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Sensitivity of gravito-inertial modes to differential rotation in intermediate-mass main-sequence stars *(Corrigendum)*

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It has been brought to our attention by Jordan Van Beeck (KU Leuven) that there were errors in Eq. (6) and in the expressions for the coefficients G_i in Eq.(9), given in appendix B, in the original paper. These have been corrected below. The theoretical period spacing patterns shown in Fig.3 were computed using these expressions, and have also been corrected below. These changes do not affect the results or the conclusions of the original paper.

In Eq.(6) in the original paper we provided the Taylor expansion of the asymptotic period spacing pattern for a star with a differential rotation profile. The correct expression is

$$\begin{aligned}\Pi_0\left(n+\alpha_g\right) \approx \frac{\sqrt{\lambda_{\nu km,s}}}{f_{\rm co,s}} \Bigg\{ 1 &+ \left(\frac{\lambda'_{\nu km,s}}{2\lambda_{\nu km,s}} + \frac{m f'_{\rm rot,s}}{f_{\rm co,s}}\right)\langle r - r_s\rangle \\ &+ \mathbf{\frac{1}{2}}\left[\frac{\lambda''_{\nu km,s}}{2\lambda_{\nu km,s}} - \left(\frac{\lambda'_{\nu km,s}}{2\lambda_{\nu km,s}}\right)^2 + \frac{m f''_{\rm rot,s}}{f_{\rm co,s}} + 2\left(\frac{m f'_{\rm rot,s}}{f_{\rm co,s}}\right)^2 \right. \\ &\left. + \left(\boldsymbol{\frac{m f'_{\rm rot,s}}{f_{\rm co,s}}}\right)\left(\boldsymbol{\frac{\lambda'_{\nu km,s}}{2\lambda_{\nu km,s}}}\right)\right]\langle (r-r_s)^2\rangle \Bigg\},\end{aligned}$$

where the changes with respect to the original paper are marked in bold. The meanings of the various symbols remain unchanged.

This equation was subsequently rewritten using the chain rule to derive the corrected version of Eq.(9) in the original paper

$$\Pi_0\left(n+\alpha_g\right) \approx \sqrt{\lambda_{\nu km,s}}\left(P_{\rm co,s} + \sum_{i=1}^{3} a_i \mathbf{G_i}\left(\boldsymbol{\nu}\right)\right),$$

where the corrected expressions for the coefficients G_i are given by

$$\begin{aligned} G_1 &= \mathbf{P^2_{co,s}}\left[\frac{1}{\lambda_s}\left(\frac{{\rm d}\lambda}{{\rm d}\nu}\right)_s\left(1+\frac{m\nu_s}{2}\right) + m\right], \\ G_2 &= \frac{\mathbf{P^2_{co,s}}}{\mathbf{2}}\left[\frac{1}{\lambda_s}\left(\frac{{\rm d}\lambda}{{\rm d}\nu}\right)_s\left(1+\frac{m\nu_s}{2}\right) + \mathbf{m}\right], \\ G_3 &= \frac{\mathbf{P^3_{co,s}}}{\mathbf{2}}\left[\left(\frac{2}{\lambda_s}\left(\frac{{\rm d}^2\lambda}{{\rm d}\nu^2}\right)_s - \frac{1}{\lambda_s^2}\left(\frac{{\rm d}\lambda}{{\rm d}\nu}\right)_s^2\right)\left(1+\frac{m\nu_s}{2}\right)^2 \right. \\ &\quad \left. + \frac{\mathbf{3}m}{\lambda_s}\left(\frac{{\rm d}\lambda}{{\rm d}\nu}\right)_s\left(1+\frac{m\nu_s}{2}\right) + 2m^2\right]. \end{aligned}$$

Again, the changes with respect to the original paper are marked in bold.

For the actual implementation in the calculations, these corrected expressions were rewritten as

$$2 f_{{\rm rot},s}\Pi_0\left(n+\alpha_g\right) \approx \sqrt{\lambda_{\nu km,s}}\nu\left\{1 + c_1F_1 + c_2F_2\right\},$$

where the functions F_1 and F_2 express the variation of the Coriolis force around the spin value of a g-mode at the radial coordinate r_s and are given by

$$\begin{aligned} F_1 &= \frac{\nu}{2}\left[m + \frac{1}{\lambda_s}\left(\frac{{\rm d}\lambda}{{\rm d}\nu}\right)_s\left(1+\frac{m\nu}{2}\right)\right], \\ F_2 &= \frac{\nu^2}{4}\left[2m^2 + \left(\frac{2}{\lambda_s}\left(\frac{{\rm d}^2\lambda}{{\rm d}\nu^2}\right)_s - \frac{1}{\lambda_s^2}\left(\frac{{\rm d}\lambda}{{\rm d}\nu}\right)_s^2\right)\left(1+\frac{m\nu}{2}\right)^2 \right. \\ &\quad \left. + \frac{3m}{\lambda_s}\left(\frac{{\rm d}\lambda}{{\rm d}\nu}\right)_s\left(1+\frac{m\nu}{2}\right)\right]. \end{aligned}$$

The coefficients c_1 and c_2 depend on the variation of the rotation profile at the radial coordinate r_s. When the rotation profile is unknown, these can be set free. When the rotation profile is known, they can be calculated as

$$\begin{aligned} c_1 &= \frac{f'_{\mathrm{rot,s}}}{f_{\mathrm{rot,s}}}\langle r - r_s\rangle + \frac{1}{2}\frac{f''_{\mathrm{rot,s}}}{f_{\mathrm{rot,s}}}\langle (r - r_s)^2\rangle, \\ c_2 &= \frac{1}{2}\left(\frac{f'_{\mathrm{rot,s}}}{f_{\mathrm{rot,s}}}\right)^2 \langle (r - r_s)^2\rangle. \end{aligned}$$