Ultraviolet and optical properties of Narrow-Line Seyfert 1 galaxies

1Based on observations made with the NASA/ESA Hubble Space Telescope, obtained from the data archive at the Space Telescope Science Institute. STScI is operated by the Association of Universities for Research in Astronomy, Inc., under NASA contract NAS 5-26555.

Anca Constantin and Joseph C. Shields Department of Physics and Astronomy, Ohio University, Athens, OH 45701; constant@helios.phy.ohiou.edu

abstract

Narrow Line Seyfert 1 (NLS1) galaxies are remarkable for their extreme continuum and emission line properties which are not well understood. New results bearing on the spectroscopic characteristics of these objects are presented here, with the aim of establishing their typical ultraviolet (UV) and optical spectral behavior. We employ Hubble Space Telescope (HST) observations of 22 NLS1s, which represent a substantial improvement over previous work in terms of data quality and sample size. High signal-to-noise (S/N) NLS1 composite spectra are constructed, allowing accurate measurements of the continuum shape and the strengths, ratios, and widths for lines, including weak features which are barely identifiable in other Active Galactic Nuclei (AGN) composites. We find that the NLS1 sources have redder UV-blue continua than those typically measured in other quasars and Seyferts. Objects with UV line absorption show redder spectra, suggesting that dust is important in modifying the continuum shapes. The data also permit a detailed investigation of the previously proposed link between NLS1s and $z \gtrsim 4$ quasars. Direct comparison of their composite spectra, as well as a Principal Component Analysis, suggest that high-$z$ QSOs do not show a strong preference toward NLS1 behavior.