Gaia Data Release 2

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Special issue

Gaia Data Release 2

Gaia Data Release 2

The kinematics of globular clusters and dwarf galaxies around the Milky Way

(Corrigendum)

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This is a corrigendum to Gaia Collaboration (2018). It corrects errors in Appendix B, which describes the modelling of the Large and Small Magellanic Clouds (LMC and SMC). One of these errors also affects Fig. 18 of the paper, which shows the rotation curve and median radial motion in the LMC. No other results in the paper are affected.

There should be no vector products in Appendix B, and everywhere a vector product appears should be a scalar product. This affects Eqs. (B.5), (B.8), (B.10), (B.12), (B.13), and (B.20).

Equation (B.10), which defines one component of position within the plane of the galaxy, contains an additional typographical error, and it should have read

$$\xi = \boldsymbol{l} \cdot \boldsymbol{R} = \frac{l_x x + l_y y}{z + ax + by}. \tag{1}$$

Equation (B.21) is incorrect. The factor of $(ax + by + z)$ is applied to the wrong part of the equation. It should have read

$$\begin{aligned}(l_x - x(l_x x + l_y y))\dot{\xi} + (m_x - x(m_x x + m_y y + m_z z))\dot{\eta} \\ = -v_x + x(v_x x + v_y y + v_z z) + \dot{x}/(ax + by + z) \\ (l_y - y(l_x x + l_y y))\dot{\xi} + (m_y - y(m_x x + m_y y + m_z z))\dot{\eta} \\ = -v_y + y(v_x x + v_y y + v_z z) + \dot{y}/(ax + by + z).\end{aligned} \tag{2}$$

This error affects the derived deprojected motions of stars in the LMC, and means that changes in the observational signature of the bulk motion away from the centre are not properly accounted for. The effect becomes more significant further from the centre.

Figure 1 shows the resulting median tangential velocity, v_T (the rotation curve), and median radial velocity v_R as a function of de-projected radius R for the LMC, which is otherwise produced in the same way as before. The major differences between this and the equivalent figure in Gaia Collaboration (2018) are as follows

- The rotation curve reaches a greater velocity ($\sim$85 km s^{-1} versus $\sim$75 km s^{-1}) and remains flat beyond 6 kpc, as opposed to starting to fall.
- The difference in asymmetric drift for the blue and red populations is clearer – the blue population, which is typically younger than the redder population, is rotating faster.
- The apparent outward motion of the stellar populations is much smaller. The blue population has almost no net radial motion, while the red population has one of $\lesssim$8 km s^{-1} (as opposed to $\sim$20 km s^{-1}).
- The difference in radial motion between the $y < 0$ and $y > 0$ populations is dramatically reduced, as is the difference between the value derived assuming the known line-of-sight bulk motion and the one derived leaving this value free.

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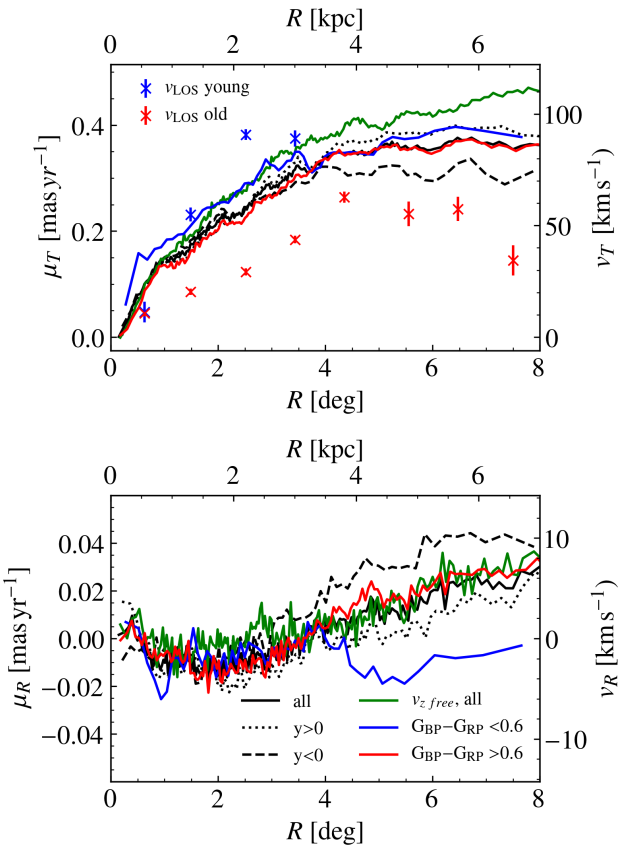

Fig. 1. Rotation curve (*top*) and median v_R (*bottom*) of the LMC, as a correction to Fig. 18 in Gaia Collaboration (2018). The assumed values for the centre-of-mass velocity and orientation of the disc (i and Ω) are taken from a fit to all stars within an angular radius $\rho < 3°$ of the LMC's centre. Angular distances and velocities given on the lower and left axes have been converted to real-space values on the upper and right axes assuming a distance to the LMC of 50.1 kpc (Freedman et al. 2001). The points shown in the *upper panel* were derived from observed line-of-sight velocities of old and young stars by van der Marel & Kallivayalil (2014, their Table 4).

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