4U 1624-490

Observation plan

4U 1624-490 will be observed for a total of 50 ks. We also ask to divide this observation in two parts of 25 ks each. In this case, the purpose is to have each of the parts centered at one dip, since the orbital period is too long (21 hours or 76 ks) to get two full dips if the exposure is uninterrupted. The dip ephemeris (easily measurable with MAXI) will be provided to the planning team in due time. We will then get a total dip exposure of 30 ks (15 ks per dip), which result in a minimum of ~6 ks exposure per flux level within dips (considering 5 flux levels).

For this target, we request the open filter for Resolve (expected count rates are 21.4 s^{-1} for 4U 1624-490 during shallow dipping). For Xtend we request the $1/8^{th}$ Full Window Mode for this target (expected count rates are ~24.6 s^{-1} during shallow dipping for 4U 1624−490).

Immediate objectives

[1] Measure the column density, ionization and velocity of the plasma or plasmas present during persistent emission to determine if a wind is present (and if so measure its mass outflow rate) or rather a static atmosphere or hot corona.

[2] Measure the column density, ionization and velocity of the plasma or plasmas present during dipping emission in a flux- and phase-resolved manner to constrain the geometry of the plasma or plasmas responsible for the obscuration during dipping. In particular, attempt to determine the precise location of the lines (e.g. low ionization lines could be on the stream of cold material towards the disc, at the zone of impact with the disc or even further inside the disc) to understand the relation between low and high ionization plasmas, e.g. whether they might result from a thermal instability.

[3] Attempt to detect emission lines (e.g. He-like triplets from O VII or Mg XI) during the deepest dipping episodes or absorption lines from meta-stable levels (e.g. Fe XXII) that can help constraining the density of the plasmas.

[4] Study the dependence of the presence of dips or of the detected plasmas as a function of changes in the continuum (luminosity and hardness) e.g. to constrain if radiation pressure may help launching a wind and to further understand potential shielding in the disc.

If X-ray bursts occur during the observations:

[5] Study the dependence of the presence of dips or of the detected plasmas following the X-ray burst to further constrain the effects of illumination on the existing plasmas (and the recombination timescales), the capability to launch a wind via radiation pressure, and the location of the plasmas.

[6] If the bursts show photospheric radius expansion, search for lines within the bursts that can be attributed to the spread of burst products in the corona or on the surface of the accretion disc. This could be the first detection of such products.