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X-ray Polarization in Supernova Remnants

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The fast shocks in supernova remnants are known to accelerate particles to extremely high energies. The acceleration process is closely tied to the magnetic field structure in the shock region. This, in turn, can be modified considerably by the shock. Synchrotron emission from the shock regions provides crucial details about the magnetic field strength and orientation through its polarization. Radio polarization studies of several SNRs have provided important maps of the field orientation, and these provide clues about the connection with particle acceleration. Due to the rapid losses of the highest-energy particles, however, X-ray polarization measurements provide magnetic field information from particles much closer to the acceleration sites. Here I discuss how X-ray polarization observations can be used to investigate the magnetic fields in SNRs in order to address questions about acceleration efficiency dependence on shock obliquity, levels of turbulence in the fields, and acceleration of particles at the reverse shock.

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