J31a Investigation on the XMM-Newton EPIC Spectra of Six ULXs in Quest of Slim Disk Signatures

○ Kiki Vierdayanti，嶺重 慎 (京都大学)，海老沢研 (JAXA/ISAS)，川口俊宏 (青学大)

We investigate the XMM-Newton EPIC spectra of six ULXs, that are claimed as strong candidates of IMBHs in several papers. We first tried fitting by the standard spectral model of disk blackbody (DBB) + power-law (PL), finding good fits to all the data with low innermost temperatures of the disk, $0.1 < kT_{\rm in} < 0.5$ keV. This apparently supports the IMBH interpretation of ULXs, in agreement with others. We, however, find that the PL component dominates over the DBB component at almost entire energy ranges. Thus, the results derived solely from the minor DBB component are questionable. Next, we tried to fit the same data by the p-free disk model, assuming effective temperature profile of $T_{\rm eff} \propto r^{-p}$. Surprisingly, we also obtained good fits but with higher innermost disk temperatures, $1.8 < kT_{\rm in} < 6.7$ keV. More importantly, we obtained $p \sim 0.5$, just the value predicted by the slim-disk theory, rather than $p \sim 0.75$ expected by the standard-disk model. The estimated black hole masses are less than 100 $M_{\odot}$. More sophisticated slim-disk model by Kawaguchi also gave good fits with roughly consistent values of black hole masses. We thus conclude that ULXs should shine at around the Eddington luminosity and that they should contain stellar-mass black holes.