

Tracing the wind interface of the massive binary Eta Carinae

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Abstract

The binarity of Eta Carinae has been debated for a long time, but most recent evidence favors a binary star interpretation. However, very little is known about the nature of the companion star. Over Eta Carinae's spectroscopic period many observable wind lines in the NUV/Optical region, have been shown to exhibit peculiar line profiles with unusual velocity shifts relative to the system velocity. Some of the lines are exclusively blue-shifted over the entire 5.54 yr cycle and their ionization/excitation imply formation in the interface between the two massive stars. Especially, the He I emission lines are mainly formed in the wind interface region. Since the wind momentum is much larger for the primary star than its companion, the wind interface is located fairly close to the companion. Consequently, by tracing the He I emission we can construct a radial velocity curve that will describe the motion of the companion star and will derive the relation between the masses of the binary system stars. Furthermore, we will measure velocity and intensity variations in H I and Fe II to further investigate the ionization/excitation structure throughout Eta Carinae's wind. The analysis of the central source of Eta Carinae, due to the closeness of the two stars in the binary system (30 AU) and the intervening matter in line-of-sight towards Eta Carinae, is extremely dependent on data obtained with high angular resolving power. The HST archival data is crucial for the continuance of this project.

Investigators:

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Number of investigators: 5

Dataset Summary:

Instrument	No. of Datasets	Retrieval Method	Retrieval Plan
STIS	950	FTP	Line by line reduced spectra are in hand