The Red Clump population in the Galactic disk as seen by Gaia

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Potencial model

- Allen & Santillan potential + two aligned Ferrers bars (Ωp = 50 km/s/kpc)

Therefore, in the first case, hereafter Case 1, the non-axisymmetric component aims to model the Galactic bar as a boxy/bulge bar, i.e. the COBE/DIRBE triaxial bulge plus the bar. Therefore, the non-axisymmetric component of the potential consists of the superposition of two Ferrers ellipsoids (Ferrers 1877) with non-homogeneity index equal $n = 1$. To characterise the COBE/DIRBE bulge we set the semi-major axis to $a = 3.13\,kpc$ and the axes ratios to $b/a = 0.4$ and $c/a = 0.29$. The triaxial bulge mass is $M_{bul} = 6.3 \times 10^9\,M_\odot$. The length of the bar is set to $a = 4.5\,kpc$ and the axes ratios to $b/a = 0.15$ and $c/a = 0.026$. The mass of the bar is fixed to $M_b = 6.3 \times 10^9\,M_\odot$. So in total it makes a boxy/bulge type of bar with total mass equal to $M_b = 10^{10}\,M_\odot$ and located at 20° from the Sun-Galactic Centre line.

Test particle simulations

IC Romero-Gómez et al. 2013 (in prep)

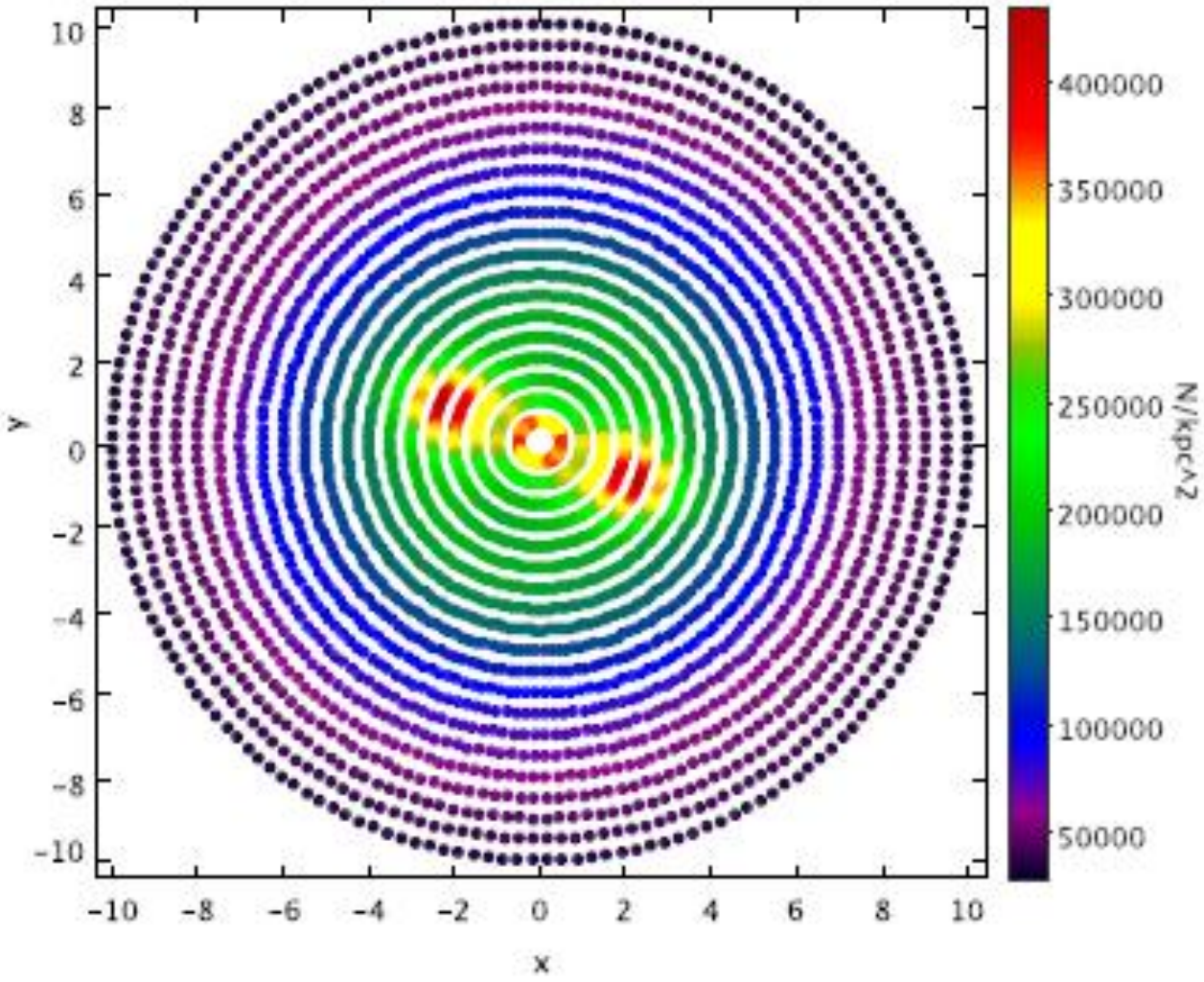
3D test particle integration

1) 10 Gyr for relaxation in the potential
2) 4 bar periods to adiabatically grow the bars
3) 4 additional bar periods to reach statistical equillibrium

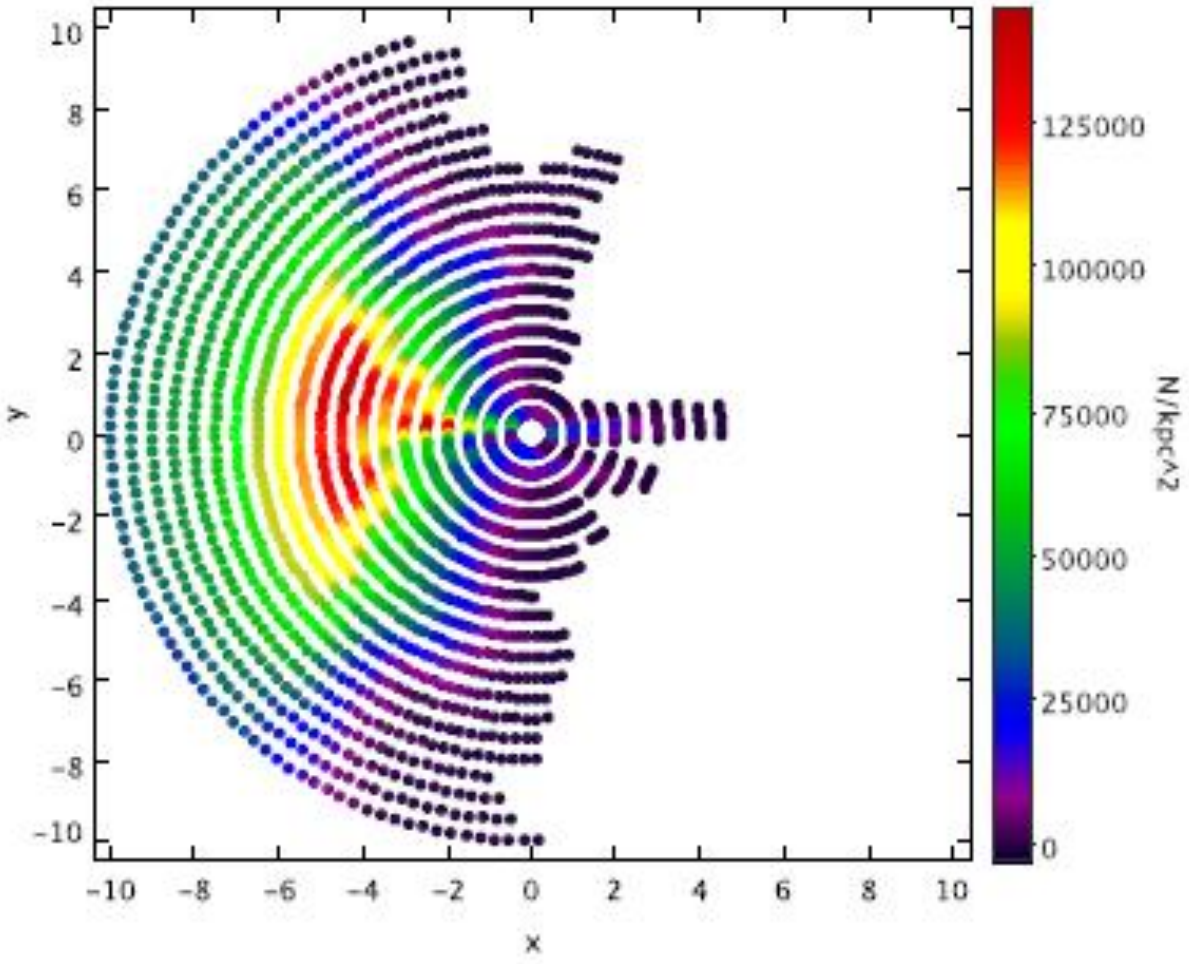
The Red Clump population

As metioned above, we assume the test particles are Red Clump K-giant stars, that is K0-1III, so here we assume they have absolute magnitude $M_K = -1.61$ (Alves 2000), intrinsic colors $(V-I)_o = 1.0$ and $(V-K)_o = 2.34$ (Alves 2000). The absorption in V is computed from Drimmel, Cabrera-Lavers & López-Corredoira (2003), which characterises by rapidly increasing the absorption close to the galactic plane, while it remains low just above/below the plane, approximately one scale-height. We assume then the extinction law from Cardelli, Clayton & Mathis (1989) to finally compute the apparent magnitude in V

- Extinction from Drimmel et al. (2003)
- Data with and without Gaia errors
- Only stars with Gaia radial velocities ($G_{RVS} < 16.1$)



Number of RC stars per kpc^2 (no limit in magnitude)



Number of RC stars per kpc^2 with $G_{\_RVS} < 16.1$

Catalog in twiki:

Data provided (see ReadMe file):

21.8 M particle with $G_{RVS} < 16.1$ (2.7 Gbytes)

- G, G_RVS
- real galactocentric positions & velocities
- Observed galactocentric positions & velocities (affected by Gaia errors)

The full set of RC stars with no cut in magnitude is also available (~72M particle)

Sun placed at (X,Y,Z) = (-8.5, 0, 0) kpc