

S35a Systematic search of fading AGN in the local universe at $z < 0.4$

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Active galactic nuclei (AGN) are key populations for understanding the growth of supermassive black holes (SMBHs). Recent observations have revealed an interesting AGN population that shows strong AGN activity at large scales with ~ 1 kpc but a much weaker one at small scales (< 10 pc), suggesting a fading activity of the central engine, and they are called “fading” AGN. We systematically search such fading AGN by cross-matching the SDSS type-1 AGN catalog at $z < 0.4$, covering the [OIII] $\lambda 5007$ emission lines, with the *WISE* mid-infrared (MIR) catalog covering emissions from the ~ 10 pc scale dusty tori. Out of the ~ 9000 sources, we find 50 fading AGN candidates whose bolometric luminosities estimated from the *WISE* MIR band ($L \sim 10^{44-46}$ ergs/s) are at least one order of magnitude fainter than those estimated from the [OIII] luminosities ($L \sim 10^{45-47}$ ergs/s). Those fading AGN candidates show two important properties that 1) past AGN activity estimated from the [OIII] band reaches around the Eddington-limit, suggesting an experience of the past burst phase and such burst phase might be unstable and it does not last longer than $\sim 10^4$ yr. 2) More than 30% of the fading AGN candidate population show a large absolute variability of $\Delta W1 > 0.45$ in the *NEOWISE* 3.4 μm band for the last ~ 10 yr. Some of such population also show the changing-look phenomena disappearing of the blue continuum and broad line region in the multi-epoch optical spectra. This suggests that some fading AGN candidates are still continuously in the fading phase even in the last ~ 10 yr.