

# Vela X-1

## Observation plan

A 50 ksec observation of Vela X-1 around orbital phase 0.5 and two 10 ksec long observations around phase 0.25 and phase 0.75, for a total of 70 ksec.

(Vela X-1 High Mass X-ray Binary has the orbital period of 8.964 days.)

## Immediate objectives

Using XRISM Resolve observations of Vela X-1 we will study:

- [1] The total mass budget in the wind and the average intensity of ionizing radiation.
- [2] The properties of the primary wind.
- [3] The interaction of the wind with the compact object gravity: A bow shock is expected, along with a wake structure associated with the gravitational focusing of the wind.
- [4] Interaction of the wind with the X-rays: X-ray ionization will suppress the UV driving of the wind by ionizing the ions responsible for the UV opacity. This will lead to large scale wake structures trailing the X-ray source in its orbit.
- [5] Interaction of the wind with the rotating beam of X-rays from the pulsar.
- [6] The primary nucleosynthetic history by searching for iron peak trace elements such as Mn and Cr. And, the element abundance and the distribution of column densities of the near-neutral material in the wind by measuring the neutral fluorescence lines including Si, S, Ar, Ca and Ni.

The observation of Vela X-1 is virtually guaranteed to produce spectra which are of high statistical significance and rich in line features. It will provide prime material for highlighting the capabilities of XRISM and the Resolve instrument.