Abstract Submitted
for the SES13 Meeting of
The American Physical Society

Analysis of Lyapunov Structure for a Nonlinear Field Representation for Blazar Optical Microvaraibility KEITH ANDREW, AARON BRZOWSKI, ANDREW BROWN, CAMERON HUBBARD, MICHAEL CARINI, Western Kentucky University — Utilizing observational data available from Bell Astrophysical Observatory and the Kitt Peak Robotically Controlled Telescope on the micro-variability of Blazars in the optical regime we analyze the general intensity equations for the Blazar jet. The equations model extreme states of matter for a slowly decelerating conical jet geometry that can include relativistic effects coupled to magnetically dominated accelerating parabolic base transitioning to the slow acceleration regime. We look at the inverse Compton emission from the synchrotron radiation and examine terms that could account for accretion disk, CMB scattering, dusty torus interactions and turbulence effects. The variations are characterized by the Hurst exponent and maximum correlation dimension to determine how close the microvariability is to being Brownian. The resulting equations have regimes that are strongly nonlinear that have unstable equilibria near regions that have a positive Lyapunov exponent. These regimes are being explored for parameter values that might lead to chaotic dynamics that could alter the variability of light received by the blazer on several time scales.

Keith Andrew
Western Kentucky University

Date submitted: 19 Sep 2013 Electronic form version 1.4