

S02a [O IV] and [Ne V]-weak AGNs Hidden by Compton-thick Material in Late Mergers

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We study “buried” AGNs with dense circumnuclear material in U/LIRGs, which show weak or no ionized lines from NLRs due to optically-thick material in almost all directions. Employing a new indicator of [O IV] 25.89- μm line to 12- μm AGN luminosity ratio derived from infrared spectra and spectral energy distributions, respectively, we find 15 buried AGN candidates that are [O IV]-weak ($L_{[\text{O IV}]} / L_{12, \text{AGN}} \leq -3$) among 36 AGNs in local U/LIRGs. For the [O IV]-weak AGNs, we estimate their covering factors of Compton-thick (CT) material with XCLUMPY model to be $f_{\text{CT}}^{(\text{obs})} = 0.55 \pm 0.19$ on average. This value is consistent with the fraction of CT AGNs ($f_{\text{CT}}^{(\text{stat})} = 53 \pm 12\%$) in [O IV]-weak AGNs in U/LIRGs and much larger than that in Swift/BAT AGNs ($23 \pm 6\%$). The fraction of [O IV]-weak AGNs increases from $27^{+13}_{-10}\%$ (early) to $66^{+10}_{-12}\%$ (late mergers). The [O IV]-weak AGNs with Eddington ratios close to the effective Eddington limit for CT material ($\log \lambda_{\text{Edd}}^{\text{eff}} \sim -1$) show the highest $f_{\text{CT}}^{(\text{obs})}$ ($\sim 0.4\text{--}1.0$) and largest line-of-sight N_{H} ($\gtrsim 10^{25} \text{ cm}^{-2}$) in late mergers. Similar results are obtained with the [Ne V] 14.32- μm line. These suggest that (1) the circumnuclear material in buried AGNs are regulated by the AGN-driven radiation pressure on the CT obscurers, and (2) dense material found in buried AGNs with large $f_{\text{CT}}^{(\text{obs})}$ ($\sim 0.5 \pm 0.1$) in U/LIRGs is a likely cause of a unique structure of buried AGNs and the amount of material may be maintained through continuous supply from their host galaxies.