

Recent Results in Supernova Remnants at Highest Energies

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Supernova remnants (SNRs) are now established as cosmic particle accelerators through observations of non-thermal emissions from radio to gamma-ray domain in the past decades. In the context of Galactic cosmic-ray origin, one of the key questions was if they are proton accelerators. At least for some SNRs, gamma-ray emissions are solidly attributed to decay of neutral pions, providing long-awaited evidence for proton acceleration. The next and current burning question is if SNRs are accelerators up to the knee at \sim PeV. I will review recent gamma-ray results with particular emphasis on this topic. Information from other wavelengths is essential for this topic as well. X-rays work as probes for electrons accelerated up to very high energies. Synchrotron X-ray variability, if attributed to amplified magnetic fields, gives important information in discussing maximum attainable energies of particles accelerated in SNRs. Interstellar gas clouds observed with radio line emissions not only serve as targets for accelerated protons to produce neutral pions, but also amplify magnetic fields through shock-cloud interactions. I will also review recent X-ray and radio observational results related to particle acceleration in SNRs.

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