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M - *L* relations for rapid and slow rotators

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Abstract. Comparing the radii of eclipsing binaries components and single stars we have found a noticeable difference between observational parameters of B0V - G0V components of eclipsing binaries and those of single stars of the corresponding spectral type. This difference was confirmed by re-analyzing the results of independent investigations published in the literature.

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Larger radii and higher temperatures of A - F eclipsing binaries can be explained by synchronization of such stars in close systems that prevents them to rotate rapidly.

So, we have found that the M - L relation based on eclipsing binary data cannot be used to derive the initial mass function of single stars. While our current knowledge of the empirical M - L relation for intermediate-mass (1.5 to 10 $M_\odot$) stars is based exclusively on data from eclipsing binaries, knowledge of the M - L relation should come from dynamical mass determinations of visual binaries, combined with spatially resolved precise photometry. Then the initial mass function should be revised for $M > 1.5\,M_\odot$.

Data were collected on fundamental parameters of stars with masses $M > 1.5\,M_\odot$. They are components of binaries with $P > 15$ d and consequently are not synchronized with the orbital periods and presumably are rapid rotators. These stars are believed to evolve similarly with single stars, so these data allow us to construct M - L and other relations, that can more confidently be used for statistical and astrophysical investigations of single stars, than so called standard relations, based on data on detached main-sequence double-lined short-period eclipsing binaries. Mass-luminosity, mass-temperature and mass-radius relations of single stars are presented, as well as their HR diagram. (*Poster Presentation.)*