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Multiwavelength Synchrotron/Compton Spectral Analysis of TeV Blazars and FSRQs: A New Approach

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Summary

We present a new method to analyze multiwavelength data from blazars. By assuming the radio through X-ray flux is nonthermal synchrotron emitted by isotropically-distributed electrons in the randomly oriented magnetic field of a relativistic jet, one obtains the electron spectrum. This spectrum is then used to deduce the Compton spectrum as a function of a small set of parameters. Photoabsorption of gamma rays interacting with photons from internal jet radiation, local radiation fields, and the extragalactic background light (EBL) is included. We find that a one zone synchrotron self-Compton model is unlikely to explain the very high energy gamma-rays from the 2006 flare detected in the X-ray selected BL Lac PKS 2155-304, with implications for external radiation fields in the black hole/jet environment. We also present calculations of Compton-scattered accretion-disk and central source radiation scattered by broad line region material using the full Compton cross-section, with a self-consistent treatment of gamma-gamma opacity.

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