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Gamma-ray emission from star-forming complexes observed by MAGIC: the cases of W51 and HESS J1857+026

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Massive star-forming regions assemble a large number of young stars with remnants of stellar evolution and a very dense environment. Therefore, particles accelerated in supernova remnants and pulsar wind nebulae encounter optimal conditions for interacting with target material and photon fields, and thus produce gamma-ray emission. However, observations are challenging because multiple phenomena may appear entangled within the resolution of current gamma-ray telescopes. We report on MAGIC observations aimed to understand the nature of the emission from the star-forming region W51 and the unidentified source HESS J1857+026. While gamma-ray emission from W51 is dominated by the interaction of the supernova remnant W51C with compact molecular clumps, HESS J1857+026 seems to be mainly associated to the pulsar wind nebula from PSR J1856+0245. However, a second source, MAGIC J1857.6+0297 is resolved, with sufficient separation to determine that it cannot be powered by the pulsar. We search for multi-wavelength data to determine the origin of the new source, and we suggest that the interaction of compact HII regions with the environment may produce the observed gamma-ray emission.

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