USING SPECTROSCOPY TO INVESTIGATE GAS FLOWS AROUND SUPERMASSIVE BLACKHOLES. S. Quinn, A. Robinson*, Department of Physics, *spq5854@rit.edu*, *axrsps@rit.edu*.

It is accepted that supermassive blackholes (SMBH) reside at the center of most galaxies. Due to correlations between the central bulge and SMBH mass it is believed the formation and growth of the SMBH is closely linked to that of the galaxy itself. However, the formation and growth of SMBH remains poorly understood. Galaxies in which the SMBH is accreting matter and thus generating substantial luminosities are known as active galactic nuclei (AGN). Subclasses of AGN, known as narrow line Seyfert type 1 (NLS1) are the focus of this study. NLS1 are of interest due to their comparatively low mass SMBH and very high accretion rate, thought to be nearing the Eddington limit. This suggests the SMBH is relatively young but growing at a rapid rate. The study of these objects will provide important insight for the fueling cycle of AGN and growth rates of SMBH. This study focuses on high resolution spectral data obtained for 14 NLS1 objects. The high quality of the data allows for detailed analysis of emission lines present in each spectrum. Analyzing these objects entails using prewritten IDL routines. These routines employ the Levenburg-Marquardt algorithm to fit model profiles to various emission lines and their sub components. The model fitting allows for the measurement of emission features that are blended, or entangled within each other. Distinguishing these components permits the measurement of properties such as the luminosity, Doppler width, and shape of the emission lines. From this information, it is in turn possible to infer important physical properties of the AGN. Foremost among these are the mass of the SMBH and the accretion efficiency. Sources radiating near the Eddington limit (the maximum accretion luminosity) are expected to produce radiation pressure-driven gas outflows, which may be evidenced in the emission lines by Doppler shifts, and general line asymmetries. Our detailed spectral analysis will therefore test the current models for NLS1 and may lead to a better understanding of these unusual galaxies.