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Thematic talk: Particle acceleration at nonrelativistic astrophysical shocks: eligibility to participate in the diffusive shock acceleration

Monday, 5 September 2022 10:25 (35 minutes)

Cosmic rays that span many decades in energy are one of the main contributors to the non-thermal energies in the universe. Although the diffusive shock acceleration (DSA) is the promising mechanism for particle acceleration at shocks, whether or not the mechanisms that promote to the DSA act similarly for electrons and protons are still not well understood. Since the energy gained by a particle depends on the non-linear interactions with the electromagnetic fields involving different length and time scales for electrons and protons, a self-consistent investigation is unavoidable to find a meaningful answer. In this talk, I will review the ongoing efforts to solve this puzzle. I will focus on electron acceleration at nonrelativistic shocks and discuss the results from our investigations using kinetic particle-in-cell simulations. I will demonstrate these results with the help of test-particle analysis and compare theoretical predictions with observations of non-thermal emissions such as gamma-rays, X-rays, and radio found in most astrophysical systems.

Collaboration

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