

Looking for Physics in the Weather: 30 Years of Gamma-Ray Blazar Observations

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The launch of the Compton Gamma-Ray Observatory in 1991 revealed that the powerful relativistic outflows (“jets”) produced by accreting supermassive black holes are in fact some of the most prodigious emitters of gamma-rays in the Universe. Even accounting for likely relativistic beaming and boosting effects, this gamma-ray emission can represent a significant of the black hole’s accretion power. Exactly how a black hole manages this is still not well understood, but it is clear that the underlying physical conditions and processes are among the most extreme we know of. Because this gamma-ray emission is sporadic and highly variable, it has been termed by some as “weather” that obscures more fundamental physics. There is some truth to this, but I will argue that we have nonetheless made significant progress, both observational and theoretical, since the first gamma-ray observations of blazars. I will give an overview of the outstanding issues in the study of high-energy emission from blazars and of our future prospects for tackling them.

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