

Observations and Theories of Time-variable AGN Emission

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Active galactic nuclei (AGN) are distant, powerful sources of electromagnetic radiation from radio waves to gamma-rays. There is much evidence that they are powered by gravitational accretion of stars, dust, and gas, onto central massive black holes (MBHs) imprisoning anywhere from ~ 1 to $\sim 10,000$ million solar masses; such objects are now believed to naturally form in galactic centers during their normal dynamical evolution. Theories proposed for the physical processes believed to be ongoing in the central engines of AGN are reviewed. A new result from the non-stationary theory for the power output expected from a rotating black hole is briefly outlined; this may be the ultimate power source for much of the complex phenomena observed in the AGN central regions. Observed light curves and high-resolution radio skyplots, in various wavebands, and over different timescales, are presented for a small set of AGN of the 'blazar' or 'BL Lac' type (e.g. radio-loud blazar OJ 287).

These blazar AGN provide a direct, unobscured view into the central region, so they should be high priority targets in time monitoring programs. Some future directions are suggested for research into physical mechanisms underlying the time-variable emissions from AGN.