Poster at Splinter Meeting

Splinter I

Hot Stars and the Heritage of the Kiel School
Instabilities and pulsations in models of 55 Cygnus (HD 198478)

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Spectroscopic and photometric variability is a well established phenomenon for many supergiant stars. The origin of these variabilities is not yet fully understood. Radial and nonradial pulsations have been suggested as a candidate for variability. A recent observational study by Kraus et. al. (2015; accepted in A&A; arXiv:1507.01846v1) revealed that 55 Cygnus (HD 198478), a supergiant star, pulsates in p, g as well as strange modes. Periods for this star lie in the range between 2.7 hours to 22.5 days. These authors also found that this star exhibits episodes of enhanced mass loss on the timescale of two to three weeks.

In order to understand the pulsations in 55 Cygnus, we performed a linear stability analysis using stellar parameters close to those of 55 Cygnus including different chemical compositions. Based on the linear stability analysis, nonlinear radial simulations of the instabilities found have been performed. These simulations provide evidence for pulsationally driven mass loss with mass loss rates compatible with the observed values ($\approx 2 \times 10^{-7}$ $M_{\odot}yr^{-1}$). Nonlinear radial pulsation periods (7-8 days) lie within the range of observed periods.