IAF SYMPOSIUM ON ONGOING AND NEAR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Science Goals and Drivers for Future Exoplanet, Space Astronomy and Space Physics (2)

Author: Dr. Antonios Manousakis
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates, amanousakis@sharjah.ac.ae

Ms. Noora Alameri
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates, nalameri@sharjah.ac.ae
Ms. Maryam Alqasimi
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates, malqasimi@sharjah.ac.ae
Prof. Ilias Fernini
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates, ifernini@sharjah.ac.ae
Prof. Hamid Al Naimiy
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates, alnaimiy@sharjah.ac.ae

ACCRETION ENVIRONMENT IN SGHMXB WITH SMALL SATELLITES

Abstract

Supergiant High Mass X-ray Binaries (sg-HMXB) usually comprise of a neutron star accreting from the wind of an OB supergiant companion. As the neutron star moves through the dense stellar wind, it accretes material from its donor star and therefore emits X-rays. The wind will therefore be highly unstable revealing a very rich phenomenology. In other words, the presence of a neutron star, deeply embedded within the strong winds from its massive companion, strongly influences the wind flow, allowing to study of stellar wind properties in situ.

For very bright X-ray sources, like the prototype of this class, namely Vela X-1, even small satellites may be adequate for revealing its geometry and accretion environment. Precise knowledge of the orbital phase is essential. Synergies with other observatories will also be beneficial. The plethora of all these data can further constrain the orbit of the system and hence allow for an accurate refined orbit and X-ray wind tomography.

The nature of the accretion flow around this system, we eventually revealed when state- of-the-art hydrodynamical simulations confronted with observations. Even small satellites, like the upcoming Sharjah-Sat-1 will provide enough data through continuous monitoring over several orbits allowing studying pulse evolution, period evolution, spectral variability, etc.