

Nthcomp: Thermally comptonized continuum

Nthcomp is a **much** better description of the continuum shape from thermal comptonisation than an exponentially cutoff power law, but is not that much more complicated in terms of parameters. The high energy cutoff is sharper than an exponential, and is parameterized by the electron temperature (kT_e). VERY roughly, an exponential rollover energy $E_c=2-3kT_e$ but the shape is very different, so it impacts on the reflected fraction as well. Another major effect (especially for X-ray binaries) is that it incorporates the low energy rollover. The hot electrons Compton UPscatter seed photons so there are few photons in the scattered spectrum at energies below the typical seed photon energies, making it significantly different to a power law below this energy. Typically the physical picture is that these seed photons are (quasi)blackbody (eg neutron star boundary layer) or disk blackbody in shape. Either of these shapes can be selected (input type), both being parameterized by a seed photon temperature (kT_{bb}). Between the low and high energy rollovers the shape of the spectrum is set by the combination of electron scattering optical depth and electron temperature. It is not necessarily a power law, but can be parameterized by an asymptotic power law index (Γ). Details of this are given in Zycki, Done & Smith (1999), including a self-consistent reflection component which is NOT released here as it was written using non-FITS standard files so has significant issues with portability.

This is the thermally comptonized continuum model of Zdziarski, Johnson & Magdziarz 1996, MNRAS, 283, 193, as extended by Zycki, Done & Smith 1999, MNRAS 309, 561. Please reference these papers if you use it.

par1 = Γ , asymptotic power-law photon index.

par2 = kT_e , electron temperature (high energy rollover)

par3 = kT_{bb} , seed photon temperature (low energy rollover)

par4 = inp_type, 0 or 1 for blackbody or disk-blackbody seed photons, respectively

par5 = redshift

K = normalization, unity at 1 keV for a norm of 1.