

Correlations between stellar dynamics and metallicity in the discs

Semi-analytic chemodynamical model of the Milky Way

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The Milky Way



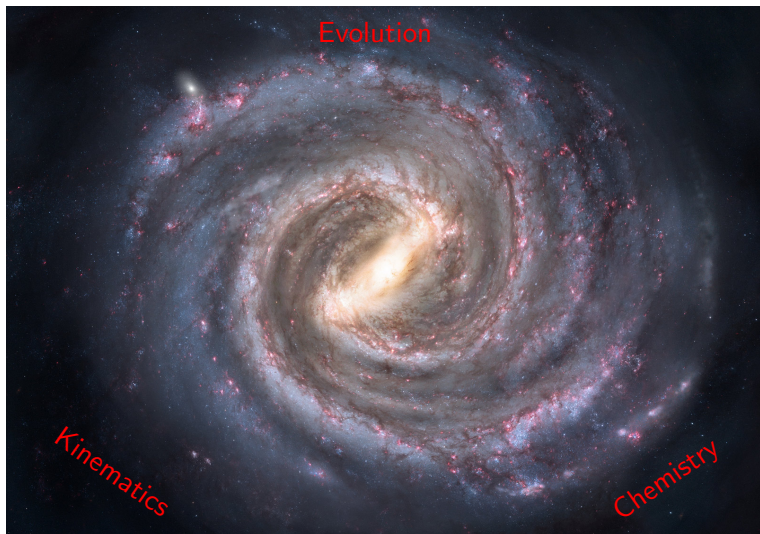
The Milky Way



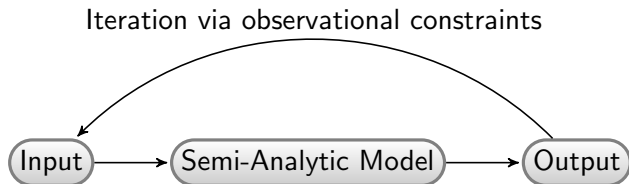
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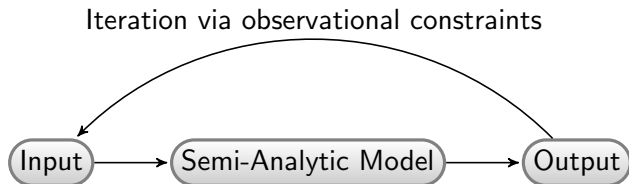
The Milky Way



Local disc model: Just & Jahreiß (2010)



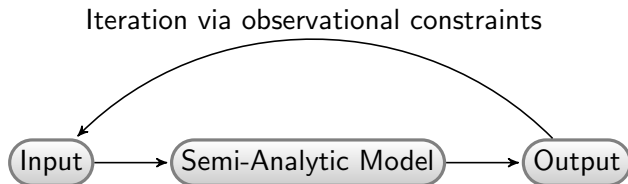
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1 Input

- star formation history
 $\text{SFR}(t)$
- age-velocity dispersion
relation
 $\sigma_W(\text{age})$
- metallicities
 $[\text{Fe}/\text{H}](t)$
- mass distribution
- initial mass function

Local disc model: Just & Jahreiß (2010)



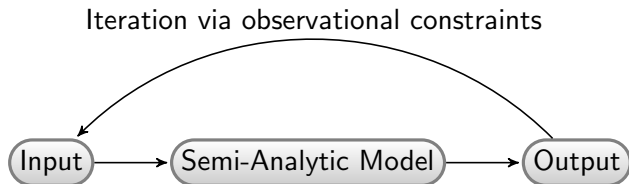
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2 Time evolution

- solving Poisson equation
- stellar evolution from
population synthesis

Local disc model: Just & Jahreiß (2010)



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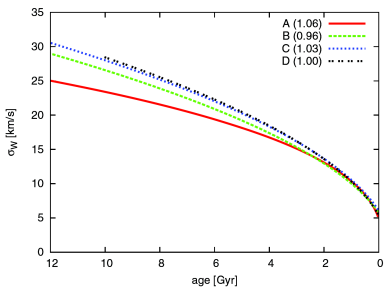
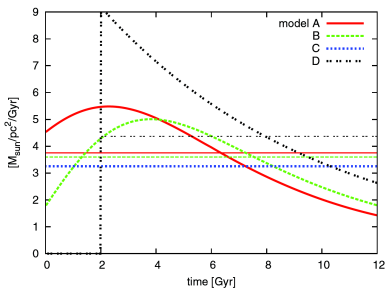
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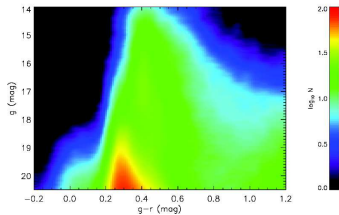
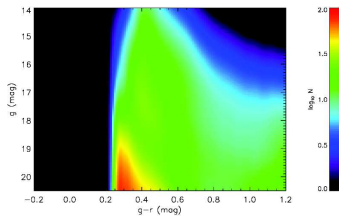
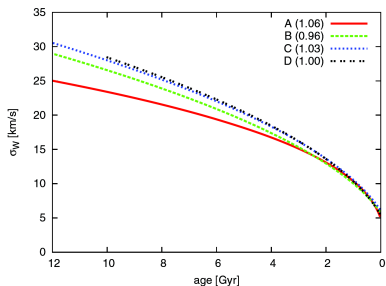
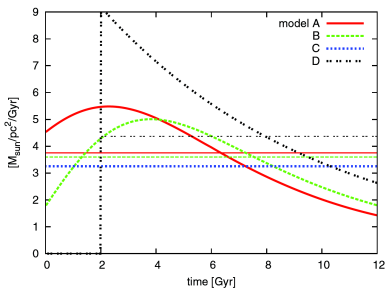
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3 Output of observables

- $[\text{Fe}/\text{H}](z)$ distributions
- kinematics above the plane
- vertical density profiles
 $\rho(z, \text{age})$





- Local disc profiles fit F-K dwarf distribution in SDSS very well at $b=90^\circ$

Constraining the star formation history

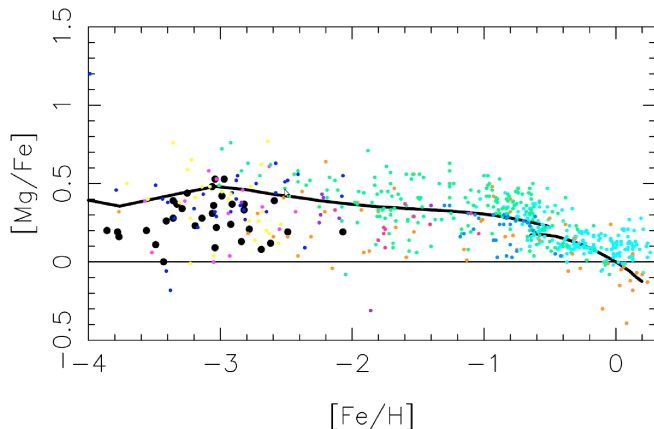
- Select tracer elements

Constraining the star formation history

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- Include prescriptions for their chemical enrichment processes

Constraining the star formation history

- Select tracer elements
- Include prescriptions for their chemical enrichment processes
⇒ increase constraining observables and overcome degeneracy of SFR



(Francois+ 2004)

Constraining the Milky Way Assembly history

- Extend the model to different radii



Constraining the Milky Way Assembly history

- Extend the model to different radii
⇒ Constrain the star formation history at different radii



Constraining the Milky Way Assembly history

- Extend the model to different radii
 - ⇒ Constrain the star formation history at different radii
- Include radial migration



Constraining the Milky Way Assembly history

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- Need suitable observational data
 - ⇒ RAVE, SEGUE, GCS

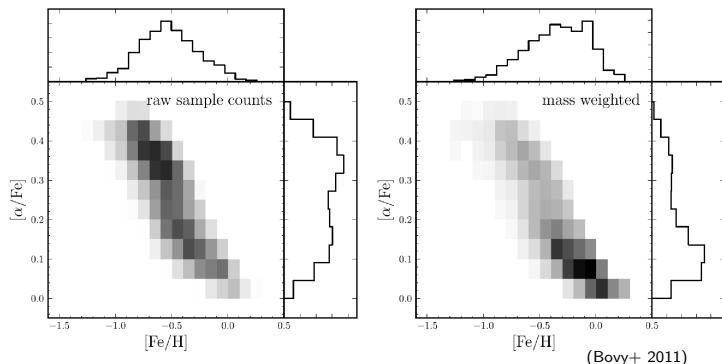
My personal wish list

My personal wish list

- Overcome instantaneous recycling approximation

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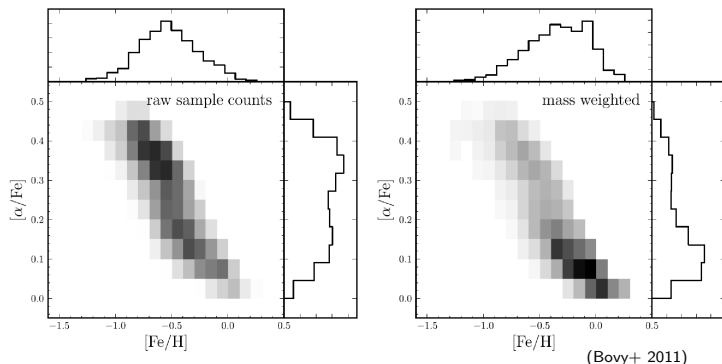
- Overcome instantaneous recycling approximation
- Omit observational biases (selection function)

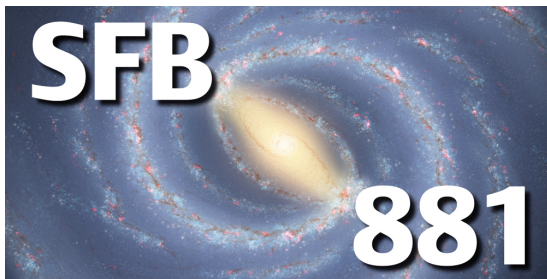


(Bovy+ 2011)

My personal wish list

- Overcome instantaneous recycling approximation
- Omit observational biases (selection function)
- Gaia ESO Survey data release before 2014





Thank you for your attention