Using Machine Learning to Catalog Accreted Stars in Gaia ESA DR3 Survey

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OBJECTIVE
To build an Accretion Catalog of the Milky Way.
i.e. To determine which stars were born within the Milky Way (in situ stars), and which ones merged with us later (accreted stars).

KEY CONCEPTS
Gaia ESA DR3, FIRE Simulation, Galaxy Formation.

METHODS
- Ananke DR2 Data
- Kinematics Data (b, pmr, pmdec)
- Feature Extraction
- Neural Network
- Update Weight
- Forward Pass
- Predicted Label (in situ, accreted)

RESULTS
- Toomre Diagram of In Situ Stars
- Toomre Diagram of Accreted Stars
- Metallicity
- Performance

REFERENCES

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NEXT STEPS
- Apply "transfer learning."
- Apply on Gaia DR2.
- Repeat for Ananke and Gaia DR3.
- Publish the Accretion Catalog.

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