Estimation of the physical condition of the torus in active galactic nuclei by a modeling of the Compton shoulder in the reflected X-ray spectrum

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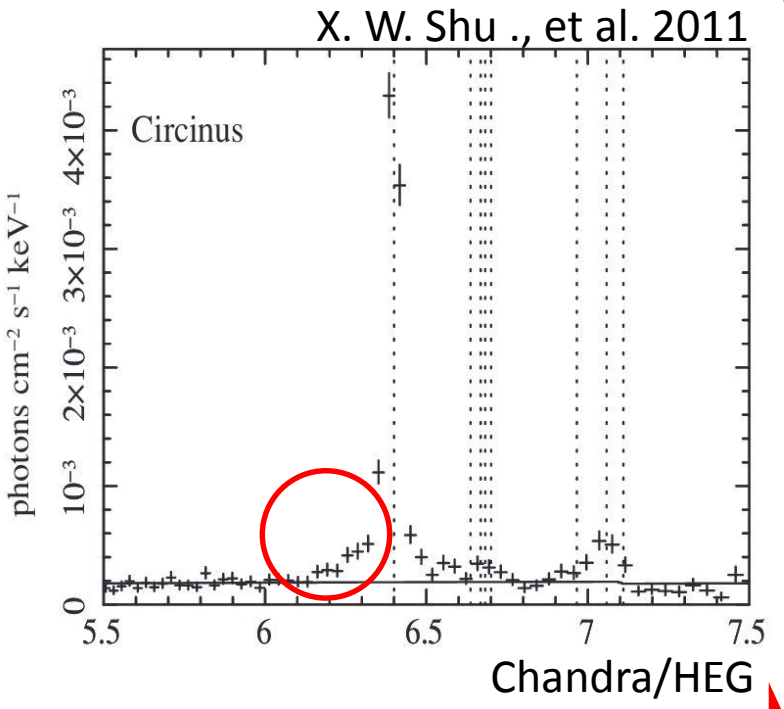
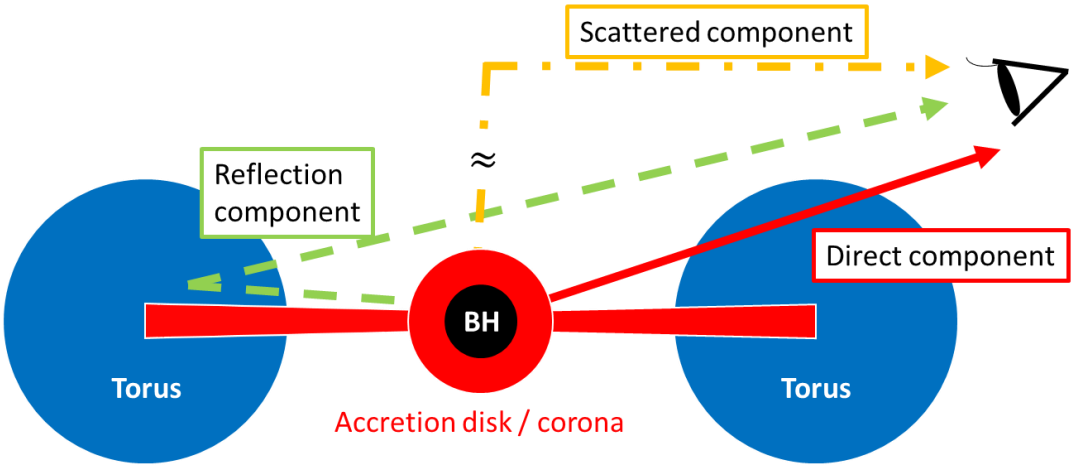
Compton shoulder



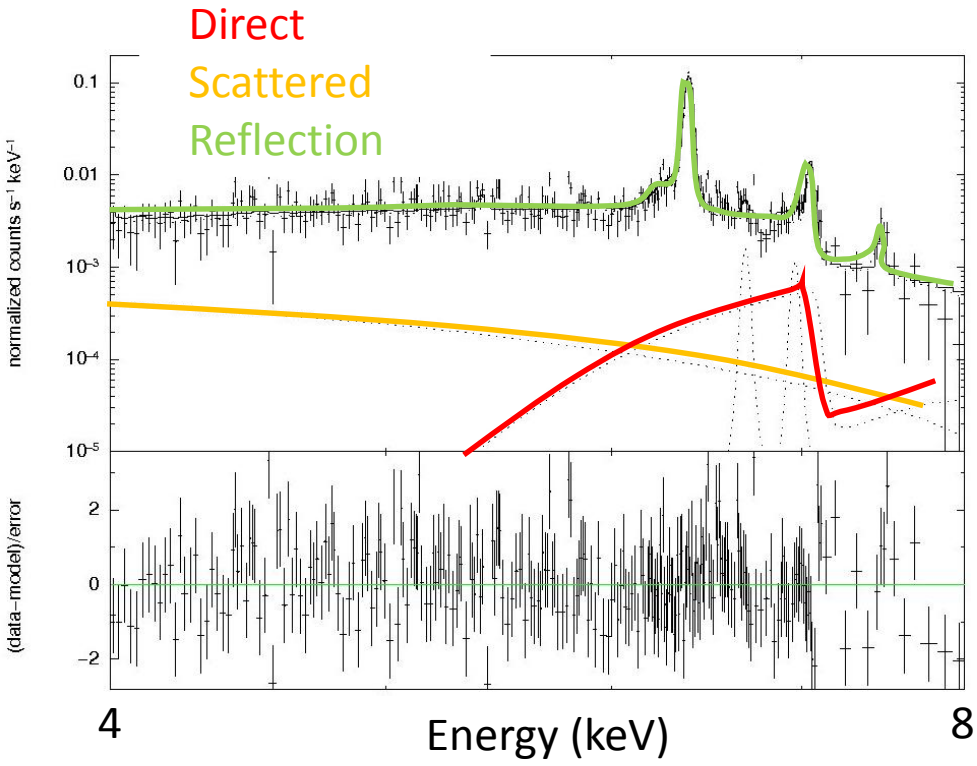
Characteristics of the Compton shoulder is a powerful tool to investigate the structure of the torus

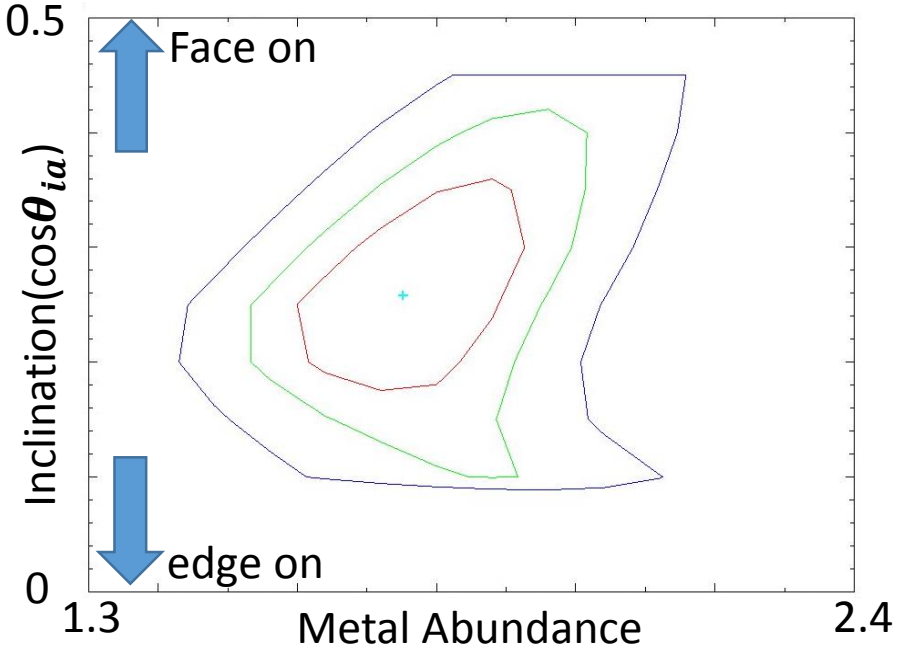
X-ray components from type Ⅱ Seyfert



We developed a Monte-Calro based X-ray reflection spectral model (Our model) to reproduce the structure of the Compton shoulder and applied Our model to the Chandra High Energy Transmission Grating data with an enough high spectral resolution.

Our analysis of the Circinus galaxy(Seyfert Ⅱ galaxy)





- We successfully reproduced the structure of the Compton shoulder and constrained the absorption column density(N_H), inclination angle($\cos\theta_{ia}$), and metal abundance, using the spectral data only around Fe-Kα emission line(4-8keV).
- N_H and $\cos\theta_{ia}$ are consistent with edge-on geometry.
- Metal abundance is $1.75^{+019}_{-0.17}$, which is slightly higher than the solar. This gives a hint for the star formation history around the torus in the AGN.