

Diskir: Irradiated inner and outer disk

The inner disk can be irradiated by the Compton tail. This can substantially change the inner disk temperature structure from that expected from an unilluminated disk in the limit where the ratio of luminosity in the tail to that in the disk, $L_c/L_d \gg 1$. This is generally the case in the low/hard state of accreting black holes, and neglecting this effect leads to an underestimate of the inner disk radius (Gierlinski, Done & Page 2008a MNRAS, 388, 753).

The irradiated inner disk and Compton tail can illuminate the rest of the disk, and a fraction f_{out} of the bolometric flux is thermalized to the local blackbody temperature at each radius. This reprocessed flux generally dominates the optical and UV bandpass of LMXBs (Gierlinski, Done & Page 2008b MNRAS, submitted).

par1 = kT_{disk} , innermost temperature of the UNILLUMINATED disk
par2 = Γ , asymptotic power-law photon index
par3 = kT_e , electron temperature (high energy rollover)
par4 = L_c/L_d , ratio of luminosity in the Compton tail to that of the UNILLUMINATED disk
par5 = f_{in} , fraction of luminosity in the Compton tail which is thermalized in the inner disk
(generally fix at 0.1 as appropriate for an albedo of 0.3 and solid angle of 0.3)
par6 = r_{irr} , radius of the Compton illuminated disk in terms of the inner disk radius
par7 = f_{out} , fraction of bolometric flux which is thermalized in the outer disk
par8 = \log_{out} , \log_{10} of the outer disk radius in terms of the inner disk radius
K = normalization, as in diskbb