# *The Blazar Times*

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## *Journal Abstracts*

### BL Lac Objects in the Synchrotron Proton Blazar Model

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We calculate the spectral energy distribution (SED) of electromagnetic radiation and the spectrum of high energy neutrinos from BL Lac objects in the context of the Synchrotron Proton Blazar Model. In this model, the high energy hump of the SED is due to accelerated protons, while most of the low energy hump is due to synchrotron radiation by co-accelerated electrons. To accelerate protons to sufficiently high energies to produce the high energy hump, rather high magnetic fields are required. Assuming reasonable emission region volumes and Doppler factors, we then find that in low-frequency peaked BL Lacs (LBLs), which have higher luminosities than high-frequency peaked BL Lacs (HBLs), there is a significant contribution to the high frequency hump of the SED from pion photoproduction and subsequent cascading, including synchrotron radiation by muons. In contrast, in HBLs we find that the high frequency hump of the SED is dominated by proton synchrotron radiation. We are able to model the SED of typical LBLs and HBLs, and to model the famous 1997 flare of Markarian 501. We also calculate the expected neutrino output of typical BL Lac objects, and estimate the diffuse neutrino intensity due to all BL Lacs. Because pion photoproduction is inefficient in HBLs, as protons lose energy predominantly by synchrotron radiation, the contribution of LBLs dominates the diffuse neutrino intensity. We suggest that nearby LBLs may well be observable with future high-sensitivity TeV gamma-ray telescopes.

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### On the Nature of MeV-blazars

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