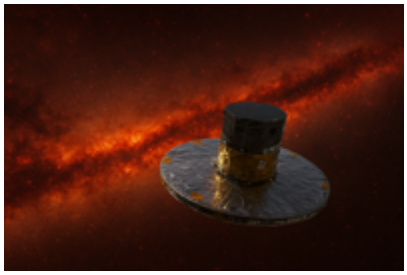

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Inference of the Galactic SFH and IMF from BGM FASt and Gaia DR3/DR4

Wednesday 28 January 2026 10:38 (7 minutes)

Despite the fundamental role of the star formation history (SFH) and the initial mass function (IMF) in describing the Milky Way—and their intrinsic correlation—their consistent and robust determination remains challenging. The unprecedented astrometric and photometric precision of Gaia provides a unique opportunity to address this long-standing problem. I will present a new implementation of the Besançon Galaxy Model Fast Approximate Simulations (BGM FASt), a population synthesis framework designed to efficiently generate synthetic Milky Way stellar catalogs. By fitting Gaia DR3 color–magnitude diagrams, we make a robust derivation of the 2nd and 3rd slopes of the IMF and obtain an SFH in the Solar neighborhood characterised by a hiatus 6 Gyr ago, a bump with a wide plateau from 6 to 2 Gyr ago, and an accurate increase in the last Gyr (del Alcázar-Julià et al. 2025). I will compare our findings with recent studies, including Fernández-Alvar et al. (2025) and Alzate-Trujillo et al. (2025). Finally, I will discuss the ongoing work and how BGM FASt will benefit from the upcoming Gaia DR4, expected by the end of this year, whose improved parallaxes, proper motions, and radial velocities will allow for a more detailed characterization of the different Galactic components and their role in the Milky Way assembly history.

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