

Summary

High-mass stars seem to have the highest multiplicity rate among all stars which increases the chance to be observed also as eclipsing binary (EB) systems. As a consequence early-type EBs are not only a unique laboratory to study properties, formation and evolution of high-mass stars but – due to their brightness – they have also the potential for measuring accurate distances to nearby galaxies, and thus to significantly improve the Hubble constant determination based on Cepheids and SN Ia.

With the present project we want to attack the major questions with respect to high-mass stars, i.e.

- Stellar parameters like mass, mass-ratio, luminosity, radius, abundances, period, etc.
- Origin and evolution of close multiple and interacting systems
- Detection and investigation of higher multiplicity systems
- Mass transfer and rotation of individual components in multiple systems

Apart from exploring stellar properties, detached double-lined spectroscopic EBs offer a unique opportunity to measure accurate distances to nearby galaxies. By high-precision V – K measurements of early-type EBs we will solve the main problem related to the calibration of the surface brightness – color relation technique making it an excellent tool for obtaining 2% distances to individual EB systems in a volume of 2 Mpc now, and up to 30 Mpc with the advent of future extremely large telescopes.