Spiral Arms

Galaxy Modeling with a GAIA Mock Catalogue

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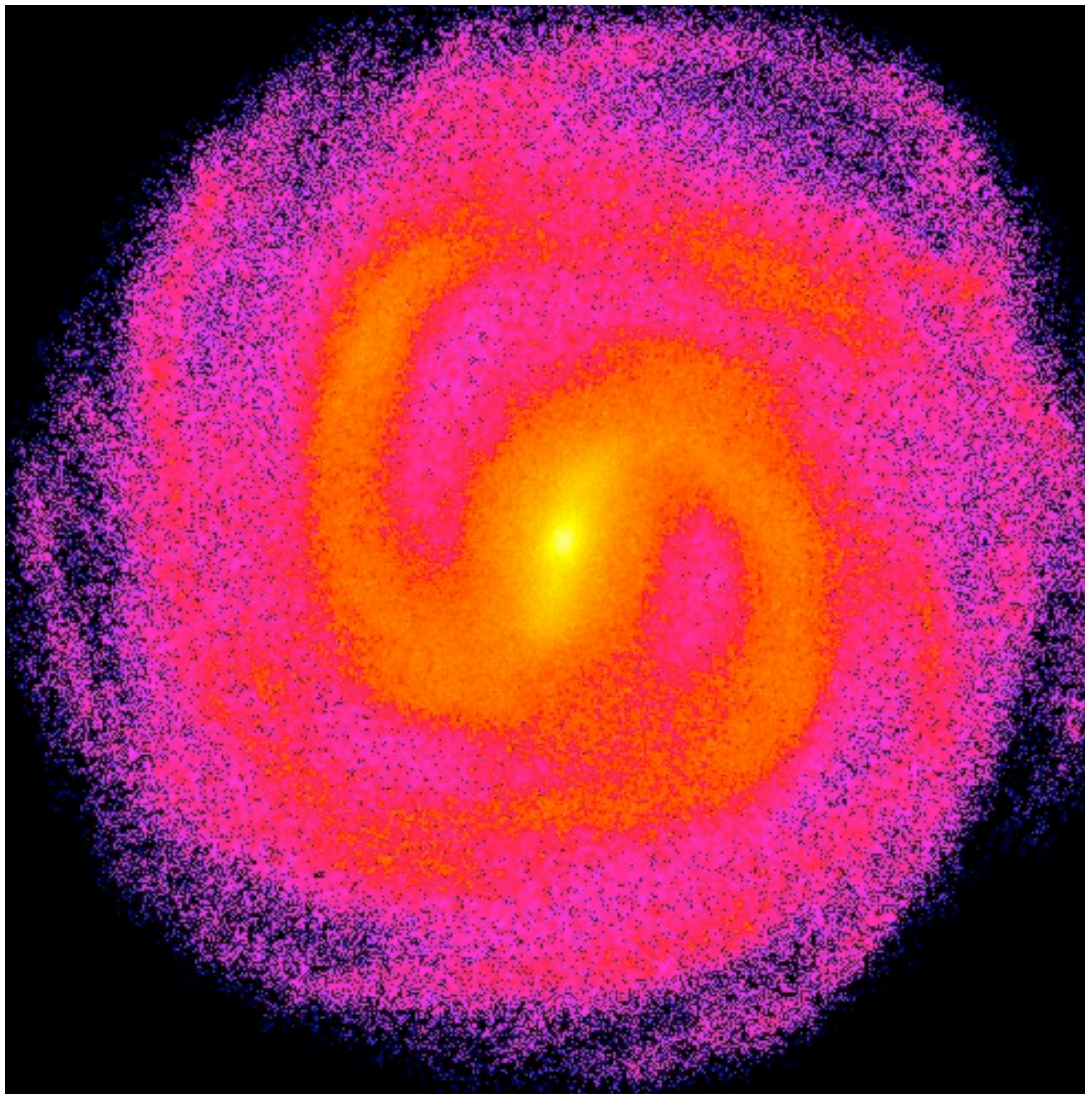
A number of unknowns about MW spiral arms

- ¿Number? 2-4
- Structural Parameters
- Steady?, Transient? (like in most simulations, e.g. Sellwood 2011), Manifolds (Athanassoula, Romero-Gómez?)
- Kinematics (rigid rotation?)

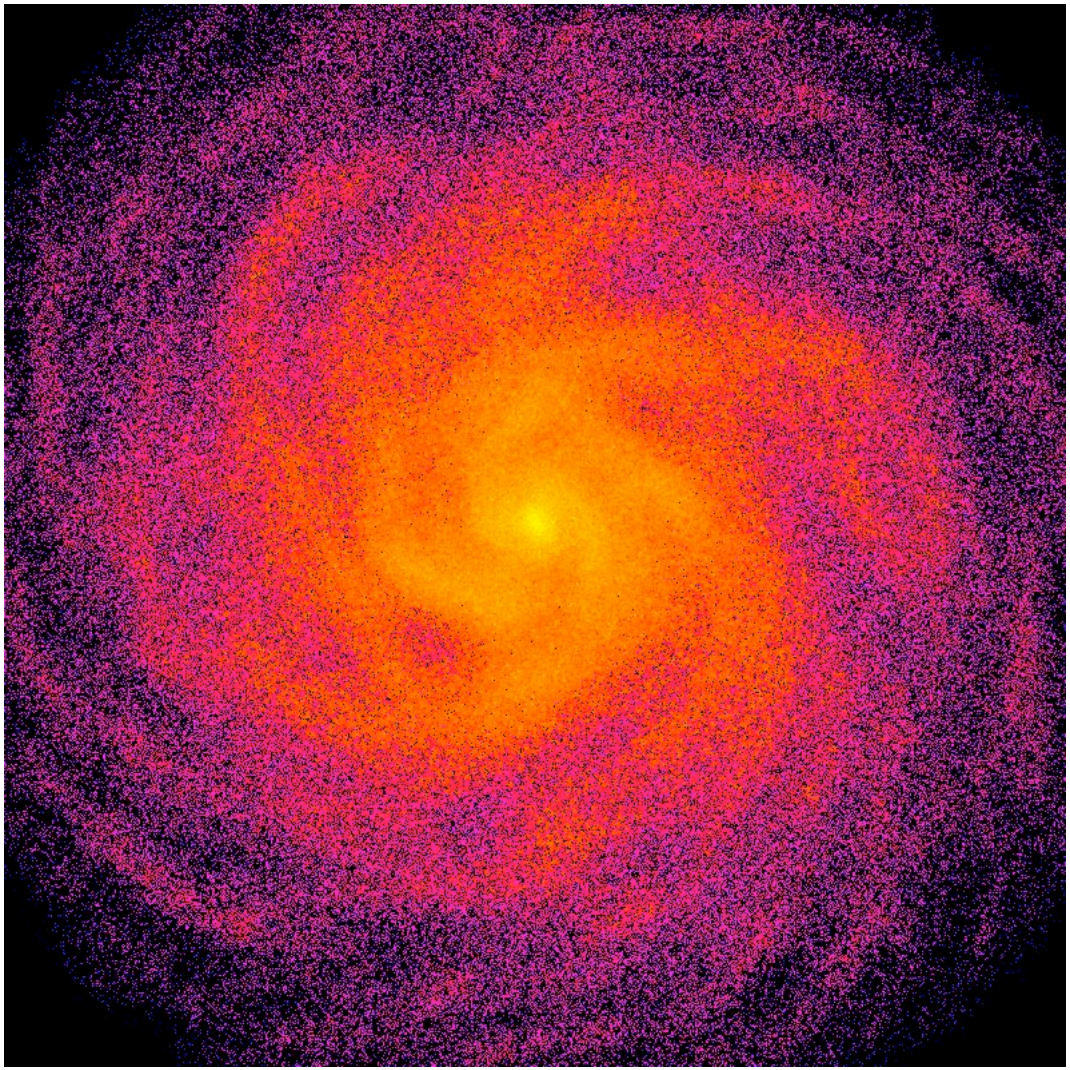
Bar Triggered?



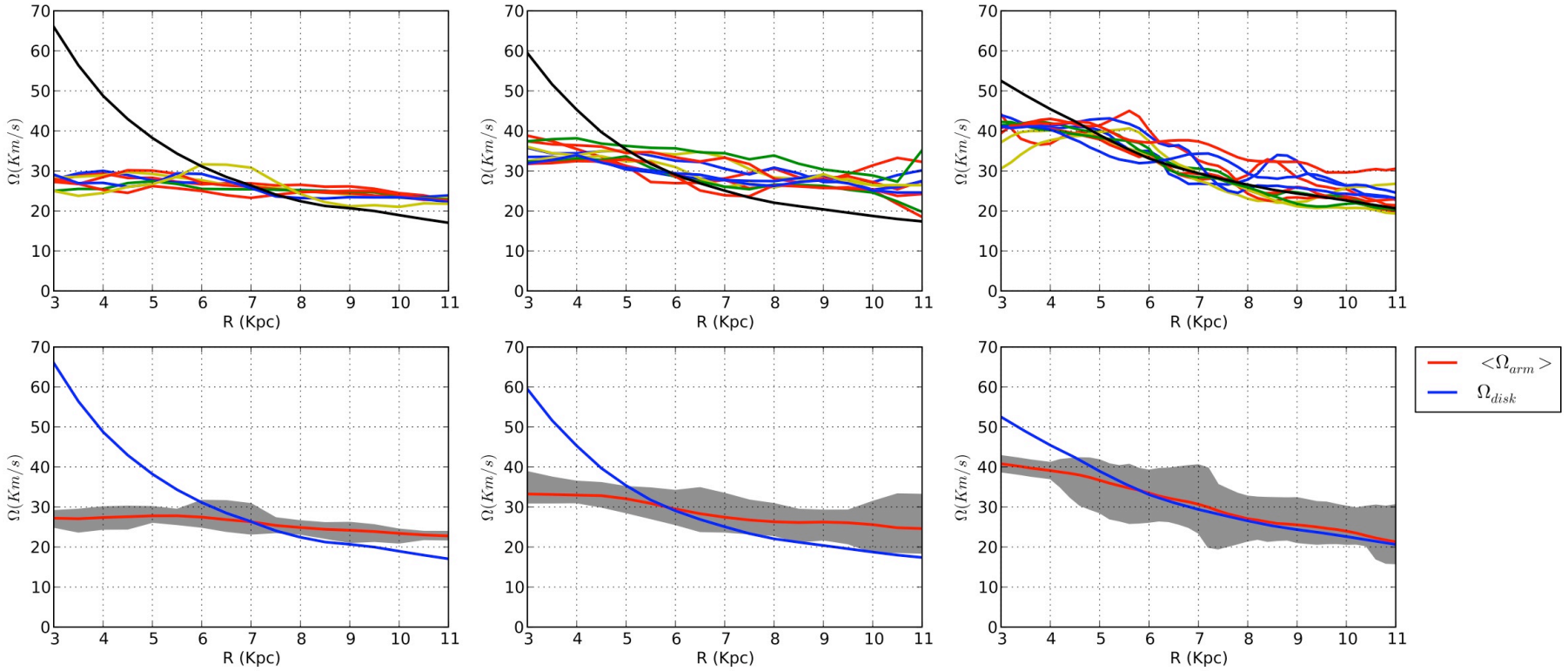
N-body
(colisionless)
ART code
1e6 Ndisk
Up to
5e6 Ndisk

Roca-Fabrega
et al
in preparation

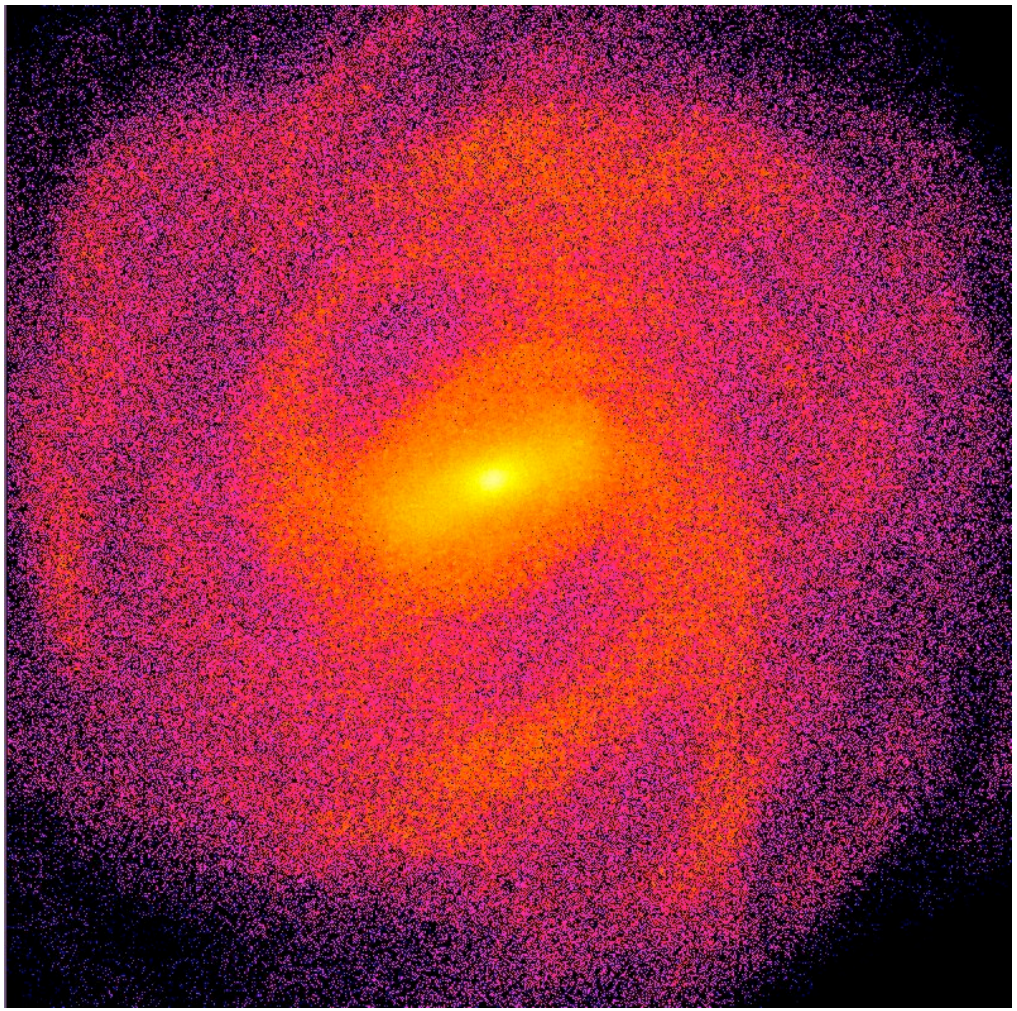
Unbarred Model

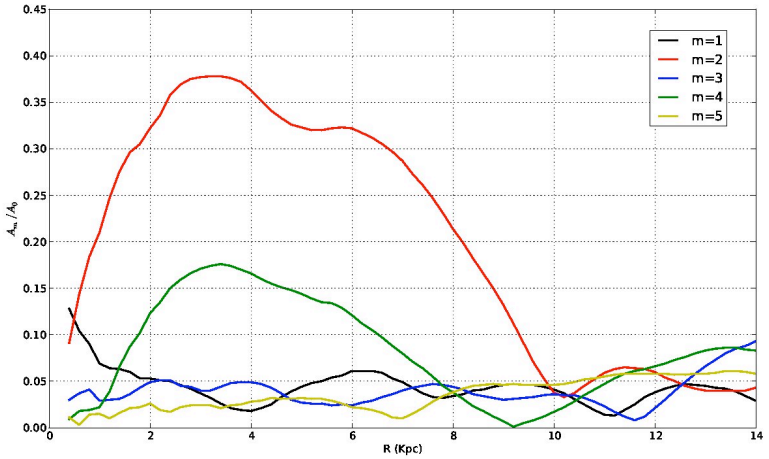


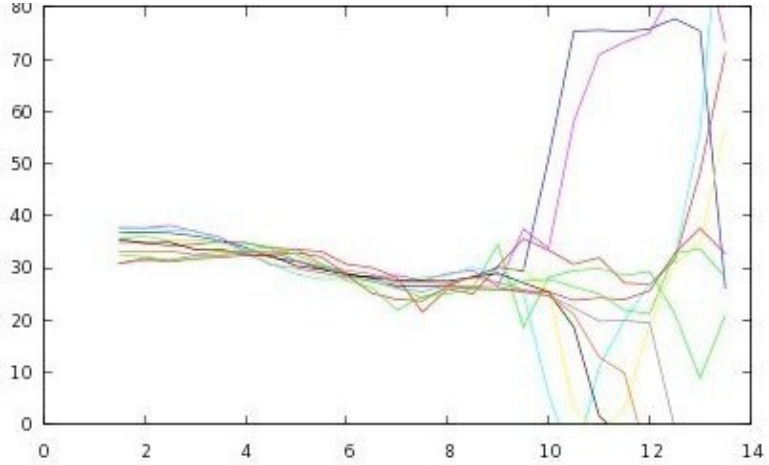
Kinematics for each case



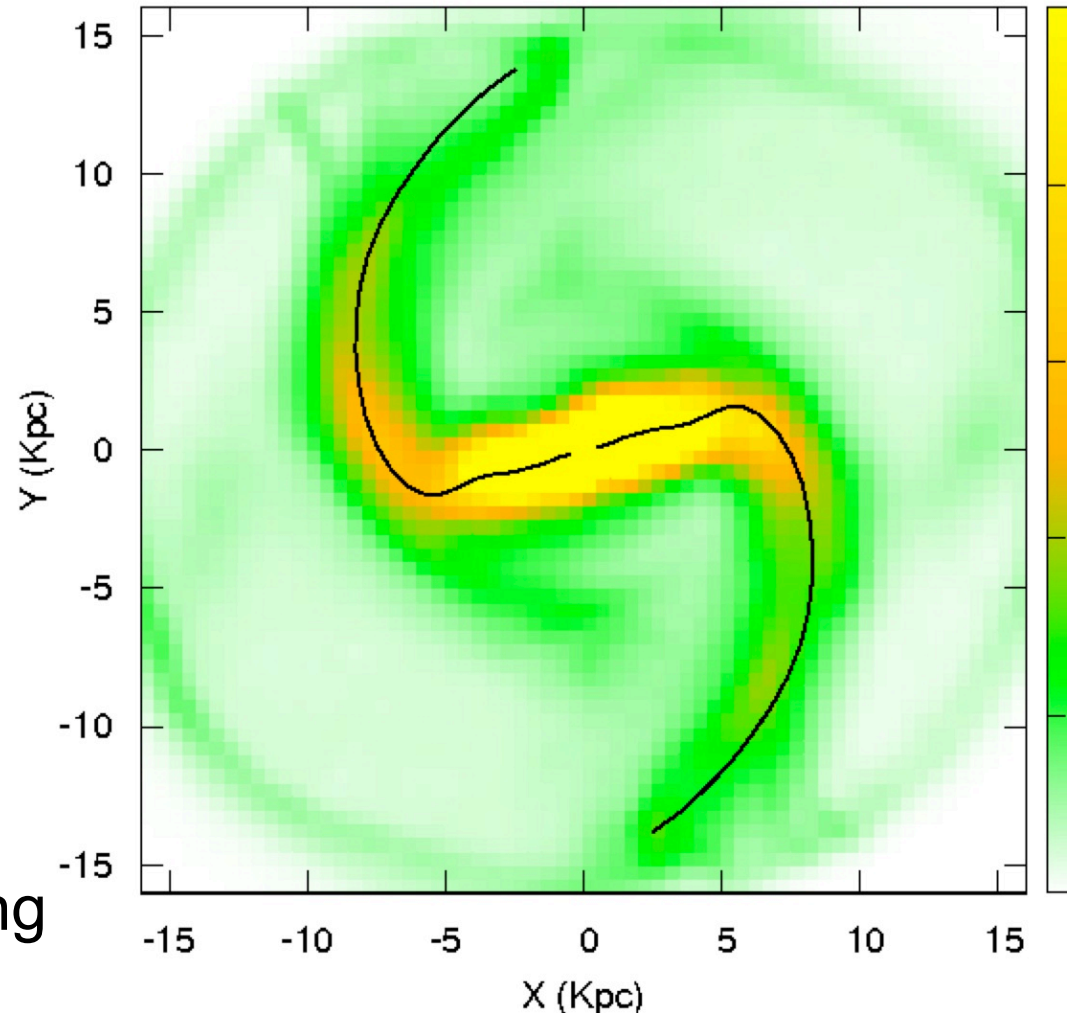
Complications: Bisymmetric arms deform and break





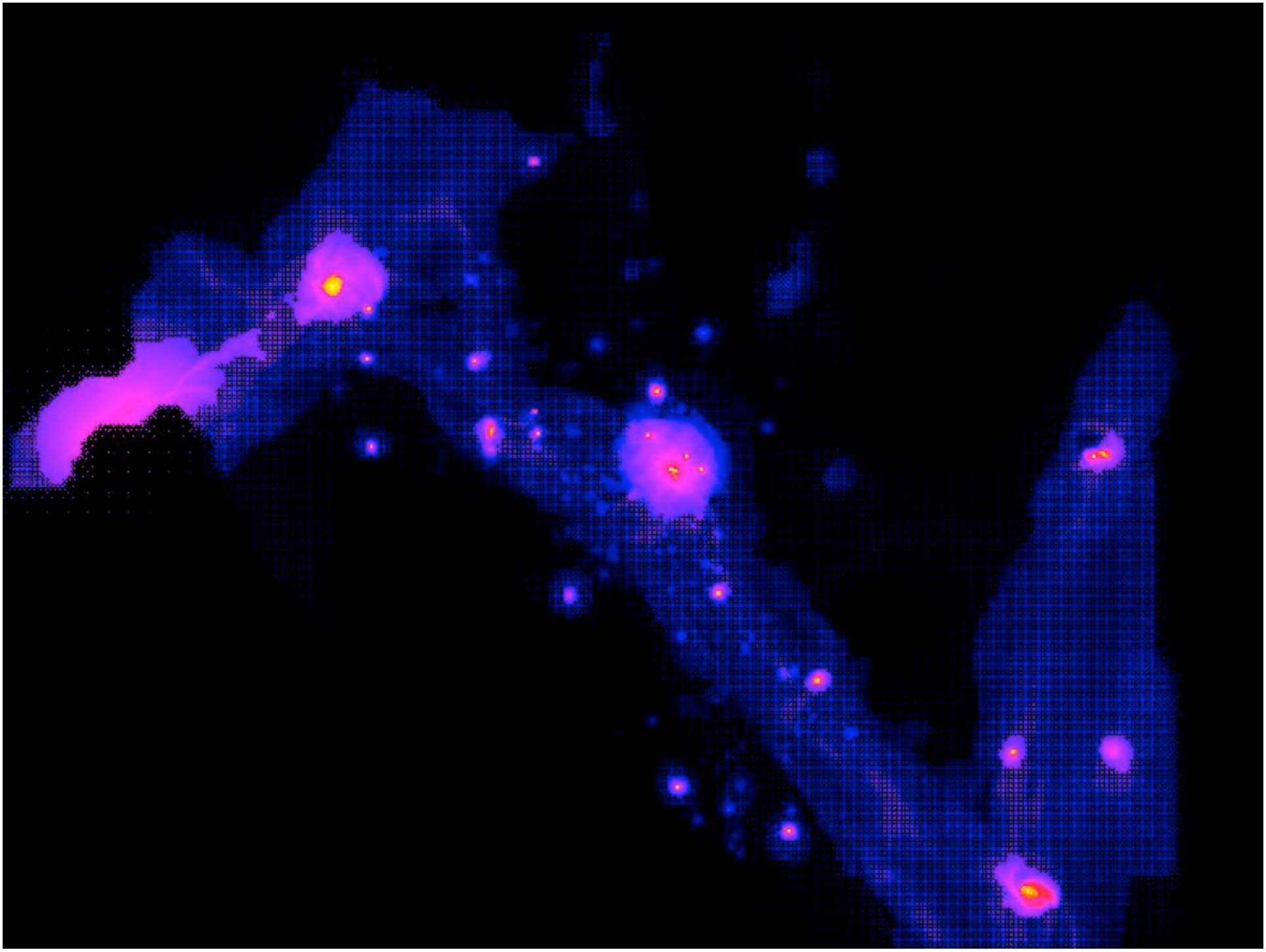


Still testing



Using GAIA for: Tremaine & Weinberg method in the Milky Way disk (Debattista, Gerhard,Sevenster 2002) for spiral arms analysis?

- Model independent method for measuring pattern speed
- Do they show rigid rotation?
- Do arms rotate as fast as the bar?
- If not and still bisymmetric? Maybe at the process of breaking up?
- Corotate with the disk? Not bar triggered. Like in Grand, Kawata et al 2012?
- Consequences for disk stellar migration, sun?
- else? Surely many other possibilities



Thank you