

The Symposium of Ultra-High-Energy Gamma Rays from Supernova Remnants and the Origin of Galactic Cosmic Rays

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A Global Perspective on SNRs, MCs, and Gamma-ray Sources

This report investigates the associations between supernova remnants (SNRs), pulsar wind nebulae (PWNe), and molecular clouds (MCs), and their role in TeV gamma-ray emission. Based on a systematic CO survey, we reveal that a high proportion (~80%) of Galactic SNRs are associated with MCs. Separately, a statistical analysis of LHAASO TeV sources shows that PWNe and SNRs are major contributors, and that MC-associated PWNe show enhanced TeV emission with a systematic positional offset. Together, the studies establish that SNR/PWN-MC associations are prevalent in the Galaxy and are key environments for the production of very-high-energy radiation.

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