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SUPPLEMENTARY INFORMATION

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Tidally trapped pulsations in a close binary star system discovered by TESS

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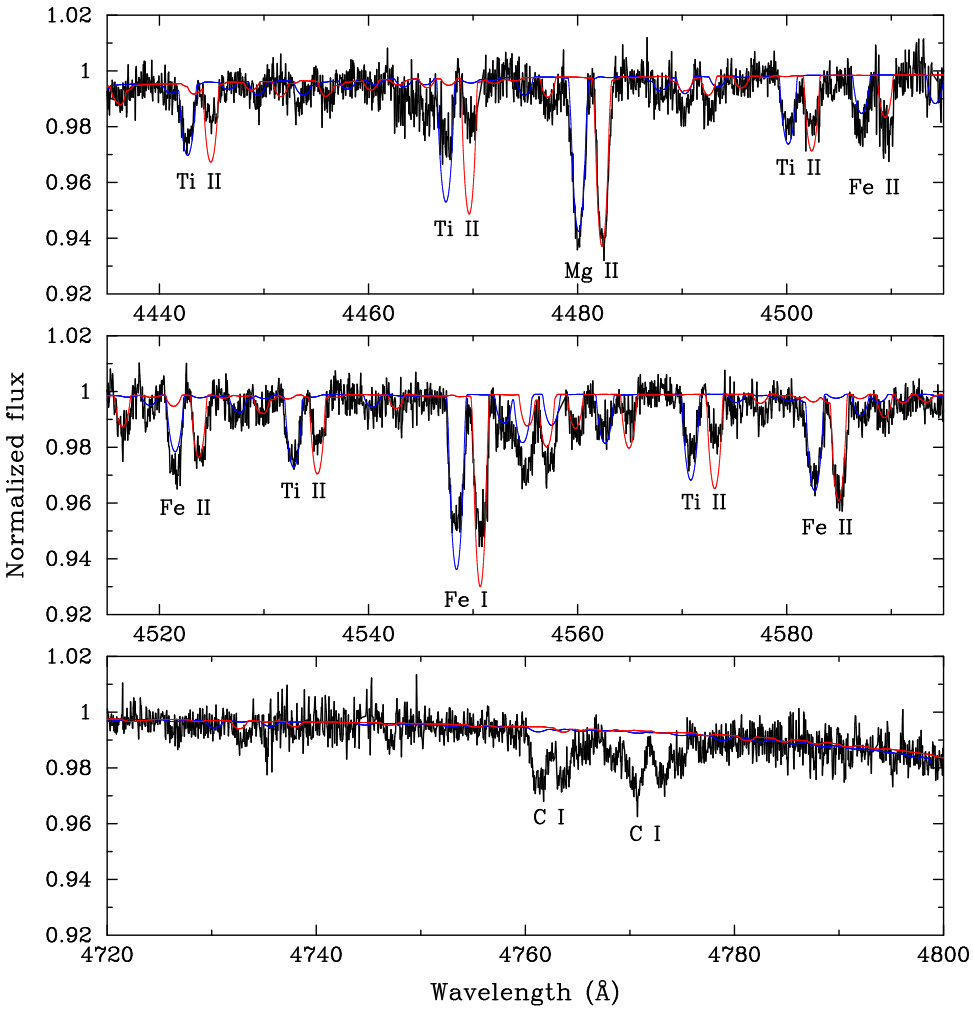
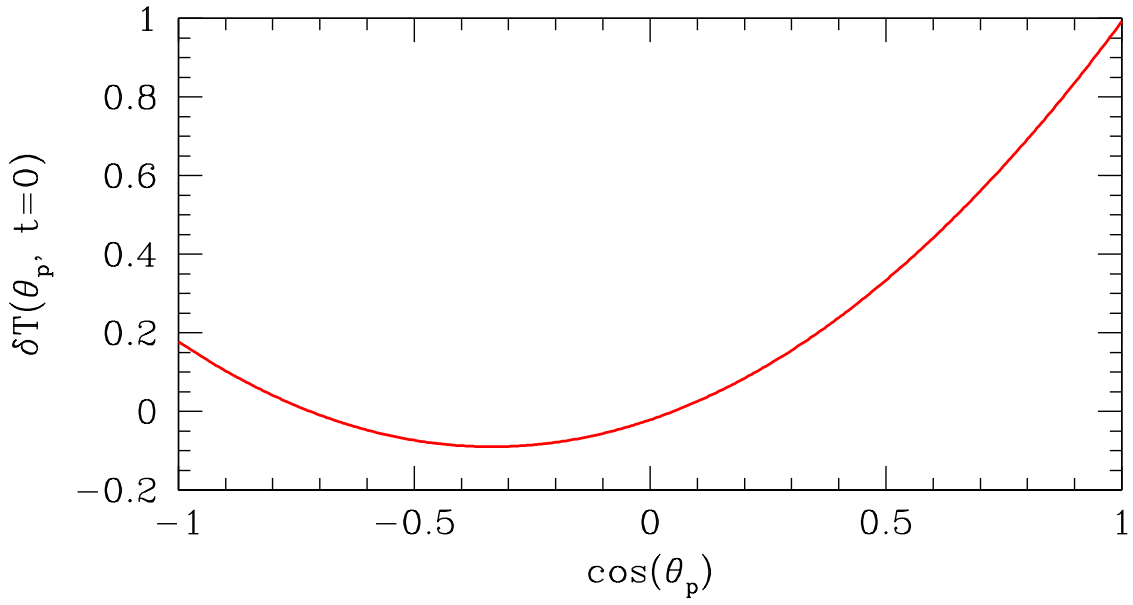
Supplementary Figure 1



Selected regions of a high-resolution spectrum of HD 74423 demonstrating it to be composed of two λ Bootis stars. Top two panels: a region containing prominent metal lines of A-type stars. Lower panel: a region around a multiplet of carbon lines. The black graph is the observed spectrum, and the blue and red lines are two theoretical spectra with $T_{\rm eff} = 8000\,{\rm K}$, $\log g = 4.0$, $[M/H] = -2.0$ and $v \sin i = 55$ and $50\,{\rm kms}^{-1}$, respectively. The spectral lines are all double, with a separation of about $150\,{\rm kms}^{-1}$. The strengths of most metal lines are reasonably well reproduced with such a low overall metallicity, with the exception of carbon that has a much larger abundance. Both components of HD 74423 thus share the λ Bootis type spectral peculiarity.

Supplementary Figure 2



Temperature perturbation at the initial pulsation phase as a function of $\cos\theta_{\rm p}$. This asymmetric distribution is required to reproduce the run of the pulsation amplitude in Fig. 4 and indicates the pulsation amplitude to be trapped in one hemisphere.