
CoRoT and Kepler observations of classical pulsators: the vanishing of the Blazhko effect of RR Lyr and the pulsational content of Cepheids

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Abstract

The light curve of RR Lyr has been regularly monitored since the discovery of the periodic variability in 1899. Analysis of all observed maxima allows us to identify two primary pulsation states defined as pulsation over a “long” primary pulsation period (P longer than 0.56684 d) and over a “short” one (P shorter than 0.56682 d). These states alternate with intervals of 13-16 yr, and are well defined after 1943. The 40.8-d periodical modulations of the amplitude and the period (Blazhko effect) were noticed in 1916. We provide homogeneous determinations of the Blazhko period in the different primary pulsation states. We established how the Blazhko period suddenly diminished to around 39.0 d in 1975, not following the variations of the pulsation period. Kepler followed the decrease in amplitude of the Blazhko effect in a continuous way, but only thanks to ground-based observations by means of dedicated, transportable, and autonomous small instruments (Very Tiny Telescopes, VTTs) we could state that the last change of P occurred in mid-2009, that the maximum O-C amplitude of the Blazhko effect occurred at the end of 2008, and that the following decrease is still ongoing. Cepheid variables were very rare in the Kepler and CoRoT fields: the results on a previously unknown Cepheid observed with CoRoT shed new light on the pulsational content of these large-amplitude pulsators.

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