NGC 1365

Observation plan

Our target was approved at Priority A for two 125 ks exposures taken several days to weeks apart. The observation is not a ToO, so it requires no trigger. We require no filter for Resolve and select full window mode for Xtend.

Immediate objectives

[1] **Resolve Fe XXV, Fe XXVI Kα, Kβ absorption lines and search for the corresponding emission (if found in Compton-thin state)**. Measuring P- Cygni profiles from winds would put unprecedented constraints on the covering fraction and launching radius of an extreme, ionised wind. With our ideal observation, we should observe variability in the wind on timescales of weeks/days.

[2] **Measure the broad iron K emission line to estimate BH spin, and search for the corresponding reverberation lag with Resolve + Xtend.** If both XRISM observations of NGC 1365 occur in NnH < 1 × 1023 cm−2 state, we will perform a high-frequency time lag search to probe reverberation time delayslags.

[3] **Search for comet-like broad line region clouds, and corresponding soft lags.** The signature of eclipsing comet-like BLR clouds is a rapid increase in column density that slowly decreases over time (on timescales of ~ 50 ks). This may also produce low-frequency soft lags (measurable with Resolve + Xtend) that can place independent constraints on BLR location and structure.

[4] **Measure the temperature/velocity of collisionally-ionised emission and disentangle from photoionised component.** In archival RGS data, the photo-ionised emission contributes at the 5-15% level. We will search for variability in the photoioniszed component, and comparecomparing the collisionally-ionised emission to other star- forming galaxies, and the photo-ionised NLR emission to other AGN.