

Honours project: Long-term photometric study of Be X-ray binaries using MeerLICHT

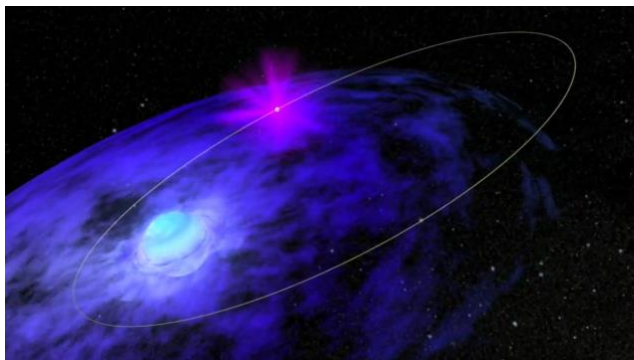
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Project context and summary

Be X-ray binaries (BeXBs) are a subclass of high-mass X-ray binaries that are made up of a Be star and a compact object which is primarily a neutron star. The Be star has a Keplerian disc (“decretion” disc) in its equatorial regions which is believed to be formed by the fast rotation of the star. The complex interaction between the disc and the neutron star results in accretion of matter, giving rise to enhanced X-ray emission.

The decretion disc in BeXBs shows a wide range of variability which is primarily seen at optical wavelengths. The main observational characteristics of Be discs are emission lines in the optical spectra, photometric variability and infrared excess. Studying long-term decretion disc variability is crucial since it is this matter that is ultimately responsible for the multiwavelength emission that is seen in these systems.

The project aims to use long-term multi-band photometric data from the MeerLICHT wide-field optical telescope to investigate changes of different properties of discs on various timescales. The optical data comprise ugriz+q photometry which will be used to perform a systematic study of changes in brightness and colour from a sample of BeXB systems with a wide range of orbital parameters.



An artist's impression of a Be X-ray Binary.