

Astrophysical Modeling of Wolf Rayet Stars Using Low Resolution Gratings

Goncalves, Ivo

Costa, Daniel

Franqueira, Mauro

Wolf Rayet (WR stars), which are poorly studied in the field of astronomy, are massive stars with luminosities a million times bigger than the Sun's and temperatures about 8 times higher. It's also known that WR stars have an emission maximum in the UV area and that they are old stars, meaning that they present a different behavior in HR diagrams. Usually, research regarding stars such as this is conducted by professional astronomers with access to instrumentation with the latest technology. So, we wondered if high school students could make progress in this field of study with such scarce resources and, if so, what methods could we use. Our project consists in an integrated investigation of several WR stars, resorting to visible spectroscopy and using low resolution gratings, to study some of their astrophysical parameters. By using spectral data recovered from "on site" observations and from observations made on a small regional observatory, with resort only to freeware for data reduction, we were able to obtain accurate results for temperature, radius, stellar winds and chemical composition which suit the predicted data from the literature. All this data confirmed the current WR star models and even added some information about the astrophysical dynamics of WR stars throughout time, such as their intrinsic behavior and how they interact with their interstellar medium. Due to this project, we did reliable scientific investigation which we hope is going to be important to astronomy studies in the future.

Awards Won:

Fourth Award of \$500