

A multiple γ -ray source associated to a new supernova remnant?

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The EGRET telescope onboard the Compton Gamma Ray Observatory has detected 170 γ -ray point sources still unidentified with known objects in other wavebands. Just a few of these detections cluster within small regions of less than 6° in the sky.

We report here the results of a search for radio counterparts in the environs of three 3EG sources located in Capricornus region, namely 3EG J1834-2803, 3EG J1847-3219, and 3EG J1850-2652, using preexisting 408-MHz continuum data and new 2.326-GHz continuum and neutral hydrogen line observations.

We have eliminated the contaminating diffuse emission from the radio continuum images with a well-proven filtering technique, and found that an extended non-thermal radio feature, centered at $(l, b) \approx (+6.5^\circ, -12.0^\circ)$, is the most remarkable object in the field. The source is a low-brightness, shell-type structure, which very much resembles a typical SNR. It presents a limb brightened shell of size $\sim 8^\circ \times 8^\circ$, with an integrated flux at 408 MHz of $\sim 130 \pm 20$ Jy. Clear evidence for HI clouds was found at the best position of 3EG J1834-2803 and 3EG J1850-2652 from -2 Km s^{-1} up to $+4$ Km s^{-1} . The high value of b ($\sim 12^\circ$) and the HI data circumscribe the distance to $d < 470$ pc, if the source is located within the galactic disk.

We suggest that the radio source could be the result of a SN whose remnant is expanding through a cloudy ISM. When the front shock interacts with an interstellar cloud, locally accelerated cosmic rays are convected into it producing a region of strong γ -ray emission through hadronic collisions and subsequent neutral pion decays. This scenario provides a faithful representation of the main observed features. We have estimated several physical parameters within this context.