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X-ray Observations of Galactic and Extragalactic Supernova Remnants

Supernova remnants (SNRs) are intimately involved in numerous processes associated with the evolution of the interstellar medium (ISM). For example, SNRs are known to deposit vast amounts of kinetic energy and chemically-enriched material into the ISM: in addition, these sources have emerged as the leading candidates for the accelerators of cosmic-ray particles up to approximately the well-known "knee" energy of the cosmic-ray spectrum. SNRs have been observed and studied over a remarkably broad range of the electromagnetic spectrum, including the X-ray. Thanks to dramatic improvements in the angular resolution capabilities of the present generation of X-ray observatories (including Chandra and XMM-Newton) -- as well as the flux sensitivities attained routinely by these observatories -- exciting new insights on SNRs and their related phenomena have been realized in recent years. I will present a brief overview of SNRs and X-ray observations of these sources (including both Galactic and extragalactic SNRs): I will concentrate on recent studies of SNRs with unusual X-ray properties, namely SNRs with X-ray spectra dominated by non-thermal emission (believed to be synchrotron radiation) as well as mixed-morphology SNRs (that is, SNRs with center-filled thermal X-ray morphologies and contrasting shell-like radio morphologies).