

Abstract Submitted  
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**Cosmic Rays in the Gamma-ray Sky**<sup>1</sup> T. J. BRANDT, NASA/GSFC

— Instruments directly measuring properties of cosmic rays (CRs) have given us insight into their origins, acceleration mechanisms, and propagation. Indirect measurements provide complementary information which can help disentangle particle types and energetics at sources such as supernova remnants (SNRs), can suggest new sources, and can trace the propagation of CRs through, for instance, interactions with a galaxy's interstellar medium. Gamma rays are particularly good at indirectly illuminating CRs as they are sensitive to the pion decay channel ( $\text{CR}+p^+ \rightarrow \pi^0 \rightarrow \gamma + \gamma$ ). Recent work, e.g., using the pion turn-on energy to show proton acceleration in 3 SNRs and mapping CR interactions with Galactic gas using Fermi-LAT, bears this out. The survey capability of instruments like Fermi and HAWC nicely complements the isotropized CRs measured near Earth while VERITAS, MAGIC, and HESS Imaging Air Cherenkov Telescopes (IACTs) provide greater insight into potential sources, including constraining maximum energy both within and beyond our Galaxy. Upcoming IACTs like CTA will greatly enhance this. This talk will explore recent results and potential future insights into CRs using gamma-ray emission and touch on direct measurements made with gamma-ray instruments.

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