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Dispersion and Luminosity Trends of Molecular and Ionized Gas within the 400pc Circumnuclear Region of Seyfert AGN

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Investigation into the mechanics of the central region of active galactic Nuclei (AGN) are crucial to expanding our understanding of the mechanisms behind AGN and their connection to the greater galactic structure and dynamics. In recent years, utilizing new techniques and technologies, researchers have made great strides in our understanding of the physics of AGN. However researchers grapple with the challenges of acquiring high resolution data near the central regions around the AGN and limited availability of data. Statistical deficiencies act to hinder the efficacy of data analysis, and highlight a need for increased sample size which may provide deeper insight into behavior of AGN.

In this study, Integral Field Unit (IFU) data from over 90 unique nearby AGN was curated from OSIRIS and SINFONI archival datasets which were collected from the Keck and VLT observatories. This larger sample includes K-band near-infrared data and includes AGN of various Seyfert type (1, 2, 1h, 3, and the 1.1-1.9 range). This combined dataset is the largest AGN sample ever analyzed and provides improved statistics which may be exploited to identify trends previously undetected in smaller samples of Seyfert galaxies. In this study, the H2 1-0 S(1) (2.12 micron), [Si VI] (1.96 microns), and Brackett-Gamma (2.16 microns) emission lines were analyzed to obtain information pertaining to the luminosity, dispersion, and kinematics of the hot gas within the central 400 pc of the AGN. Utilizing this larger sample, we identify trends in the azimuthally averaged dispersion and luminosity of the central region of a range of Seyfert type AGN. We present results which suggest that with increased sample size, separation between Seyfert type AGN in surface brightness and velocity dispersion data trends may present. Utilization of increased data statistics may prove critical in our understanding of the central region of AGN.