and a kinetic transport equation to calculate the acceleration and propagation of cosmic rays in SNR. We then determined spectra of hadronic gamma-ray emission from RX J1713-3946, separately for the SNR interior and the cosmic-ray precursor region of the forward shock, and computed flux variations that would allow us to test the model with observations. We find that RX J1713-3946 is now detected by Fermi-LAT with very high statistical significance, and the source morphology is best described by that seen in the TeV band. The measured spectrum of RX J1713-3946 is hard with index $\gamma = 1.53 \pm 0.07$, and the integral flux above 500 MeV is $F = (5.5 \pm 1.1) \times 10^{-9}$ photons $\text{cm}^{-2} \text{s}^{-1}$. We demonstrate that scenarios based on hadronic emission from the cosmic-ray precursor region are acceptable for RX J1713-3946, and we predict a secular flux increase at a few hundred GeV at the level of around 15% over ten years, which may be detectable with the upcoming Cherenkov Telescope Array (CTA) observatory.

Collaboration

– not specified –

Registration number following "ICRC2015-I"

1092

Primary author: FEDERICI, Simone (DESY)

Co-authors: WILHELM, Alina (DESY); TELEZHINSKY, Igor (Astronomical Observatory of Kiev University); POHL, Martin (DESY); BROSE, Robert (DESY)

Presenter: BROSE, Robert (DESY)

Session Classification: Poster 1 GA

Track Classification: GA-TH