

Gamma-ray monochromatic line emission search from dark matter annihilation up to 100 TeV towards the Galactic Centre with MAGIC

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The detection of line-like TeV gamma-ray features configures as a smoking gun for the discovery of TeV-scale particle dark matter. We report the first search for dark matter spectral lines in the Galactic Centre region up to gamma-ray energies of 100 TeV with the MAGIC telescopes (La Palma, Canary Islands). The Galactic Centre region is expected to host the most promising dark matter halo due to its size and proximity and is therefore well suited for this kind of searches. Observations at large zenith angles improve sensitivity for gamma-rays in the TeV regime due to the increased telescope collection area. We present the results obtained with more than 200 hours of large-zenith angle observations of the Galactic Centre region, which allow us to obtain competitive limits to the dark matter annihilation cross-section at high particle masses ($< 5 \times 10^{-28} \text{ cm}^3 \text{ s}^{-1}$ at 1 TeV and $< 1 \times 10^{-25} \text{ cm}^3 \text{ s}^{-1}$ at 100 TeV), improving the best current constraints above 20 TeV. In addition, we also study the impact of an inner cored dark matter halo on probing the annihilation cross-section. Finally, we use the derived limits to constrain super-symmetric wino models.

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