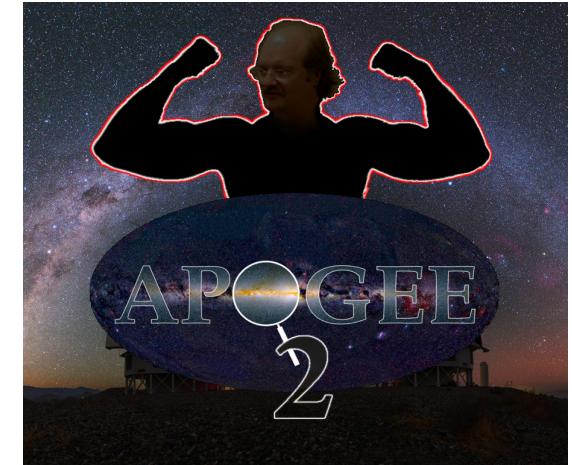
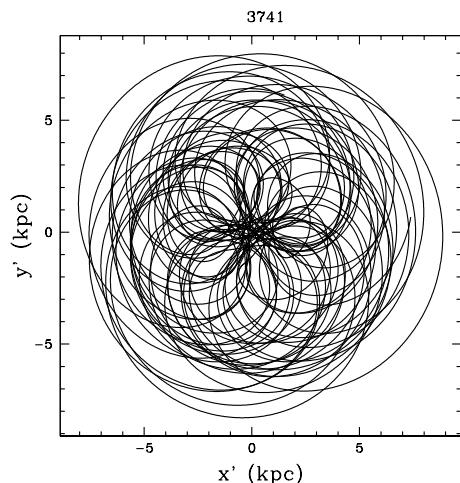
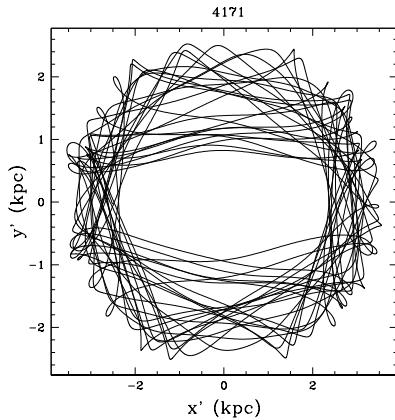
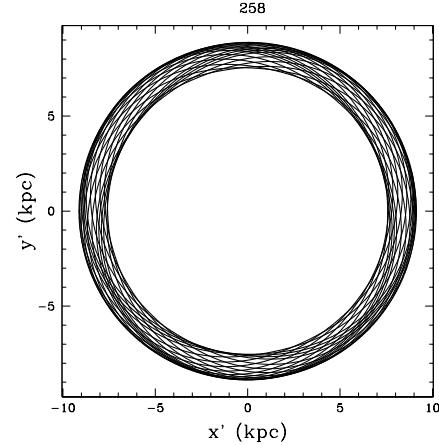


# SDSS



## ***Resonant Families of Orbits in the Milky Way as Mapped by DR13 APOGEE-RC stars: Preliminary results***



by  
J. G. Fernandez-Trincado

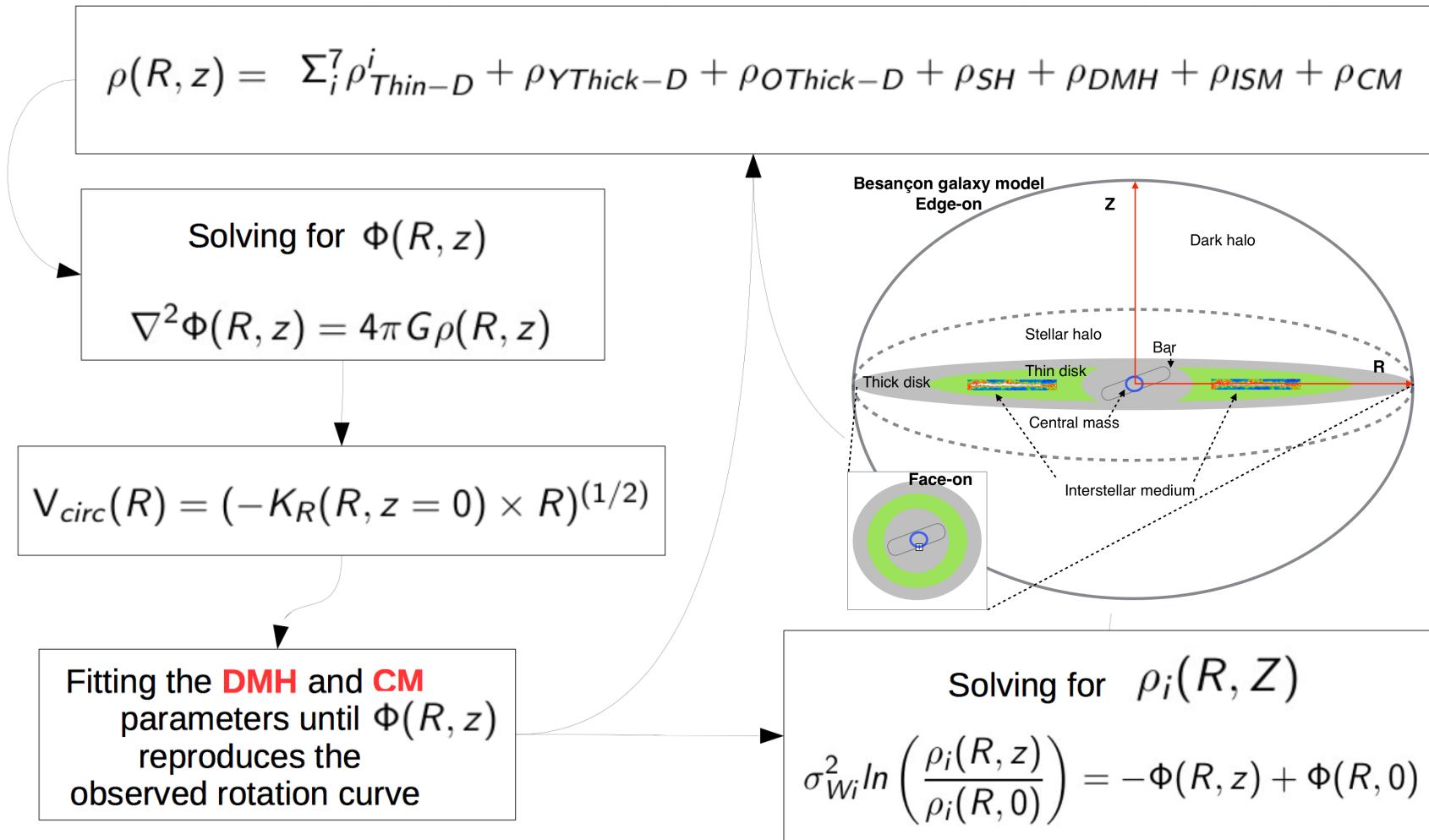
In collaboration with:

A. C. Robin, E. Moreno, A. Perez-Villegas, B. Pichardo, O. Valenzuela, J. A. Gomez-Lopez  
K. Holley-Bockelmann, C. Reylé, C. Nitschelm

Semaine de l'Astrophysique Francaise  
14 juin - 17 juin 2016, Lyon - France

# Milky Way's Gravitational Potential

Triaxial bar + Alternative 3D components (**Spiral arms**)



see *Pichardo et al. (2003, 2004, 2012); Fernández-Trincado et al. (2015a, 2015b, 2016a, 2016b)*

# Milky Way's Gravitational Potential

## Github

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Fernandez-Trincado Update README.md b8d9849 on Apr 10

1 contributor

131 lines (82 sloc) 5.42 KB Raw Blame History

## GraPot16

### A 3D fiducial model of the Gravitational Potential of the Milky Way for orbit calculations based on the Besançon Galaxy Model.

This repository is maintained by [J. G. Fernandez-Trincado](#). Feel free to check it out, make comments, provide me with some feedback. I will update the design of it eventually, since at the moment, I have just literally slapped a beta version onto the "default" design of the repository.

If interested in this project, please contact me: [jfernandez@obs-besancon.fr](mailto:jfernandez@obs-besancon.fr) and/or [jfernandezt87@gmail.com](mailto:jfernandezt87@gmail.com)

Last update: 2016, March 15

### GraPot16 sources:

- Fortran version can be found at [Fortran-GraPot16](#).
- Python version can be found at [Python-GraPot16](#). Efforts are underway to provide a Python Package of **GraPot16** to the community.
- CUDA version can be found at [CUDA-GraPot16](#). Efforts are underway to provide a CUDA Package of **GraPot16** to the community.



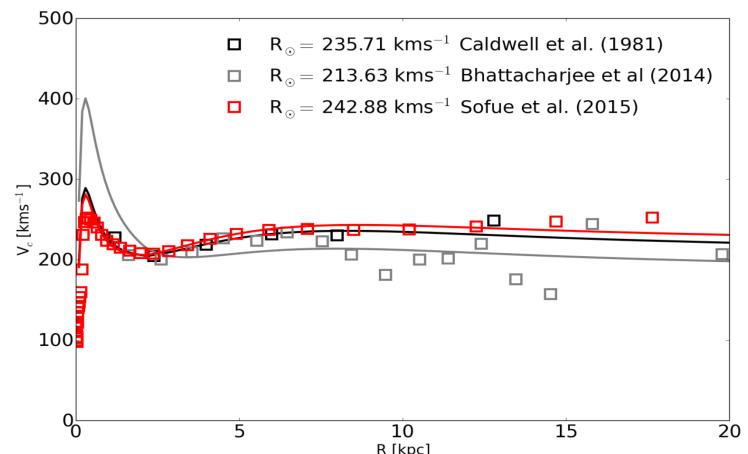
Beta Version  
GraPot16v1

### Galactic Model

We have developed a multicomponent model of the Milky Way potential which we have matched with good accuracy the rotation curve, local disk density, ...

- Axisymmetric Potential
- Non-axisymmetric Potential

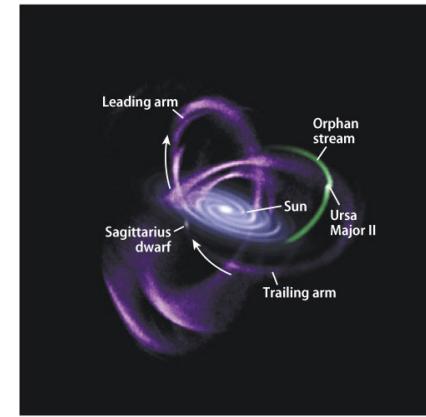
The rotation curve of our model is shown in Figure 1.



# Context: Moving groups

## stellar associations

(Proctor 1869; Eggen & Sandage 1959; Eggen 1977, 1990, 1996a,b; Wilson & Raymond 1938, Roman 1949; Soderblom & Mayor 1993)



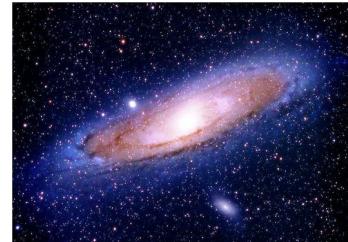
## stellar streams

Majewski 1994; Majewski et al. 1996

called ‘stellar moving groups’



Open clusters



dwarf galaxies

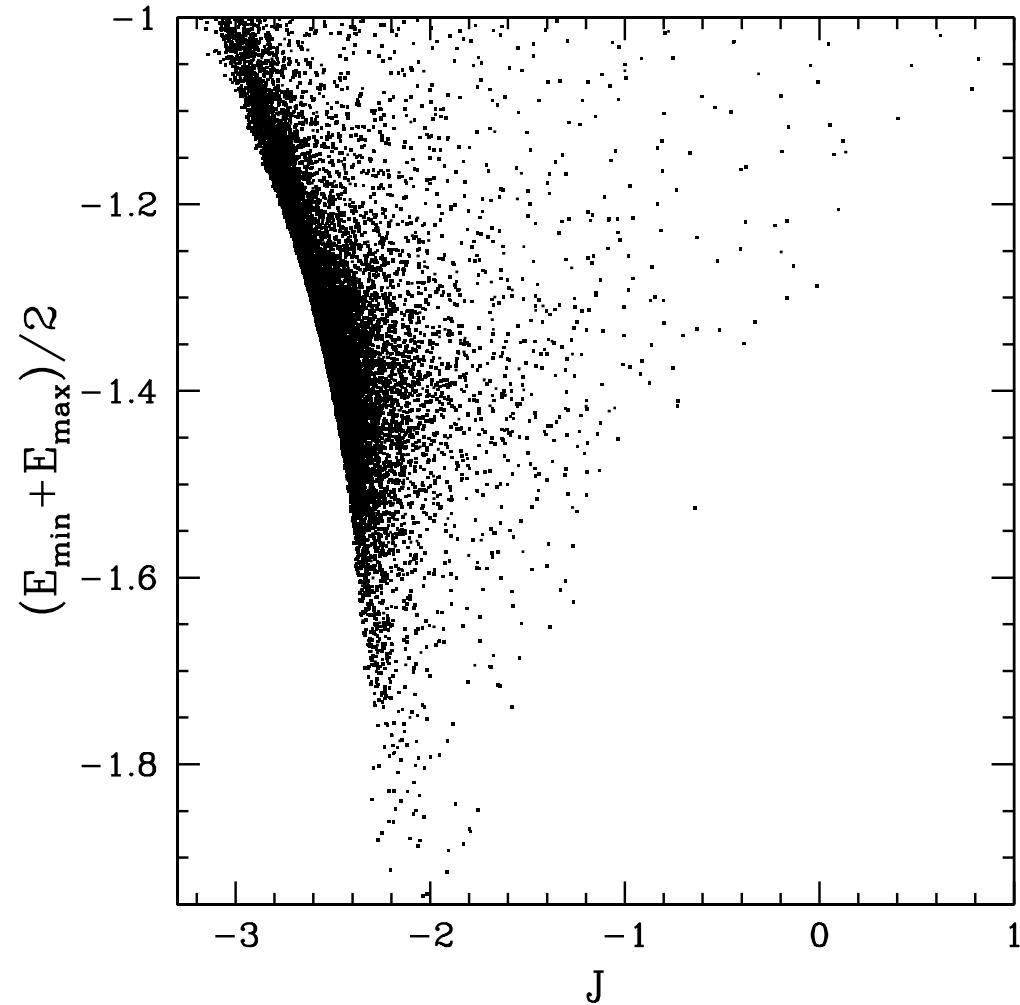


globular clusters

Perturbations by resonances with the Galactic bar and/or spiral arms and also triaxially shaped dark matter haloes

# Resonant regions

## Preliminary

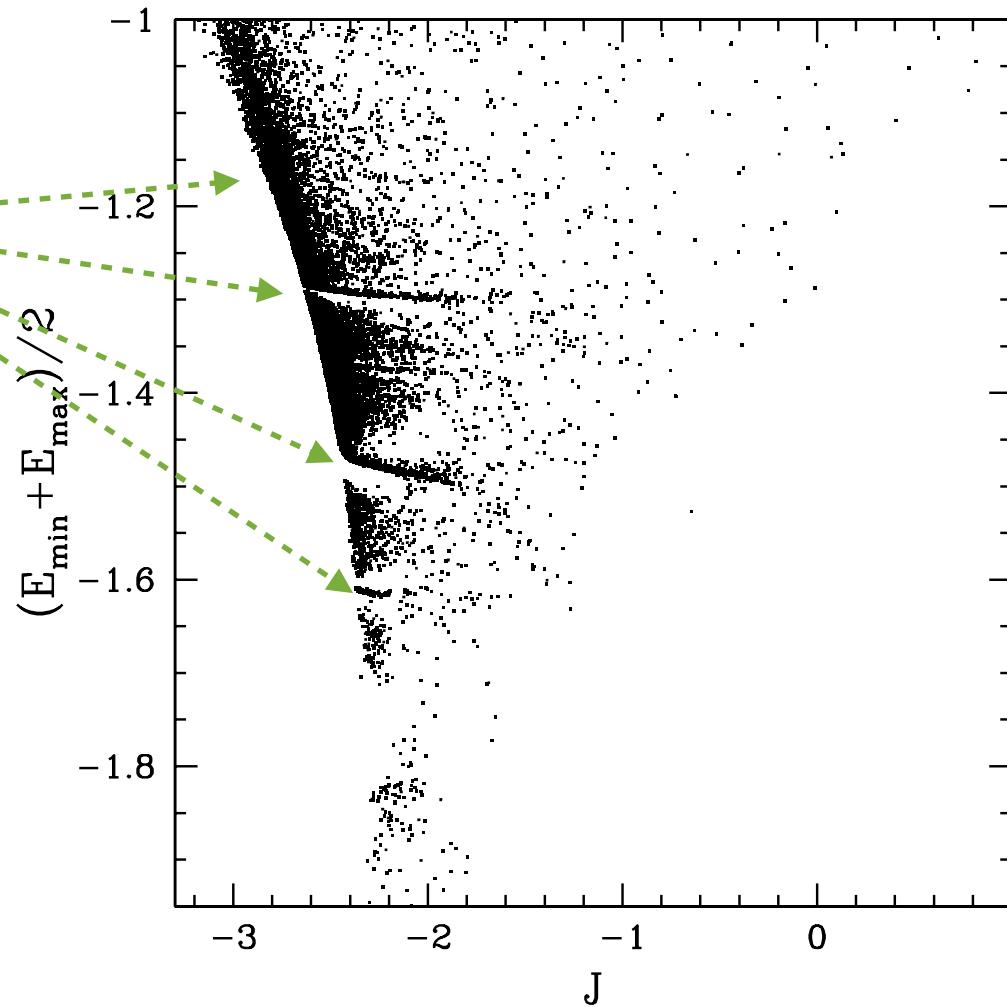


Axisymmetric Galactic model

# Resonant regions

## Preliminary

Resonant  
regions  
appear

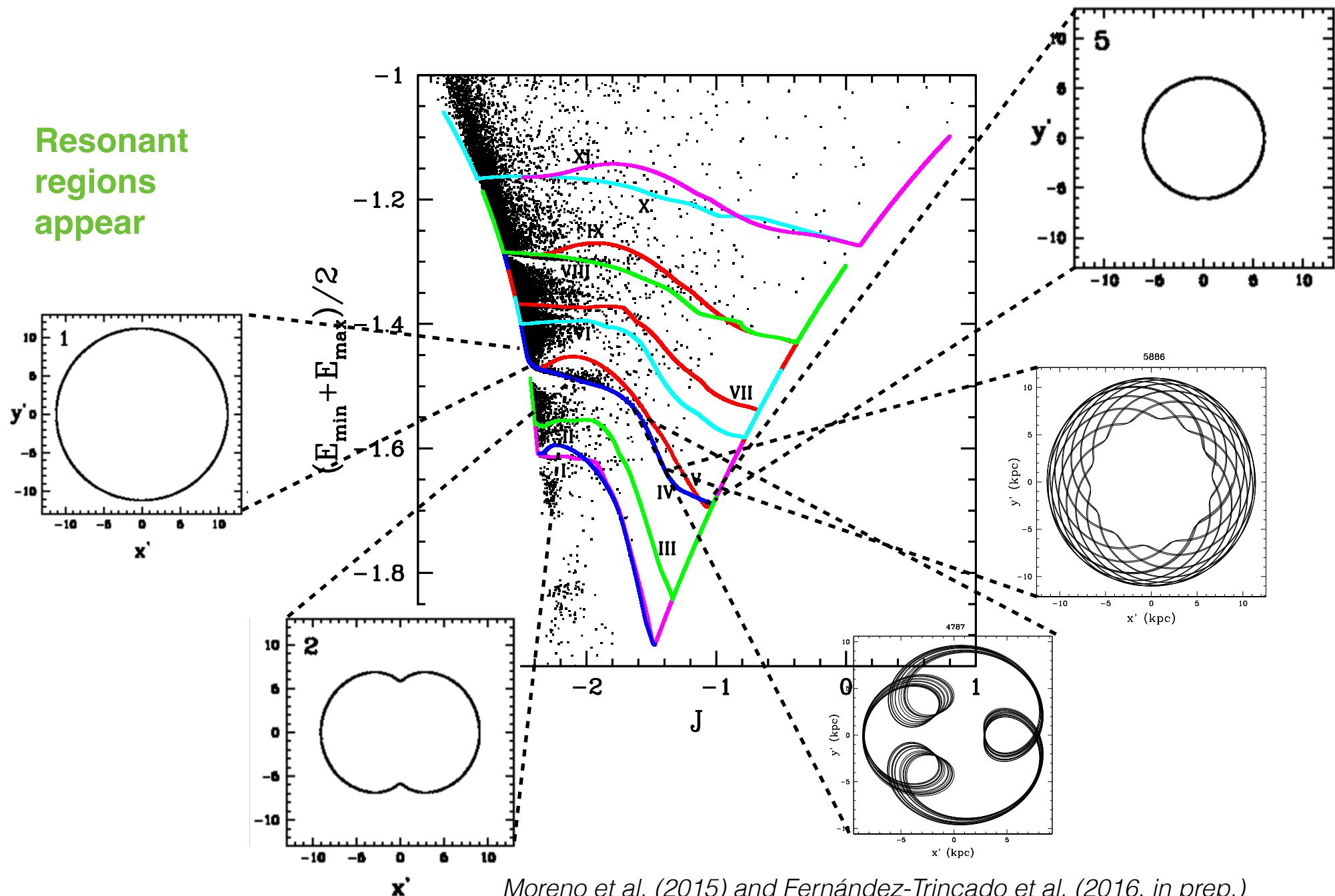


Non-Axisymmetric Galactic model: Bar + Spiral arms

# Resonant regions

## Preliminary

Resonant  
regions  
appear



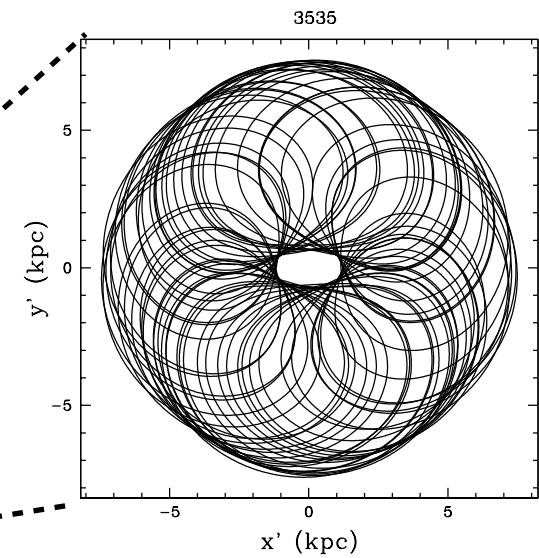
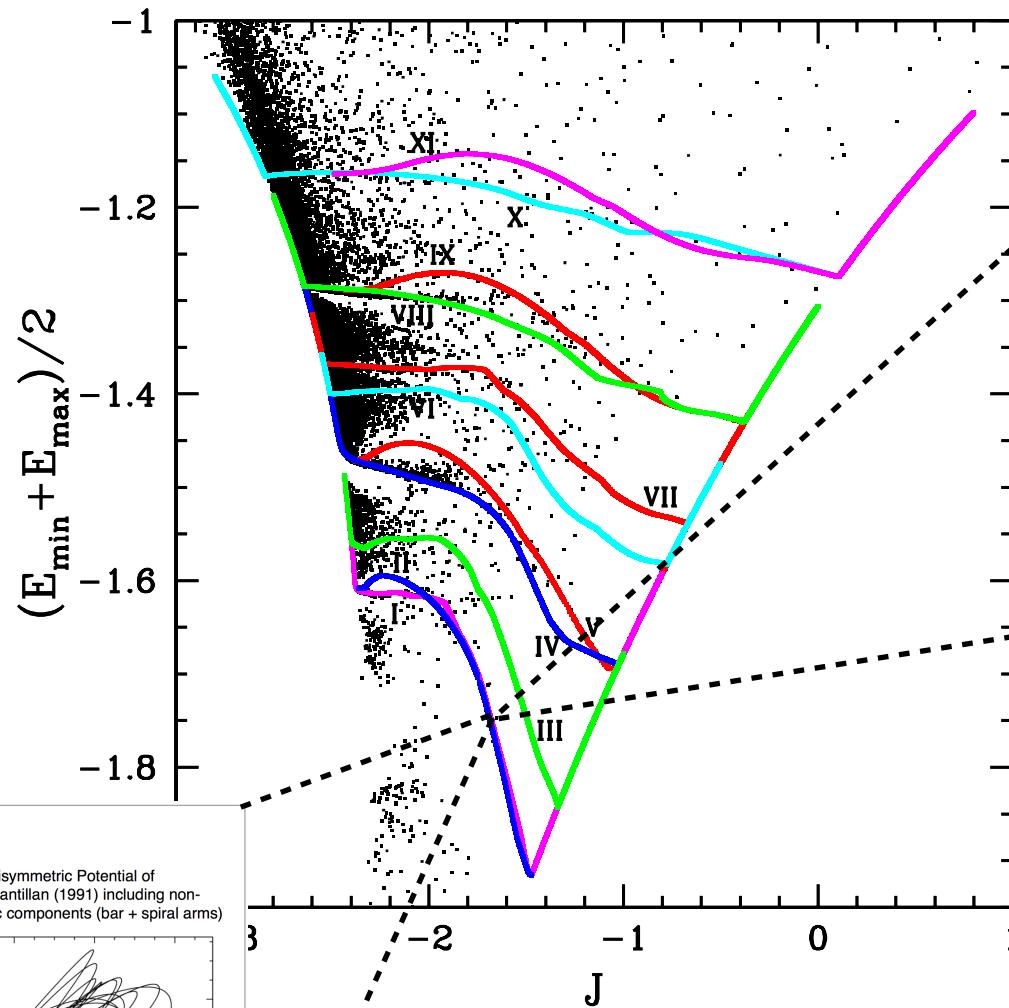
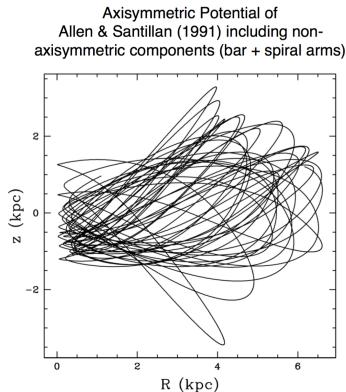
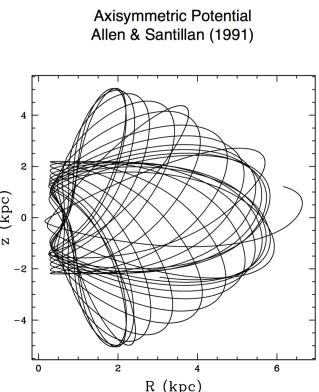
# Resonant regions

## Preliminary

Discovery of a  
Peculiar star in  
the Galactic  
Plane of the Milky  
Way with extreme  
GC-like  
abundance  
patterns

Fernandez-Trincado et al.  
(2016b)

Orbit Projection



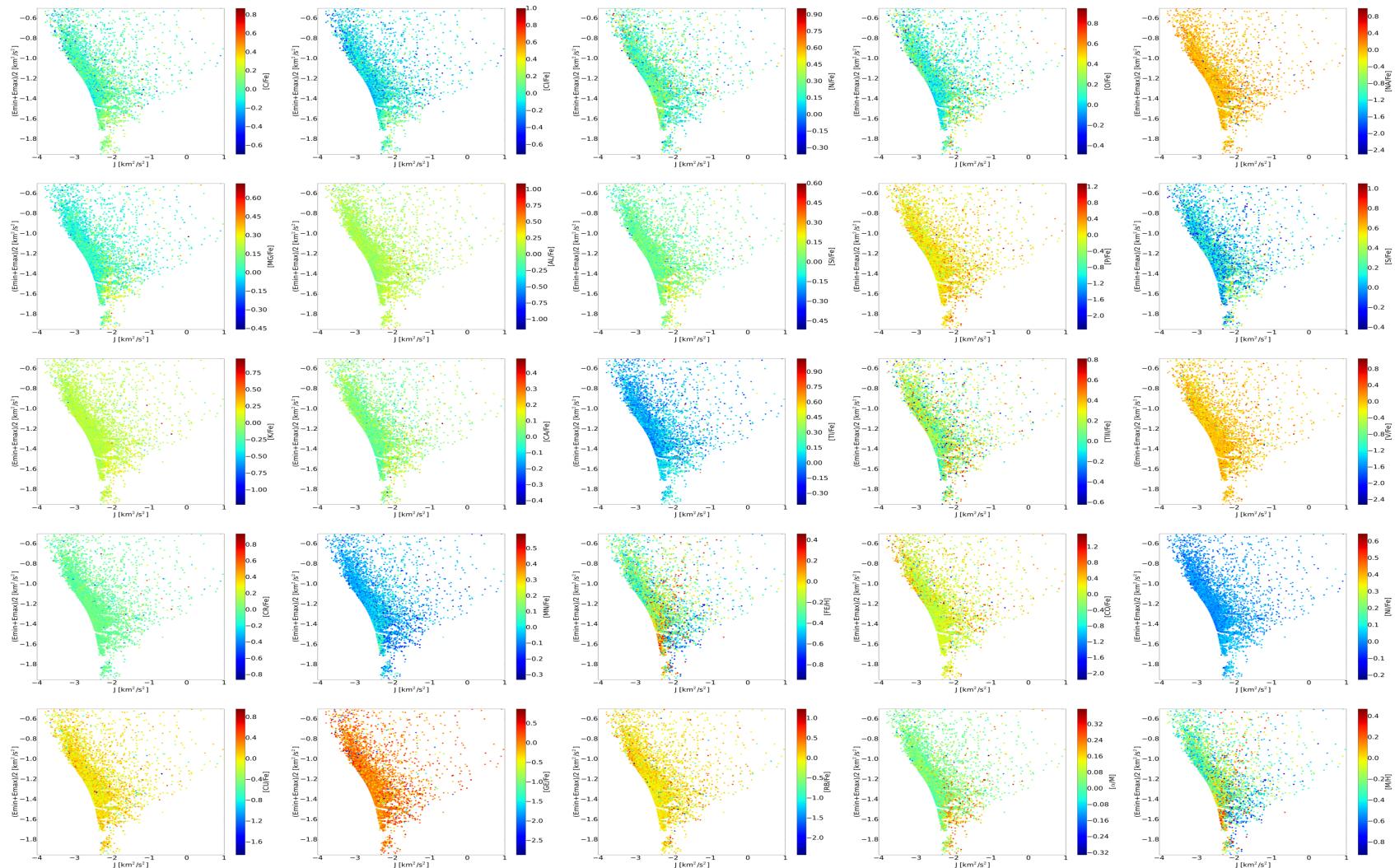
A possible origin mechanism is bar-induced  
resonant trapping

Moreno et al. (2015) and Fernández-Trincado et al. (2016, in prep.)

# Resonant regions

Next

## Searching for GC-like abundance patterns in resonant trapping regions from SDSS-IV data



*Merci*