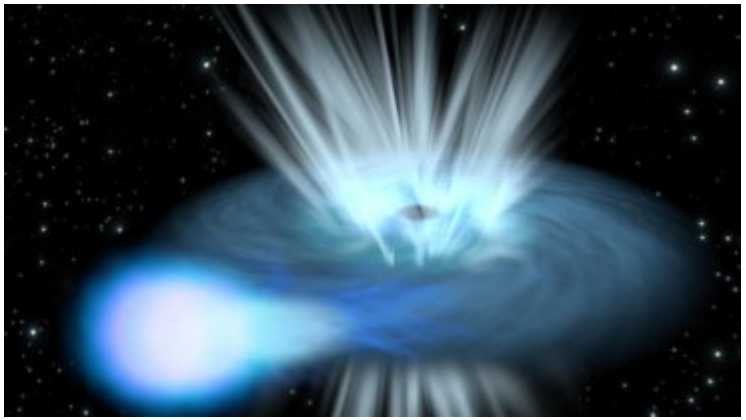
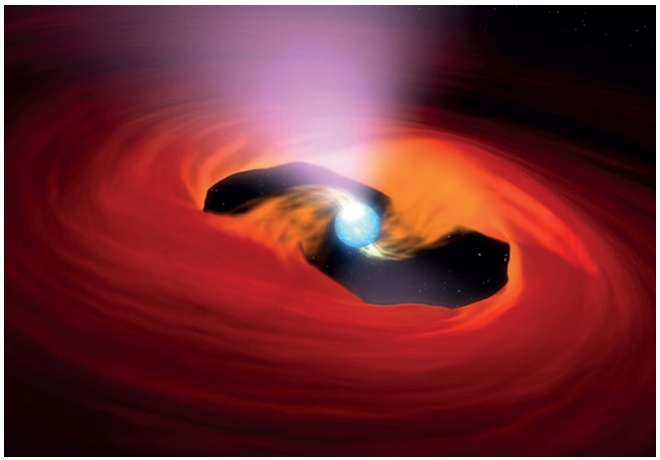
ULX discussion – what are they?

- Super-Edd BHs



  - Spectrum: photosphere + inner disc
  - Behaviour: as predicted
  - Residuals: wind absorption
  - Timing: high rms in soft objects – clumpy winds
  - Optical wind spectra

- Highly super-Edd NSs



  - Canonical pulsar spectrum *VERY* similar
  - M82 X-2: difficult to constrain spectrum
  - New pulsars – classic ULXs spectrally; other properties?

Questions

- What proportion of the ULX population is composed of NSs?
  - How do we distinguish them from BHs in absence of pulses? (Optical dynamical masses impossible?)
- Why are the spectra so similar to pulsars?
  - If we're simply observing pulsars, why the wind signatures? The giant bubble nebulae? The optical spectra? If the emission is from the super-critical disc, why do we see pulses?

More questions

- Can we accept that ULXs provide the best example of local super-Eddington accretion?
- If so, how does understanding ULX physics help us address related issues?
  - SMBH seed growth
  - Feedback in early Universe
  - TDEs
- Where do ULS fit into ULX family?