

Amit Kumar Mandal (CFT), Dust reverberation mapping in AGN

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Session: Extragalactic astrophysics (cosmology, galaxies & AGNs) We analyze the torus size luminosity relationship in Type 1 AGNs using reverberation mapping (RM) of optical and infrared light curves in the W1 and W2 bands of the WISE survey. Our sample includes 446 AGNs for W1 and 416 for W2, covering bolometric luminosities from $10^{43.4}$ to $10^{47.6}$ erg/s, with reliable lag measurements. After correcting for accretion disk contamination, we find a torus size (R_{dust}) luminosity (L_{bol}) relation, with best-fit slopes of 0.39 for W1 and 0.33 for W2, both shallower than predicted by the dust radiation equilibrium model. By incorporating K-band data, we confirm that torus size depends on dust emission wavelength, with size ratios $R_{\text{dust,K}}:R_{\text{dust,W1}}:R_{\text{dust,W2}} = 1.0:1.5:1.8$ at $L_{\text{bol}}=10^{46}$ erg/s, indicating a stratified torus structure. Additionally, we observe a moderate correlation between deviations from the $R_{\text{dust}}L_{\text{bol}}$ relation and the Eddington ratio, suggesting that the Eddington ratio may influence the flattening of this relation. Looking ahead, I plan to explore the potential of using multi-epoch LSST data for reverberation mapping (BLR RM, dust RM, and accretion disk continuum RM) in conjunction with light curves from other sources, such as SPHEREx and Euclid.

Session Classification : Active Galactic Nuclei