

Reading Assignment: The Integrated Galactic Stellar Initial Mass Function

AY 250: Stellar Populations

Feb 12, 2026

Introduction: The standard Initial Mass Function (IMF), often described by a Salpeter power law ($\xi(m) \propto m^{-\alpha}$), is typically assumed to be universal across different star-forming environments. However, the Integrated Galactic Initial Stellar Mass Function (IGIMF) theory posits that the galaxy-wide IMF is non-universal and dependent on the Star Formation Rate (SFR) and metallicity of the galaxy.

Use your AI assistant to answer the following for class on Thursday 2/19/26:

1. Provide an explanation of the IGIMF theory suitable for a first graduate student in astrophysics.
2. Explain the concept of the IGIMF “like I’m five” (or to a layperson).
3. Discuss at least one astrophysical implication of the IGIMF. Explain how a variable IMF (dependent on SFR) changes the expected observable compared to a universal Salpeter/Kroupa IMF. You can come up with your own examples and/or find examples in the literature.
4. How might you validate or invalidate the IGIMF theory?

Please add 1-2 useful slides/figures to illustrate your answers into this slide deck for in-class discussion. Make sure your name is on your slides.