Contribution ID: **77** Type: **Contributed e-poster**

The star formation history of the Galactic disk from Gaia DR3 and the BGM FASt Galaxy model (poster pitch)

Wednesday, 6 September 2023 17:42 (2 minutes)

We use the Besançon Galaxy Model Fast Approximate Simulations (BGM FASt) framework together with the Approximate Bayesian Computation (ABC) algorithm to derive the posterior probability distribution function of the parameters defining the initial mass function (IMF) and the star formation history (SFH) in the solar neighbourhood. We propose new strategies to unveil the influence of some BGM model ingredients from the Poissonian distance metric and the posterior distribution of the ratio between pseudo-simulation and data in the Hess diagrams.

Gaia DR3 up to G=13 and a set of consolidated executions of the BGM Fast + ABC code on a Cloud Environment, using both different mother simulations and priors, allow us to confirm the existence of the star formation burst in the Galactic disk 2-4 years ago proposed by Mor et al., 2019. Furthermore, for the composite IMF, we obtain the slopes of α_2 and α_3 constrained to the range [1.7, 2.8] and [1.8, 2.4] respectively, in agreement with recent values from the literature. The wide range of values obtained for the total stellar surface mass density of the thin disk at the solar neighbourhood, between 30-50 $M_{\odot}/pc^2$demonstrates that, before to conclude on the set of best ingredients for the Galactic stellar population model, we shall loop the process to fit again the Galactic potential (Robin et al. 2022) using the BGM Fast inferred parameters.

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Session Classification: WG1: The Milky Way as a Galaxy (II). Chair: Antonella Vallenari