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Multiwavelength Spectral and Polarization Signatures of Shocks in Relativistic Jets

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This talk reviews recent progress in our understanding of the multiwavelength spectral and polarization signatures of relativistic shocks in the relativistic jets of active galactic nuclei and gamma-ray bursts. Spectral signatures are based on a self-consistent coupling of Monte-Carlo simulations of diffusive shock acceleration with radiation-transfer simulations. Our results indicate that, in order to reproduce the spectral energy distributions of blazars, the pitch-angle scattering mean free path of electrons has to be strongly energy dependent. Polarization signatures of relativistic shocks are based on polarization-dependent radiation transfer simulations, indicating that large polarization-angle rotations result naturally in a straight jet pervaded by a helical magnetic field. Simultaneous fits to the SEDs, multiwavelength light curves, and time-dependent synchrotron polarization signatures from the prominent polarization-angle swing event in 3C279 are presented.

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