

Blast-Wave Physics Model for Blazars

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We apply blast-wave physics, which has been developed to understand gamma-ray burst afterglows, to models of the spectral energy distributions of blazars. Nonthermal electrons and protons are injected into the comoving plasma frame due either to interactions of the jet plasma with the surrounding medium or due to collisions between two plasmoids moving with different bulk Lorentz factors. The injected energy comes at the expense of the bulk internal motion of the plasma. Simplified analytic forms for the emission spectra, including synchrotron self-absorption and Compton processes, are compared with detailed numerical simulations. The results are used to model the spectral states observed from Mrk 501.