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X-ray and Gamma-ray Study of Supernova Remnants

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Diffusive shock acceleration (DSA), a well-developed theory of the acceleration process at work in supernova remnants (SNRs), lays the foundation for the SNR paradigm of the CR origin, though key problems are yet to be solved. Determining the acceleration efficiency is one of the key issues, where the term “acceleration efficiency” carries two different meanings; one is related to the maximum attainable energy, and the other is the energy content of CRs. Synchrotron X-ray emission produced by highest energy electrons with energies of tens of TeV, and gamma-ray emissions either by relativistic electrons via IC scattering or by high-energy protons via pion-decay can provide information about the acceleration efficiencies at SNR shocks. We will report on our recent work on X-ray and GeV gamma-ray observations of some supernova remnants. Also we will discuss prospect for the upcoming X-ray observatory, ASTRO-H, which allows us to perform X-ray spectroscopy of extended objects with unprecedented spectral resolution (7 eV).

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