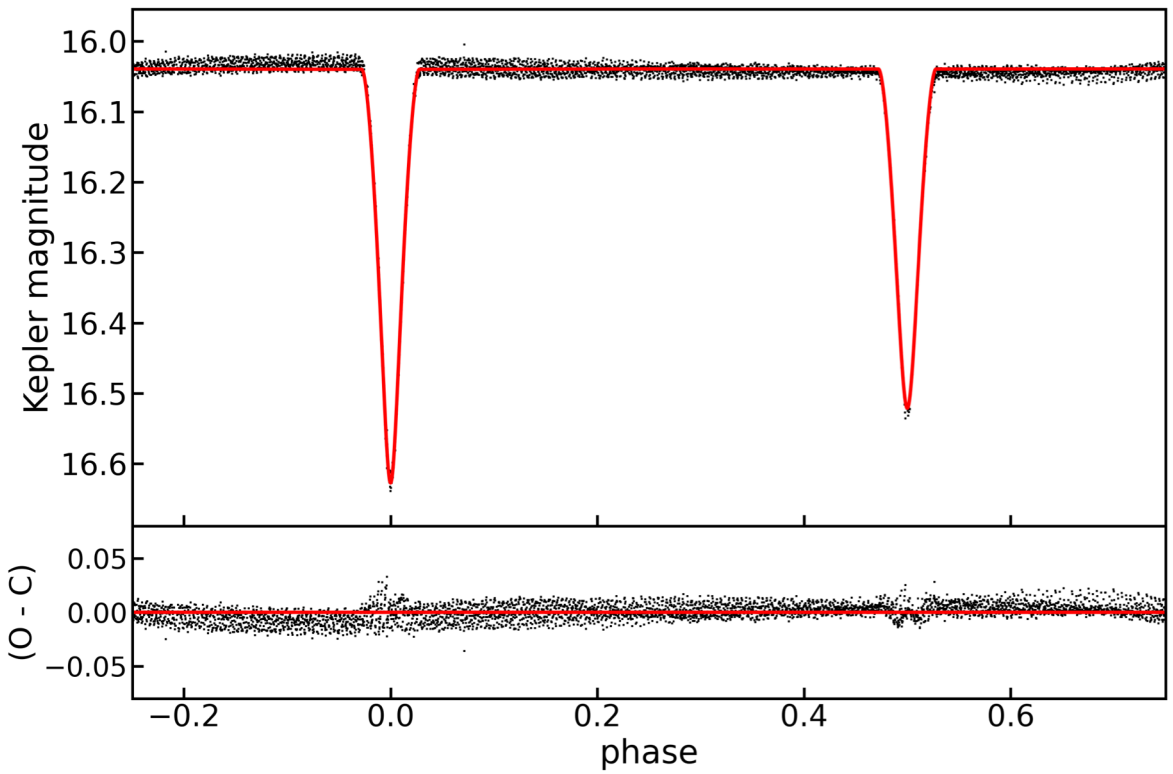
Detached eclipsing binaries from the Kepler field: radii and photometric masses of components in short-period systems

CENTRO DE ASTROBIOLOGÍA · CAB
ASOCIADO AL NASA ASTROBIOLOGY PROGRAM
CSIC INTA



Phase-folded light curve of the eclipsing binary KIC09656543 observed by the *Kepler* telescope. Black dots are the observed data, in magnitudes. The red solid line shows the best-fitting model.

The characterisation of detached eclipsing binary systems with low mass components (where each component of the system is a main-sequence K,M-type star) has become important to verify the role of convection in stellar evolutionary models, which requires model-independent measurements of stellar parameters with great precision. However, spectroscopic characterisation depends on single-target radial velocity observations and only a few tens of well-studied low-mass systems have been diagnosed in this way.

In this paper, **we characterise eclipsing detached systems with low-mass components observed during the *Kepler* mission** by adopting a purely-photometric method. Based on an extensive multi-colour dataset, we derive effective temperatures and photometric masses of individual components using machine learning (clustering) techniques. We also estimate the stellar radii from additional modelling of the available *Kepler* light curves.

Our measurements confirm **the presence of an inflation trend in the mass-radius diagram against theoretical stellar models** in the low-mass regime.

P. CRUZ ET AL., 2022, MNRAS, 515, 1416. HTTPS://DOI.ORG/10.1093/MNRAS/STAC1707