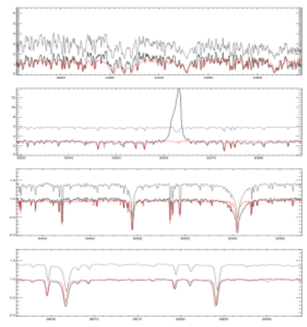
School of Physics
Trinity College Dublin

Research project in **Astrophysics**

Symbiotic Binaries: Models for Stellar Mass Loss & Accretion



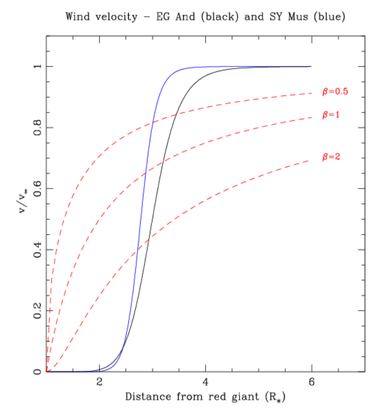
Research supervisor: Dr. Brian Espey
Astrophysics Group

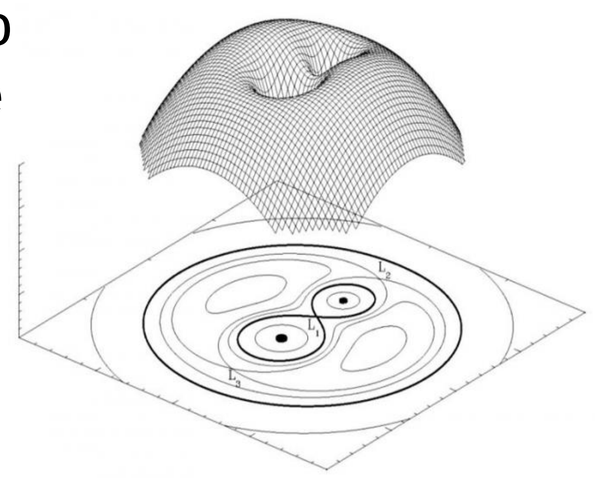
Scientific Background / Current Research

Evolved stars lose processed material in the form of a wind which provides material for future stars & planets, but the driving force of the stellar wind is not understood. For isolated stars limited information is available for the important region where the wind accelerates, and hence our understanding is similarly limited. We have used an alternative approach of observing eclipsing binary systems in which a giant star is orbited by a less massive white dwarf secondary. By observing the progressive absorption around the time of eclipse, we obtain density, temperature, and chemical abundance information, and can also infer the wind's velocity field as well as the rate of mass-loss.

Project

In our work we have measured the winds for a number of target systems, and determined mass-loss and velocity field for the giant stars. The surface (photospheric) characteristics of the giant stars are almost identical to those of normal, isolated stars, suggesting that we can apply our results to the general problem of mass-loss. However, we need to confirm this to higher accuracy. We aim to more accurately model the photospheric and chromospheric spectra, as well as study the Roche potential in these systems to better understand mass-loss by the red giant, and accretion on to the white dwarf.





Funding

4-year PhD funding available throughh PRTLI V inititative.

Contact details

Email: Brian.Espey@tcd.ie Room SNIAM 1.04 tel. +353 1 896 2680

More information / References

Crowley, C., Espey, B.R. 2010 ASP Conf. Series 425, 191-198

Crowley, C., Espey, B.R. & McCandliss, S.R. 2008 Astrophysical Journal 675, 711-722

Crowley, C. Thesis: http://www.maths.tcd.ie/~ccrowley/Thesis/