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Type: **Tutorial lecture**

Particle acceleration around shocks

We review the basic features of particle acceleration theory around collisionless shocks in astrophysical environments.

Special attention will be devoted to observational and theoretical facts about acceleration of Galactic cosmic rays in supernova remnants, discussing the arguments in favor and against a connection between cosmic rays and supernova remnants, the so-called supernova remnant paradigm for the origin of Galactic cosmic rays. Recent developments in the modeling of the mechanism of diffusive shock acceleration are discussed, with emphasis on the role of 1) magnetic field amplification, 2) acceleration of nuclei heavier than hydrogen, 3) presence of neutrals in the circumstellar environment. The status of the supernova-cosmic ray connection in the time of Fermi-LAT and Cherenkov telescopes is also discussed.

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