# The bar and/or bars: test particle simulations

WG8

11 Enero 2012

Tests with the invariant manifolds: Romero-Gomez, Athanassoula, Antoja, Figueras (GB, MNRAS 2011)
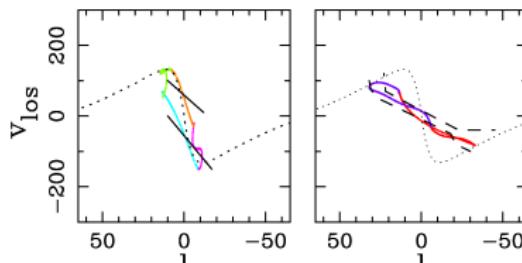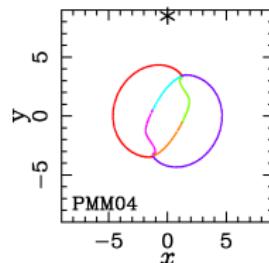

- Case 1: Galactic bar (Galactic bulge)
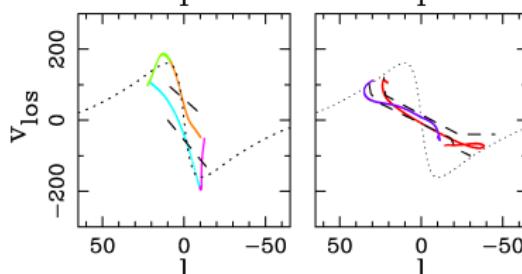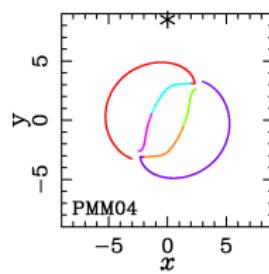
- Case 2: Bulge and Long bar aligned, i.e. 1 bar
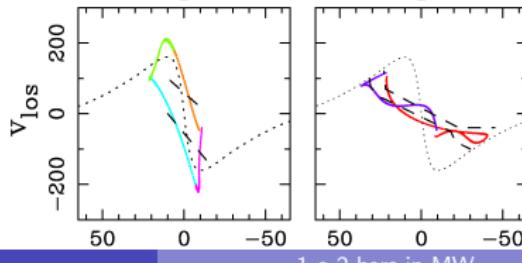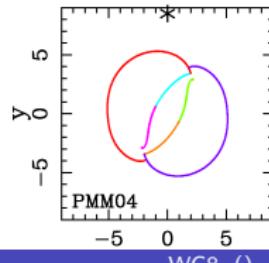
- Case 3: Bulge and Long bar misaligned, i.e. 2 bars

First tests: the 3D axisymmetric component

- Generating initial conditions with an exponential density law both in the plane and in z. The initial conditions are cold, with a radial dispersion in the solar neighbourhood of $5\,km/s$.

- The fact of adding the third dimension introduces chaos.

- Use of the SALI code (Skokos et al, 2002) to determine the ratio of chaotic initial conditions when integrated with the axisymmetric component: $\sim 0.2\%$

Time (Gyrs)

R (kpc)
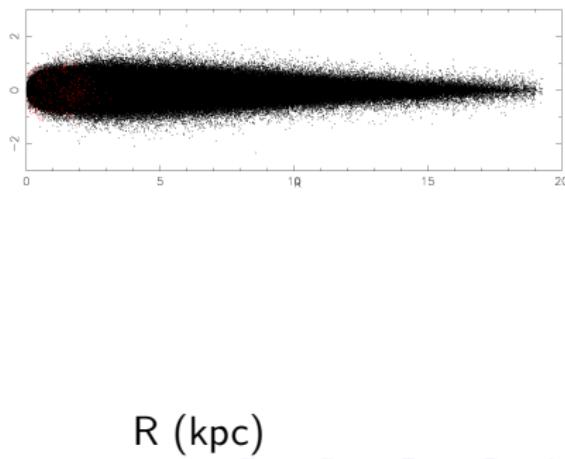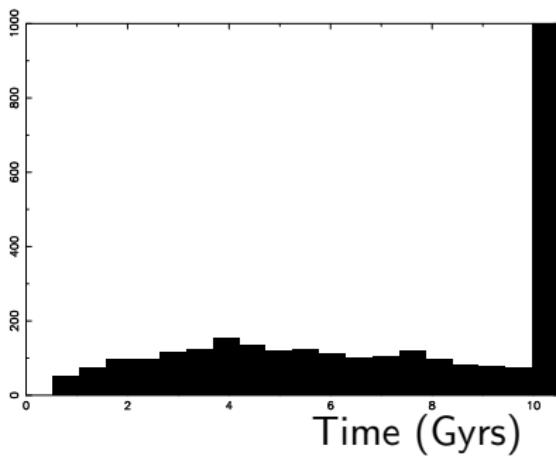
Possible strategy
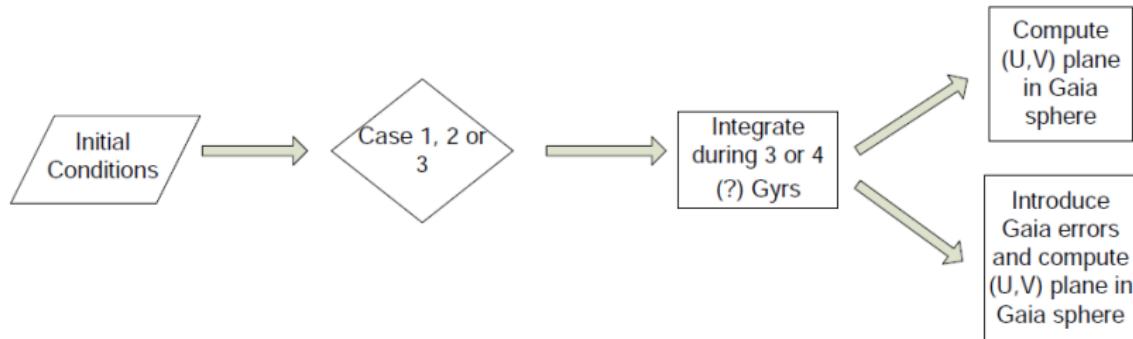
- Detection of the bar or bars kinematically in the Gaia sphere and/or the solar neighbourhood.
- Test particle simulations with 1M particles
- 3D potentials. 3 cases:
  - Case 1: 1 Bar: Galactic bar/bulge
  - Case 2: 1 Bar: Galactic + Long bar
  - Case 3: 2 Bars: Galactic + Long bar misaligned

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