Emission Lines in Supersoft X-ray Source (ELISS)

Guo Jincheng(NAOC), Jithesh Vadakkumthani (SHAO), He Lin(NAOC)

Background: Super Soft X-ray sources(SSSs) have luminosities above 10^{36}erg/s, and no emission above 1keV. Most of them are white dwarfs, and some of them are black holes.

Cal 87 is a very famous SSS in LMC.

Features about this source:

- 10.6 hr orbital period.
- Compact object is a white dwarf.
- The companion star is a main-sequence star of mass ~1.4-1.5 M_{sun}.
- Mass transfer rate is ~10^{-7} $M_{sun}yr^{-1}$.
- Blackbody like spectra with T_{eff}~3-7*10^5 K.

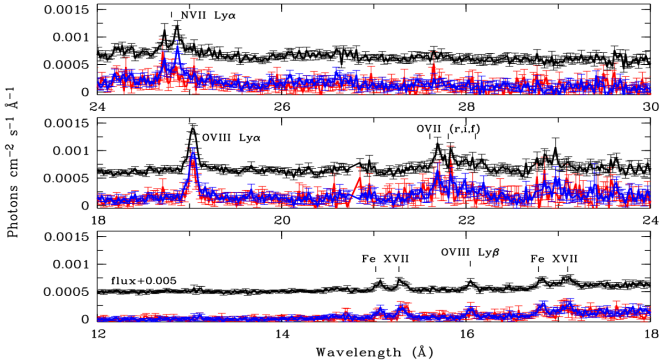
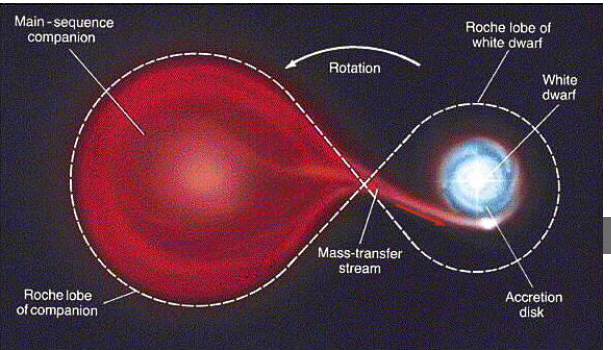


Figure 3. High-resolution X-ray spectra (RGS) of CAL 87 from the whole observation (black) considering only events collected during eclipses (red) and from events out of eclipses (blue).

T. Ribeiro et al. (2014)

Motivation: Multiple emission lines detected in XMM-Newton RGS spectrum motivated us to utilize CLOUDY to fit these lines in order to constraint the structure of the accreting white dwarf system.



Result:

Optimize method:

- black body 5e5 K
- luminosity total 37
- Radius 15.014279 vary
- Coronal 6.43473 K log vary
- Hden 8.853919 vary
- stop thickness 14

ID		Model	Observed	error
0 8	18.9732A	2.98900	1.58580	0.20000
Fe17	17.0960A	0.33793	0.47440	0.20000
Fe17	16.7760A	0.30660	0.38420	0.20000
0 7	21.6020A	1.00000	1.00000	0.20000
0 7	21.8070A	0.39736	0.84390	0.20000
0 8	16.0086A	0.24117	0.31440	0.20000
Fe17	15.2620A	0.11763	0.38470	0.20000
Fe17	15.0130A	0.41209	0.27560	0.20000