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Modeling the Emission from Turbulent Relativistic Jets in Active Galactic Nuclei VICTORIA CALAFUT, PAUL WIITA, The College of New Jersey — Active galactic nuclei (AGN) are characterized by variable emission across all bands; for radio-loud AGN this is mostly synchrotron radiation from relativistic jets of turbulent plasma. We present a numerical model developed to calculate the theoretical observed fluxes of such jets and plot light curves that allow us to analyze the variations over time. We model the jet to contain a Kolmogorov spectrum of turbulent eddies, with varying sizes and velocities. The observed flux of each eddy depends upon its variable Doppler boosting factor, a function of the relativistic sum of the individual eddy and bulk jet velocities, as well as our viewing angle to the jet. The total observed flux is found by integrating the radiation from the eddies over the turbulent spectrum. We examine theoretical light curves for a range of viewing angles, bulk jet velocities, and maximum turbulent velocities. The flux variations produced in the simulations for sensible values of the parameters tested are consistent with the types of variations observed in AGN systems. Structure functions and power spectral densities of these theoretical light curves were computed and are compared with those of observed light curves, including those of radio-loud AGN measured with the Kepler satellite.

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