KERRBB

Multi-temperature blackbody model for a thin, steady-state, general relativistic accretion disk around a Kerr black hole, developed by Li et al. 2004 (astro-ph/0411583). Includes all relativistic effects and self-irradiation of the disk, and allows for a nonzero torque at the inner boundary of the disk (which is assumed to be at the marginally stable orbit). However, zero torque ($\eta = 0$) is recommended in most cases since it is found that the effect of a nonzero torque can, to a good approximation, be absorbed into a zero torque model by adjusting some of the model parameters. KERRBB is intended as an extension of GRAD, which is limited to a non-rotating black hole and does not include self-irradiation.

par1 $= \eta$, ratio of the disk power produced by a torque at the inner boundary to that arising from accretion ($0 \leq \eta \leq 1$). $\eta = 0$ corresponds to the case of a standard disk with zero torque at the inner edge

par2 $= a$, dimensionless spin of the black hole ($-1 \leq a \leq 0.9999$)

par3 $= \vartheta_{\rm obs}$, disk inclination angle (deg; $0 \leq \vartheta_{\rm obs} \leq 85$; 0 for face-on)

par4 $= M$, mass of the black hole (solar units)

par5 $= \dot{M}_{\rm eff}$, "effective" mass accretion rate (10^{18} g/sec). When $\eta = 0$, it is just the mass accretion rate of the disk. When $\eta > 0$, the effective mass accretion rate $= (1 + \eta)$ times the true mass accretion rate

par6 $= D$, distance (kpc)

par7 $= f_{\rm col}$, spectral hardening factor, $T_{\rm col}/T_{\rm eff}$. Should be greater than 1, and is believed to be in the range $1.5 - 1.9$ for accretion disks around stellar-mass black holes

par8 = rflag, a flag to switch on/off the effect of self-irradiation (not allowed to be free). If positive, self-irradiation is included; if ≤ 0, self-irradiation is not included

par9 = lflag, a flag to switch on/off the effect of limb-darkening (not allowed to be free). If positive, disk emission is limb-darkened; if ≤ 0, disk emission is assumed to be isotropic

K = normalization, should be fixed to 1