

Abstract Submitted
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A Leptohadronic Particle Transport Model for 3C 454.3¹

TIFFANY LEWIS, NPP at NASA Goddard — A blazar is a galaxy whose central supermassive black hole is accreting so much material so quickly, that it launches and sustains a massive, powerful jet that happens to be pointed at Earth. The beamed emission from this kind of jet makes blazars the most numerous extragalactic source in X-rays and gamma-rays. In November 2010, one particular blazar, 3C 454.3 was observed across the electromagnetic spectrum while experiencing an unusually bright flare. To study the acceleration of particles in such an event, we create a numerical model of the particle population, accounting for each physical process affecting particle energetics. Here, we develop and apply a new particle transport model, co-solving the electron and proton Fokker-Planck equations. Each equation treats relevant particle acceleration and cooling terms, within a single homogeneous zone near the base of the blazar jet. Both leptonic and leptohadronic models represent the data well. Upcoming observations of high-energy polarization, from AMEGO/AMEGO-X may help to distinguish between the models.

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