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Characterization of the Circumnuclear Molecular and Ionized Gas Across the Seyfert Galaxy Population

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Investigation into the central region of active galactic nuclei (AGN) are crucial to expanding our understanding of the mechanisms behind fueling of AGN and their connection to the greater galactic structure and dynamics. As such, probing the circumnuclear (central ~ 400 pc) molecular and ionized gas across a variety of AGN is essential to demystifying the relationship between the growth of the central super massive black hole (SMBH) and fundamental AGN parameters, such as central obscuration and X-ray luminosity, and the host galaxy properties. We utilize a relatively large sample of K-band integral field unit (IFU) data of 80 unique nearby AGN curated from OSIRIS/Keck and SINFONI/VLT to investigate the central 400 pc region around the AGN. Our sample includes AGN of various Seyfert types (1, 1.1-1.9, 2, and 1h), redshifts $z < 0.035$, L14-195keV luminosities in the range of 41.1 to 44 keV, and line of sight absorbing column density derived from X-rays ranging from N_H of 20 to 25 cm^{-2} .

We analyze the H2 1-0 S(1), [Si VI], and Brackett-Gamma emission lines to characterize the line luminosity, distribution of emission, and velocity dispersion of the gas within the central 400 pc of the AGN. Utilizing the statistics afforded by our relatively large sample size we identify potential trends and correlations between median values of these measures as they relate to obscuring column density and AGN X-ray luminosity. We identify a tendency for both surface brightness and velocity dispersion within the central 400 pc to positively correlate with the L14-195keV luminosities, as well as for surface brightness to be higher within the central 200pc for Type 1.8-2 compared to Type 1-1.5 Seyferts in all three emission lines. We also investigate the characteristic radial dependency of these properties for all three emission lines. In addition, we examine the prevalence and extent of the [Si VI] emission in the sample to assess the dependency of the morphology of this potentially outflowing material on fundamental AGN properties.