
Peakbagging in the open cluster NGC 6819

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Abstract

In Kepler Red Giant stars, detailed peakbagging, meaning the extraction of individual oscillation modes and all their characteristics, have only been performed in a handful of stars. The discipline has proven itself extensively for main-sequence and sub-giant stars, but has not been applied to a large extent to evolved Red Giants. This has mainly been due to complications introduced by the many mixed dipole modes.

In this talk I will report on an extensive peakbagging effort on the evolved red giant stars of the open cluster NGC 6819. This consists of ~50 stars spanning all the way up the red giant branch (RGB) and down to and including the red clump (RC). These stars represent a unique sample, because of their common distance, metallicity, age and length of observation (Q0-Q17).

By employing sophisticated pre-processing of the time series and Markov Chain Monte Carlo (MCMC) techniques we have extracted individual frequencies, heights and linewidths for hundreds of oscillation modes in the sample of stars. For some of the stars, rotational splittings could also be obtained.

I will show that "average" asteroseismic parameters derived from these can be used to distinguish the stellar evolutionary state between RGB and RC stars, without having to measure the often difficult dipole modes. Furthermore, I will show how the fitting of some of these dipole modes can improve the detectability of acoustic glitches.

The extracted parameters are extremely promising in many respects and many future studies into detailed tests of stellar evolution will only be made possible because of this unique sample of stars.

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