J12b Physical Interpretation of the Extended Disk Blackbody Model for Ultraluminous X-Ray Sources

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We have tried to fit the XMM-Newton spectra of several ultraluminous X-ray sources (ULXs) with an extended disk blackbody (extended DBB) model, the so called 'p-free' model, assuming effective temperature profile of $T_{\rm eff} \propto r^{-p}$, where r is the disk radius. We found the existance of the slim disk signature from the p values obtained from the fitting, that is $p \sim 0.5$ rather than $p = 0.75$ as expected from the standard disk theory. We tried to estimate the black hole masses from the fitting with the extended DBB model by using the conventional method used in DBB model, a mathematical approximation of standard model (Makishima et al. 2003). However, this conventional method cannot be simply used for the case of slim disk, since its spectrum profile differ from the standard model. We need correction factor, to get the correct mass values. We tried to find this correction factor by fitting the theoretical spectra of a slim disk model with the extended DBB model. We use the slim disk model proposed by Watarai et al. (2005) which includes the general relativistic effects (gravitational bending, gravitational redshift and relativistic Doopler effects) and also the self-occultation effect. As a preliminary result, we found that the masses derived from the conventional methods are underestimated about a factor of two.