Galaxy Modelling with a Gaia mock catalogue

- 2nd WGA1 GREAT ESF Workshop
- WGA1: The Gaia - Model Interface
- @ Universitat de Barcelona (Spain)
- 29 February - 2 March 2012

Organisers

Teresa Antoja (Groningen), James Binney (Oxford), Anthony Brown (Leiden), Victor Debattista (UCLan), Francesca Figueras (Barcelona, LOC Chair), Andreea Font (Birhmingham), Amina Helmi (Groningen), Daisuke Kawata (MSSL, WGA-1 co-facillitator), Xavier Luri (Barcelona, LOC), Ivan Minchev (Potsdam), William O'Mullane (ESAC), Celin´e Reyle (Besan.con, WGA-1 co-facillitator)

GREAT

EUROPEAN SCIENCE FOUNDATION
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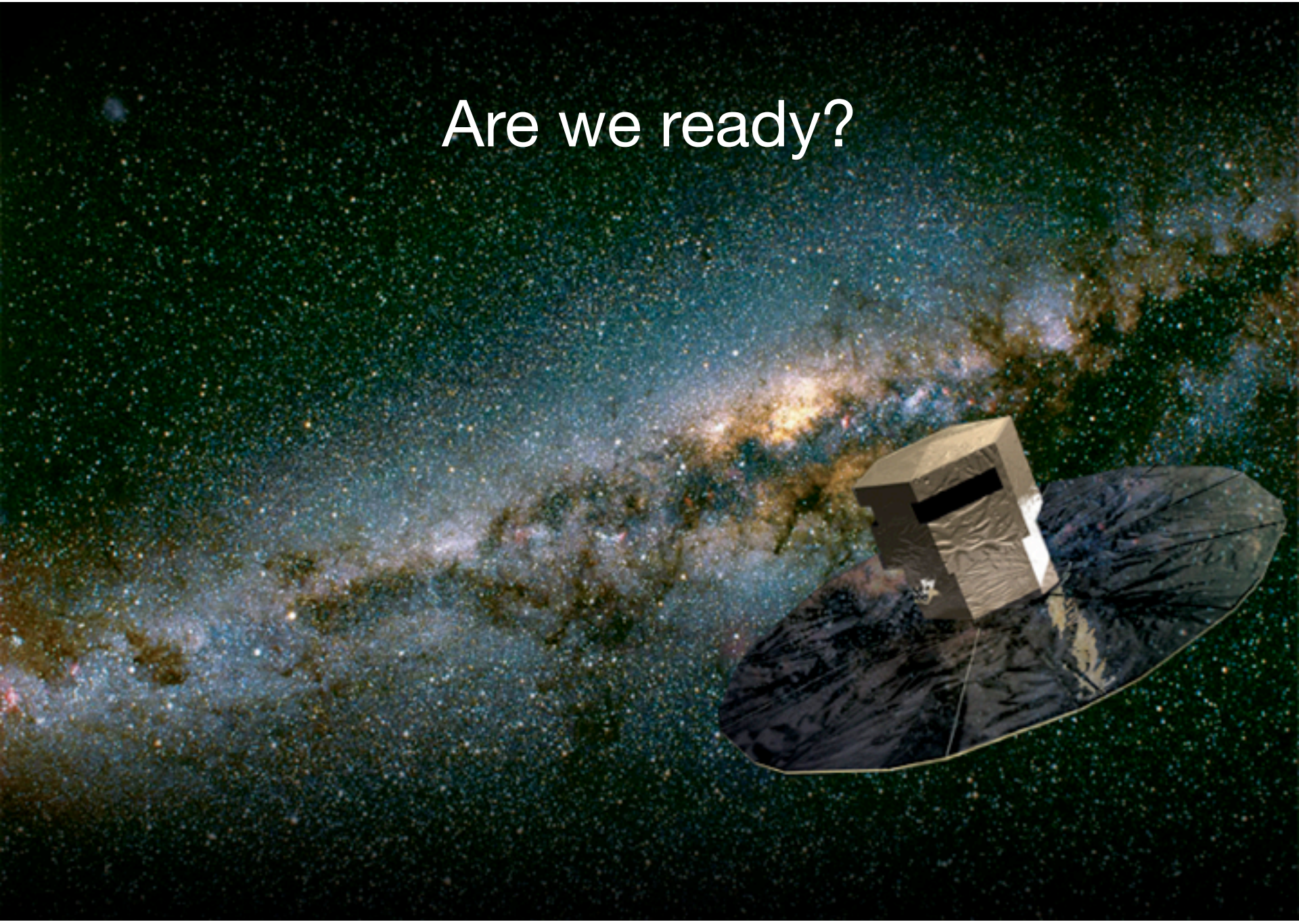
Universitat de Barcelona

Are we ready?



GREAT ESF Research Network Programme

- Provides funds for the wider GREAT research network
- The Programme provides financial support for the following activities:
  - Science meetings (workshops, conferences or schools) organised either by the Programme Steering Committee or following an open call for proposals
  - Grants for short and exchange visits awarded following an open call for applications
  - Publication of information brochures and leaflets, scientific books and meeting proceedings etc
- See http://www.great-esf.eu

GREAT Working Groups

http://great.ast.cam.ac.uk/Greatwiki/CategoryWorkgroups

Workgroup	co-facilitator	co-facilitator
WGA1GaiaModel	Céline Reylé	Daisuke Kawata
WGA2SurveyCensus	GeorgeSeabroke	ArnaudSiebert
WGA3ChemicalTagging	Sofia Feltzing	Nicholas Walton
WGA4LocalGroup	Vasily Belokurov	Michele Bellazzini
WGA5GaiaAlerts	Simon Hodgkin	Gerry Gilmore
WGA6GaiaExtragal	Mary Kontizas	tbd
WGA7NewStats	Will O'Mullane	NicholasWalton
WGA8DistanceScales	Gisella Clementini	Xavier Luri & Enzo Brocato
WGB1OpenClusterYoungAssociation	AlessandroLanzafame	AntonellaVallenari
WGB2StellarVariability	Joris De Ridder	Laurent Eyer
WGB3BinariesAndMultipleSystems	Dimitri Pourbaix	Frederic Arenou
WGB4StellarAtmospheres	UlrikeHeiter	Alex Lobel
WGB5MassiveStars	Ronny Blomme	Janet Drew
WGB6EndStatesOfStellarEvolution	DuncanFyfe	Stefan Jordan
WGC1ExoPlanets	Alessandro Sozzetti	Don Pollacco
WGC2AstrometryReferenceFrame	Mariateresa Crosta	Géraldine Bourda
WGC3Quasars	Sonia Anton	Alexandre Andrei
WGC4SolarSystem	Paolo Tanga	Alberto Cellino
WGC5ISM	Rosine Lallement	U. Munari &T. Zwitter

GREAT WGA1 Activities?

Earlier releases?

“Fitting models based on good physics will be a powerful mean of detecting systematics”

Has sense to create a commission inside WGA1 to be in continuous interaction with DPAC? (“DPAC should not work alone”)

List of representative scenarios which could be turned in to programs or

The GAP list is here :
http://great.ast.cam.ac.uk/Greatwiki/GaiaDataAccess

These were analyzed in Cambridge in November 2011 document still pending

Can Will talk us on the contents of this list of scenarios?

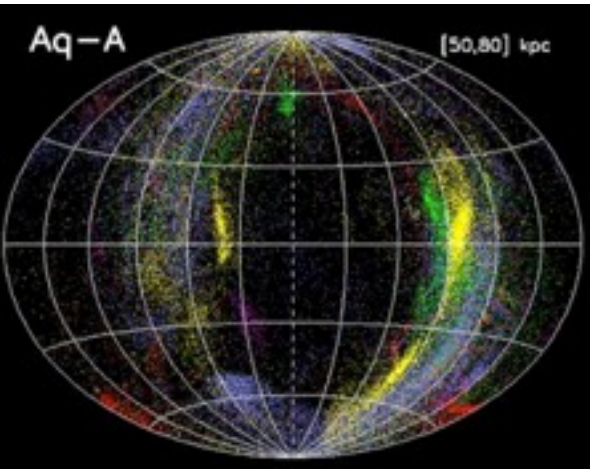
Can we identify some collaborative efforts inside WGA1?

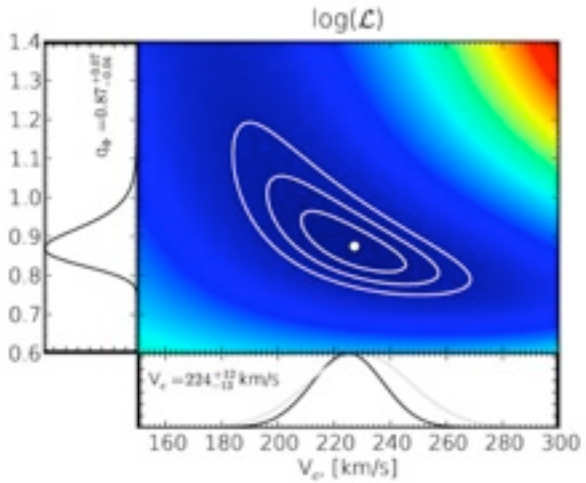
Long term

-A huge "MW like" simulation? Adapted to what Gaia will observe? Application to the European Community?

Short term:

-3rd meeting in one year from now



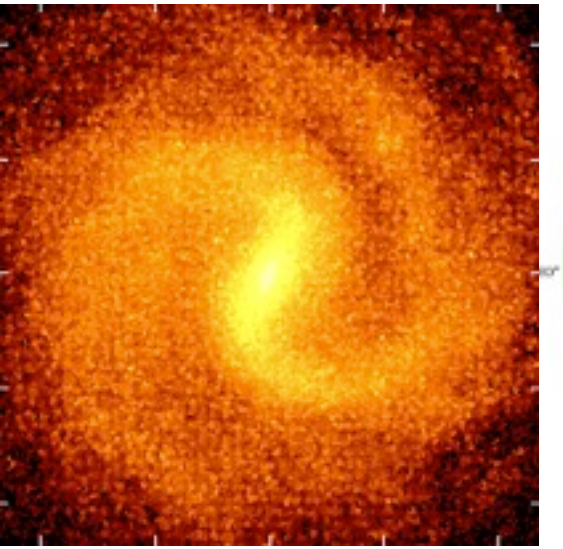


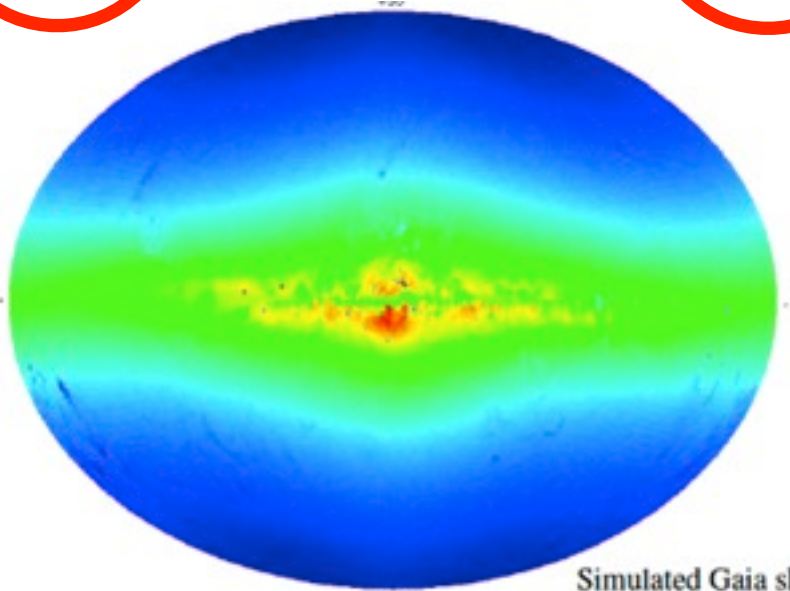
C) e.g. DPAC-CU1,CU2,GAP,GOG
Dust model
Stellar population
Gaia performance

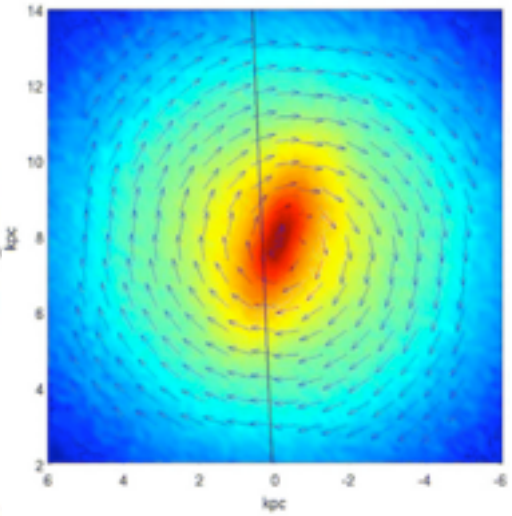
A) Simulated Galaxy Model
e.g. N-body, SPH, AMR
Semi-analytic

common platform
'Gaia mock catalogue

B) Statistical Analysis Tools
e.g.Torus
M2M
Number counts





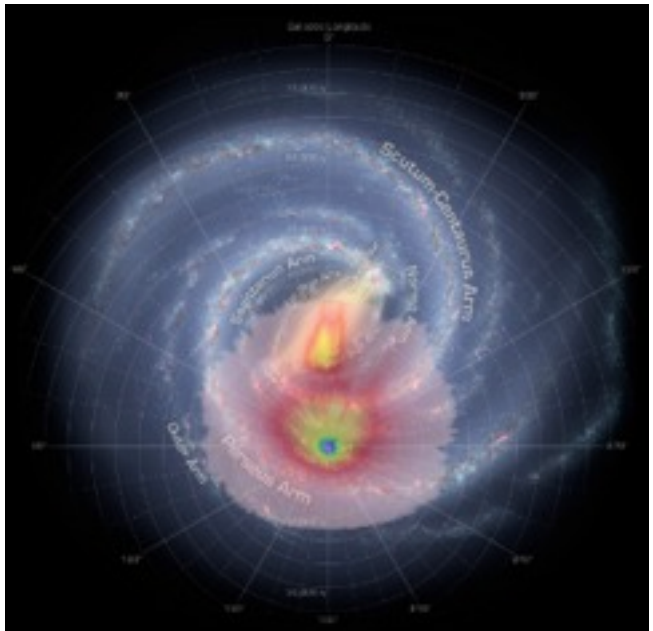


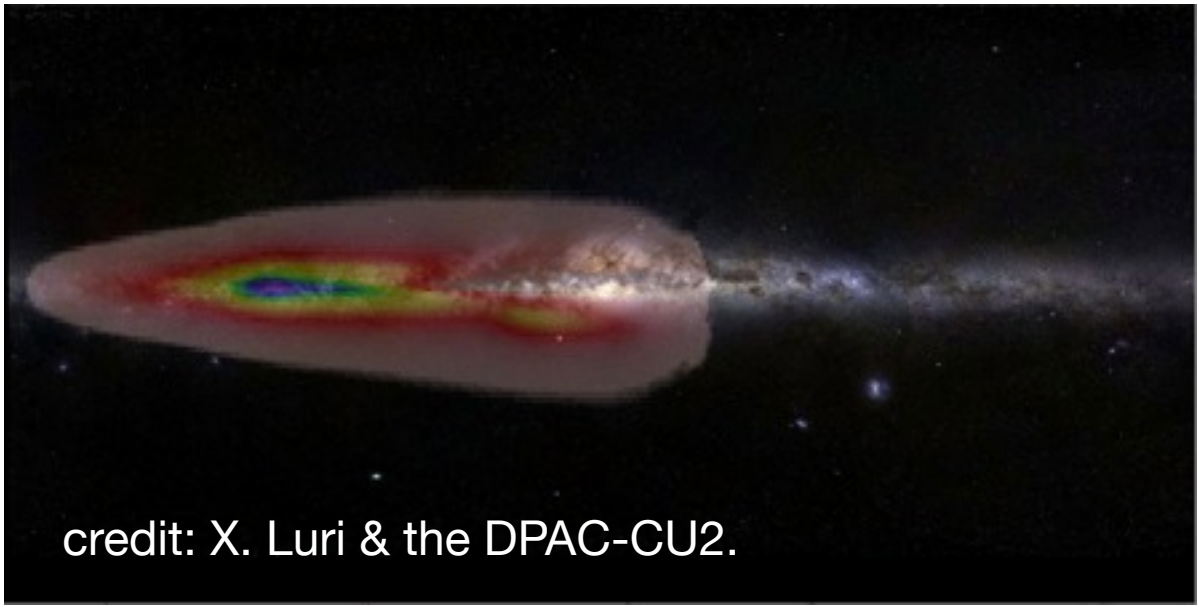
How to compare models and data?

- “A direct way of going from models to probability density functions (observables)”

Challenges for Galaxy modelling

- How to compare models with the real observations?
- selection function of the Gaia and complementary data? dust and various errors
- huge and complex data set.





A: Numerical Simulator (e.g. N-body modeller)

- a mock catalogue from simulations
  building a tool for simulator?
- objectives:
  what Gaia can see or not see.
- expertise needed
  Gaia mock catalogue (GOG and etc.)
  stellar population and 3D extinction
  Galaxy simulations
- who can (and will) do what?
  how to organise?
  GUMS module would be extremely useful here?

How to create a selft-consistent model?

N-bodies inside the BGM? (L. Athanassoula)
Gaia-wise: Think of it as a Besançn-model on steroids.

B: GREAT Grand Challenge?

- Ask participants, modellers, to fit (fake) observables by their own model
  Torus, M2M, 3D Jeans eq.
- Objectives:
  Pros and Cons of different modelling technique
  improving models
- Step-by-Step approach?
  simple spherical models
  disk with spherical halo
  disk with bar and spiral arms
  Gaia mock catalogue (from activity A)

Big Thanks to...

Francesca Figueras
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and
Local organisers