Paweł Moskalik: 2023

Papers published in 2023

- **„Type II and Anomalous Cepheids in the *Kepler* K2 Mission”**, M. I. Jurkovic, E. Plachy, L. Molnár, M. A. T. Groenewegen, A. Bódi, P. Moskalik & R. Szabó, 2023, MNRAS, 518, 642.

- **„Metallicity Estimation of MW, SMC and LMC Classical Cepheids from the shape of the V- and I-band Light Curves”**, V. Hocdé, R. Smolec, P. Moskalik, O. Ziółkowska & R. Singh Rathour, 2023, A&A, 671, A157.

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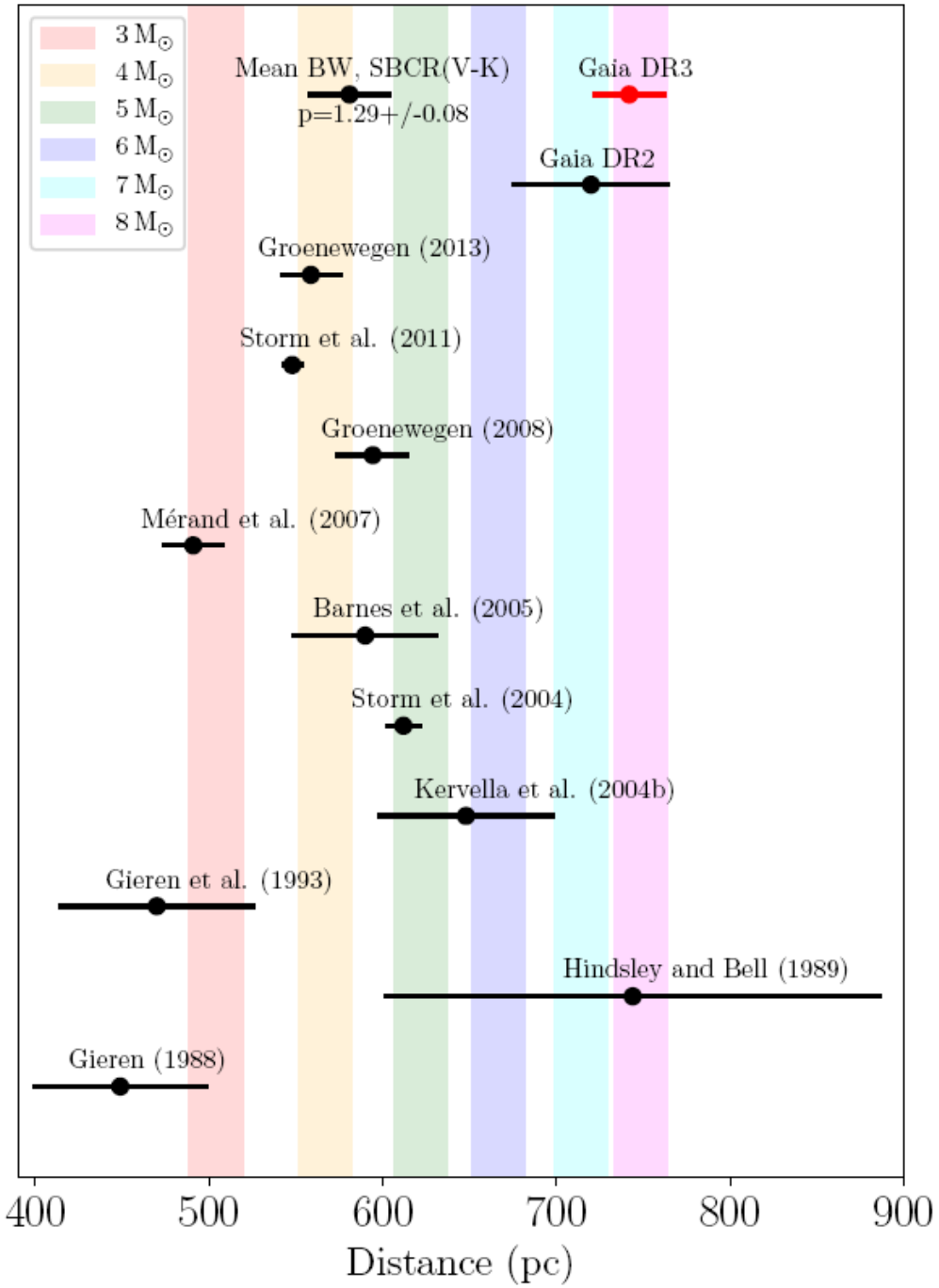
Papers submitted in 2023

- **„Pulsation Modelling of the Cepheid Y Ophiuchi with RSP/MESA. Impact of Circumstellar Envelope and a High Projection Factor on Baade-Wesselink Method”**, V. Hocdé, R. Smolec, P. Moskalik, R. Singh Rathour & O. Ziółkowska, 2023, A&A (accepted).

- **„Double-Mode RR Lyrae Stars Observed by K2: Analysis of High-Precision *Kepler* Photometry”**, J. M. Nemec, A. F. Linnell Nemec, P. Moskalik, L. Molnár, E. Plachy, R. Szabó & K. Kolenberg, MNRAS (submitted).

- **„Precise Fourier Parameters of Cepheid Radial Velocity Curves”**, V. Hocdé, P. Moskalik, N. A. Gorynya, R. Smolec, R. Singh Rathour & O. Ziółkowska 2023, A&A (submitted).

Modelling of the Cepheid Y Ophiuchi



Gaia DR3 : d = 742 ± 21 pc

Mean BW : d = 581 ± 24 pc

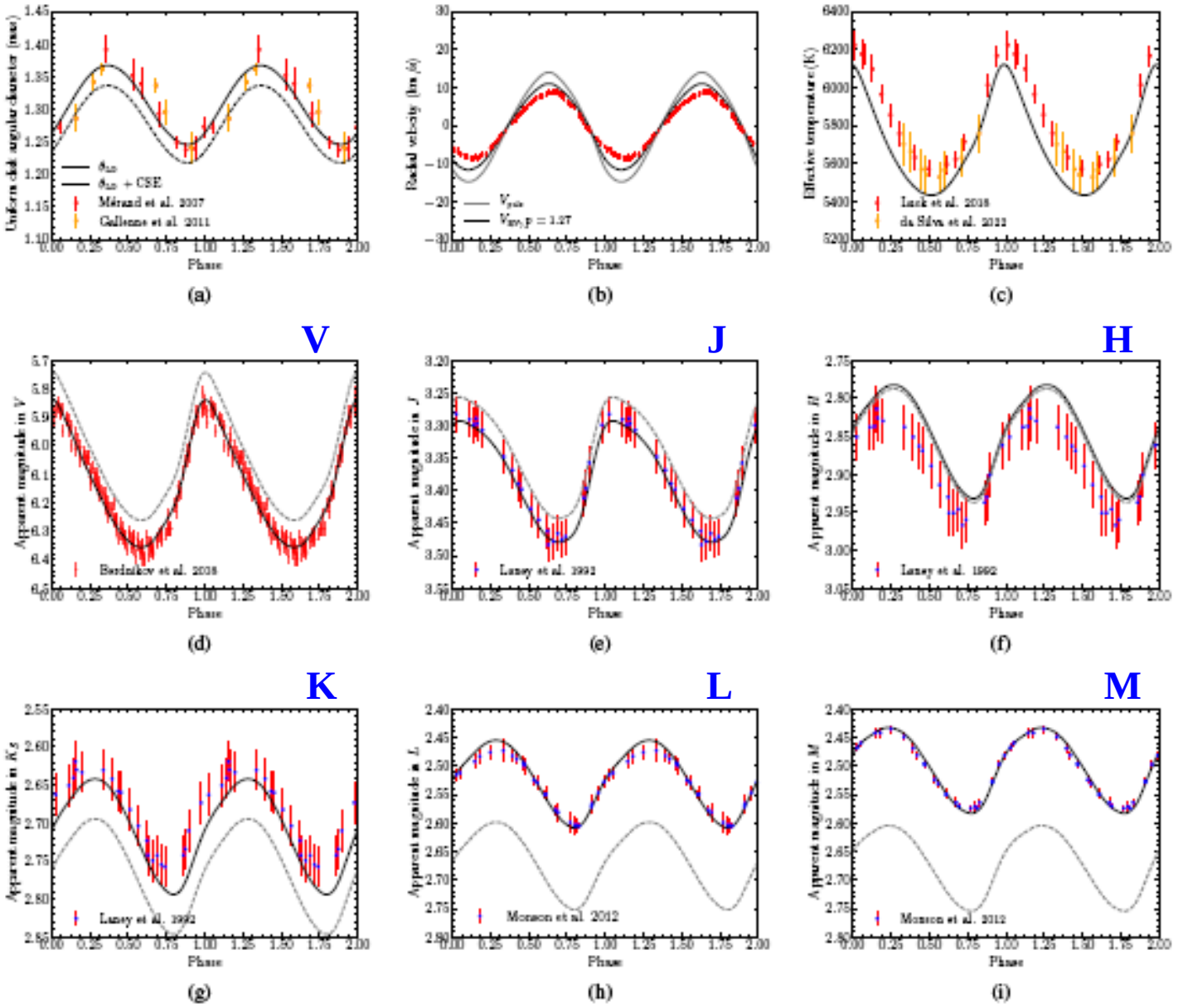


Fig. 2: Best result of the non-linear analysis with RSP/MESA for 8 $M_\odot$ model. Uniform disk angular diameter, radial velocity curve and effective temperature are displayed in (a), (b) and (c) respectively. The photometric panels indicate the apparent magnitudes in (d) V-band, (e) J-band (f) H-band (g) K_S-band (h) L-band (i) M-band. In the angular diameter and photometric panels, thick black line and dashed grey lines are RSP models with and without CSE models respectively.

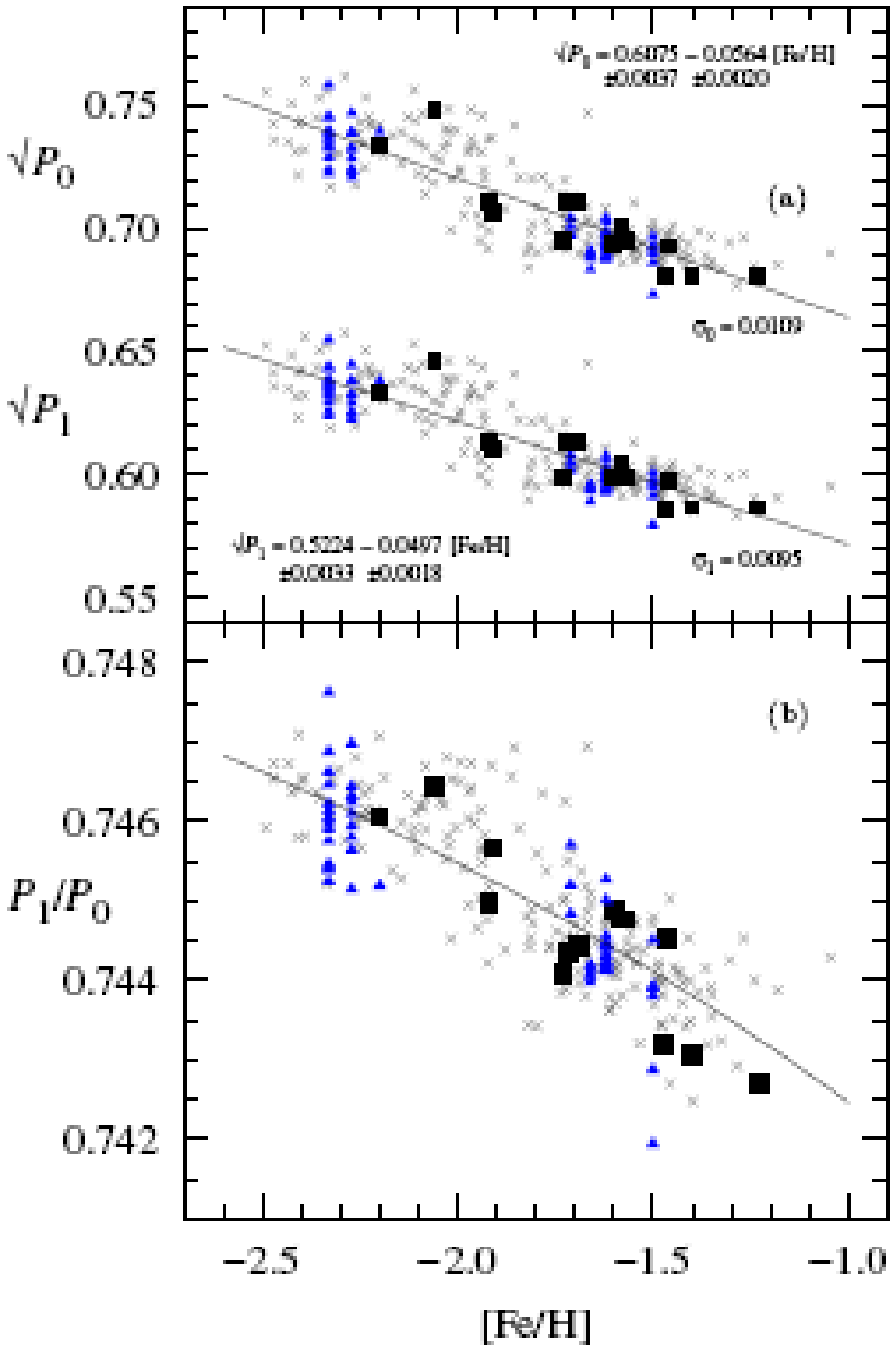
Best fit

$M = 8\,M_{Sol}$

$T_{eff} = 5725\,K$

$d = 748\,pc$

Double-Mode RR Lyrae Stars Observed by K2



$[Fe/H] = 7.59 - 13.25 \sqrt{P_0}$, $\sigma = 0.17$ dex

$[Fe/H] = 7.42 - 15.08 \sqrt{P_1}$, $\sigma = 0.17$ dex

Precise Fourier Parameters of Cepheid Radial Velocity Curves

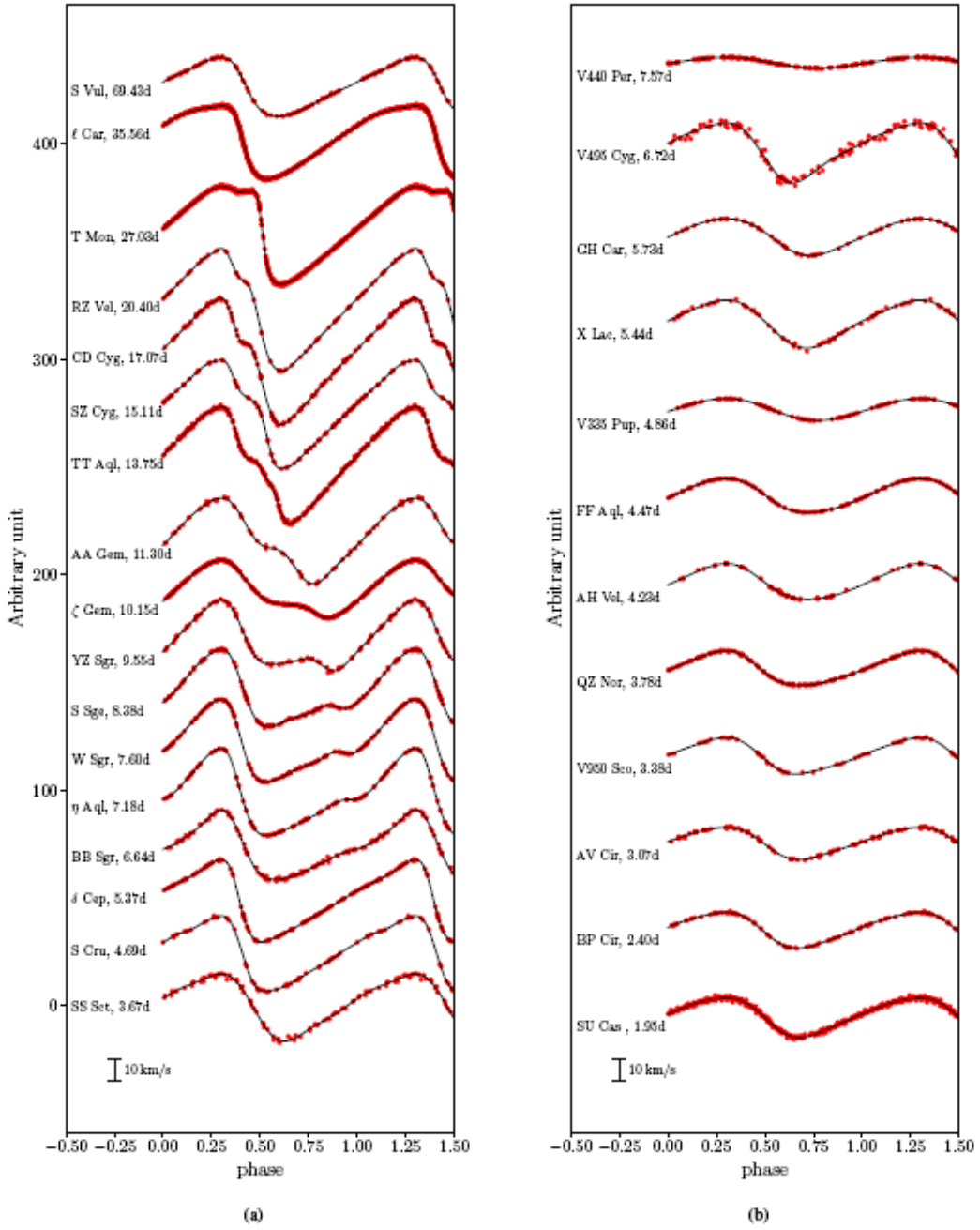


Fig. 1: Radial velocity curves and Fourier fits for a set of fundamental-mode (a) and first-overtone Cepheids (b). The scale is indicated in the left bottom corner of the plots.

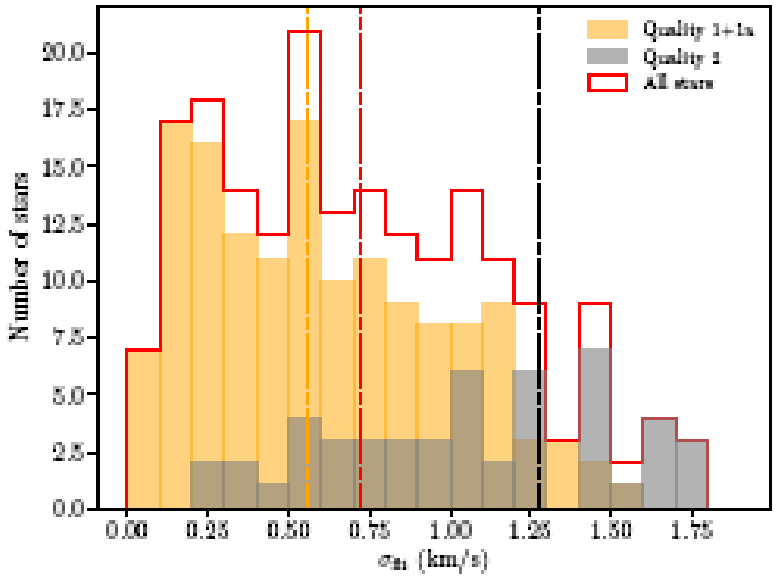
218 single-mode Cepheids

- **178 FU**
- **33 FO**

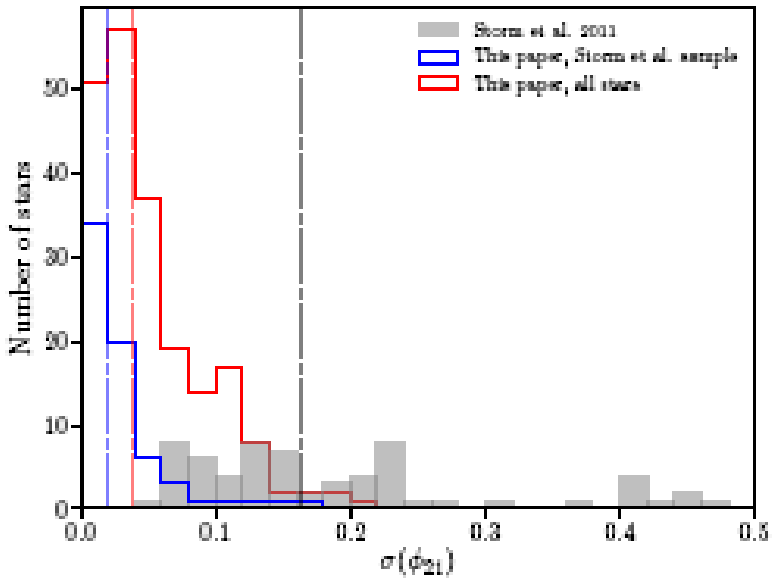
$$V_r(t) = A_0 + \Sigma\, A_k \sin(k\omega t + \varphi_k)$$

$$R_{k1} = A_k/A_1$$

$$\varphi_{k1} = \varphi_k - k\,\varphi_1$$



(a)



(c)

Median σ :

- **Quality 1 (147 stars) : 0.56 km/s**
- **Quality 2 (71 stars) : 1.05 km/s**
- **All (218 stars) : 0.72 km/s**

comparison with Storm et al. (2011)

Number of stars : 76 → 218

Median $\sigma(\varphi_{21})$: 0.16 → 0.04 / 0.02