kyrline: black hole accretion disc line emission

Line emission from an accretion disc around a black hole. The broken power-law radial dependence and the limb darkening/brightening law for the emission directionality are used to define the local flux in the spectral line. All relativistic effects are taken into account, see Dovčiak M., Karas V. & Yaqoob T. (2004) ApJS, 153, 205-221.

par1	the black hole angular momentum ($0 \leq a/M \leq 1$)
par2	the observer inclination in degrees ($0°$ – pole, $90°$ – disc)
par3	the inner edge of an accretion disc in GM/c^2
par4	0 – means we always integrate from the disc inner edge, par3 1 – if the disc inner edge, par3, is below the marginally stable orbit then we integrate emission from above the ISCO only
par5	the outer edge of an accretion disc in GM/c^2
par6	the rest energy of the intrinsically narrow spectral line (keV)
par7	the inner power-law index for the radial dependence of the emissivity that scales as $r^{-\text{par7}}$ below the boundary radius, par9
par8	the outer power-law index for the radial dependence of the emissivity that scales as $r^{-\text{par8}}$ above the boundary radius, par9
par9	the boundary radius (in units of GM/c^2)
par10	the overall Doppler shift
par11	defines the emission directionality: 0 – isotropic emission (local flux ~ 1) 1 – Laor's limb darkening (local flux $\sim 1 + 2.06\,\mu_e$) 2 – Haardt's limb brightening (local flux $\sim \ln\left[1 + 1/\mu_e\right]$)
norm	photons/cm^2/s in the spectral line

KYRH (the black hole horizon, r_h), KYRIN (the disc inner edge, r_{in}) and KYRMS (the marginally stable orbit, r_{ms}, ISCO) are added to the XSPEC internal switches. Use xset command to show their current values.