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Gamma-ray emission from the SNR W44: confirmations and challenges for cosmic-ray acceleration.

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The SNRW44 plays a crucial role in our understanding of the Cosmic Ray origin.

Recently, AGILE and Fermi-LAT data have determined, for the first time in a supernova remnant, that the gamma-ray emission from W44 can be attributed to accelerated proton/ions.

We present new W44 AGILE data and compare them with the recent Fermi data, in the light of new NANTEN2 telescope CO results. Our analysis provides strong constraints for the SNR complex environment: high density ($n > 200 \text{ cm}^{-3}$), high magnetic field on large scales ($B \sim 10^2 \text{ microG}$) and a proton spectral index steeper than in other middle-aged SNRs ($p = 3.2$).

The W44 characteristics are challenging for all theoretical models.

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