

Cyg X-2

Observation plan

Ideal Science Case: We will perform two paintings with the total exposure of 240 ks.

This is a Priority-C target and we can adjust the exposure time to be shorter to fill in any available gaps in scheduling. We have identified a minimal exposure time necessary to detect O K and Fe L scattering features from interstellar dust.

(1) 40 ks (ideal) or 10 ks (minimum); 1.6' (close to on-axis) of Cyg X-2

- Resolve: Open filter (or Neutral Density filter)*
- Xextend: 1/8 window + 0.1-s burst

*An open filter configuration would be more ideal, because the NDF has an O K shell absorption that will reduce the signal and add structure to our observation. We will consult with the Bright Sources Working Group to see if an open filter configuration can be used to achieve the same result.

(2) 200 ks (ideal) or 50 ks (minimum); 4.5' (off-axis) of Cyg X-2

- Resolve: Open filter
- Xextend: 1/8 window + 0.1-s burst
- XMA: roll angle within +/- 15 degrees of 45, 135, 225 or 315 to keep Resolve within the shadow of the mirror support structure.

Immediate objectives

- [1] Measure the position and depth of the scattering features from solid interstellar Oxygen.
- [2] Compare Fe L shell XSFS against a library of lab-measured mineralogical templates to evaluate the composition of Iron bearing interstellar dust.
- [3] Establish the analysis method for bright point sources. Observe Fe K emission/absorption lines to understand the plasma condition and constrain Doppler and gravitational shifts of a neutron star low-mass X-ray binary.