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Gamma-ray detection of the newly discovered SNR G288.8−6.3

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A new supernova remnant (SNR) was recently detected at radio frequencies with ASKAP at (l, b) = (288.8, -6.3) by Filipovic et al. 2023 (submitted), partly coincident with a Fermi-LAT extended source that was provisionally associated with a molecular cloud. We reanalysed the region around the SNR using Fermipy, taking 14.5 years of data in a ROI of 12°.
Extended emission from the region was detected with a significance of $\sim 11.4\,\sigma$ spatially consistent with the recently detected faint radio shell (radius $\sim 0.7°$) at the same position. In this study we looked at gamma-ray energies between 100 MeV and 1 TeV. All considered models favour the presence of the SNR as an additional component over a model with just the known Fermi source. We find the source to be best described by a radial Gaussian with an extension comparable to the radio size of the remnant, and a power-law spectral model with an energy flux of $(1.16\pm0.12)\times10^{-5} MeV cm^{-2} s^{-1}$, and an index of $\Gamma = 2.22\pm0.04$. The spectrum is extending up to around 5 GeV. Morphologically, hotspots seen above 1 GeV are coinciding well with the bright western part of the radio shell. Given a source position well above the Galactic plane, the low ambient density and the age of more than 10 kyrs, we conclude the emission to be likely of leptonic origin. SNRs at high Galactic latitudes are valuable targets for detailed investigations at high energies due to lower Galactic diffuse emission and lower risk of source confusion.

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