



## 11th meeting of the BRICS Astronomy Working Group

13 to 17 October 2025

Instituto Nacional de Pesquisas Espaciais (INPE)  
São José dos Campos, São Paulo, Brasil

# Multi-Instrument Study of RR Lyrae: Unveiling the Blazhko Effect and Stellar Parameters

Abdelmajid BENHIDA

First Name:	Abdelmajid
Last Name:	BENHIDA
Institution/Affiliation:	Cadi Ayyad University/Oukaïmeden Observatory
Country of Residence:	Morocco
Preferred type of presentation	Poster
Will you attend in person or online?	—
Email	a.benhida@uca.ac.ma

### Abstract

We present a comprehensive photometric analysis of the RR Lyrae variable star, leveraging 12 years of observations (2009–2021) from Kepler, TESS, and ground-based observatories (Oukaïmeden, GEOS). Through advanced frequency analysis, we robustly detect the Blazhko effect with modulation frequency  $f_B = 0.02560 \text{ d}^{-1}$ , identifying characteristic amplitude and phase modulations and triplet structures (e.g.,  $f_0 \pm f_B$ ). Key modulation parameters ( $R_1 = 5.41$ ,  $Q_1 = 0.69$ ) reveal asymmetric pulsation behavior. Using asteroseismology, we derive fundamental stellar parameters for KIC 7198959: mass  $M = 1.26 M_\odot$ , radius  $R = 1.30 R_\odot$ ,  $\log(g) = 4.31 \text{ dex}$ , and  $T_{\text{eff}} = 5020 \text{ K}$ , anchored in autocorrelation-based  $v_{\text{max}}$  and  $\Delta v$  measurements. Our results validate the synergy of space- and ground-based data—including contributions from amateur observatories—for probing complex stellar phenomena. The decade-spanning dataset confirms the persistent nature of the Blazhko effect and provides critical constraints for future models of RR Lyrae internal structure.