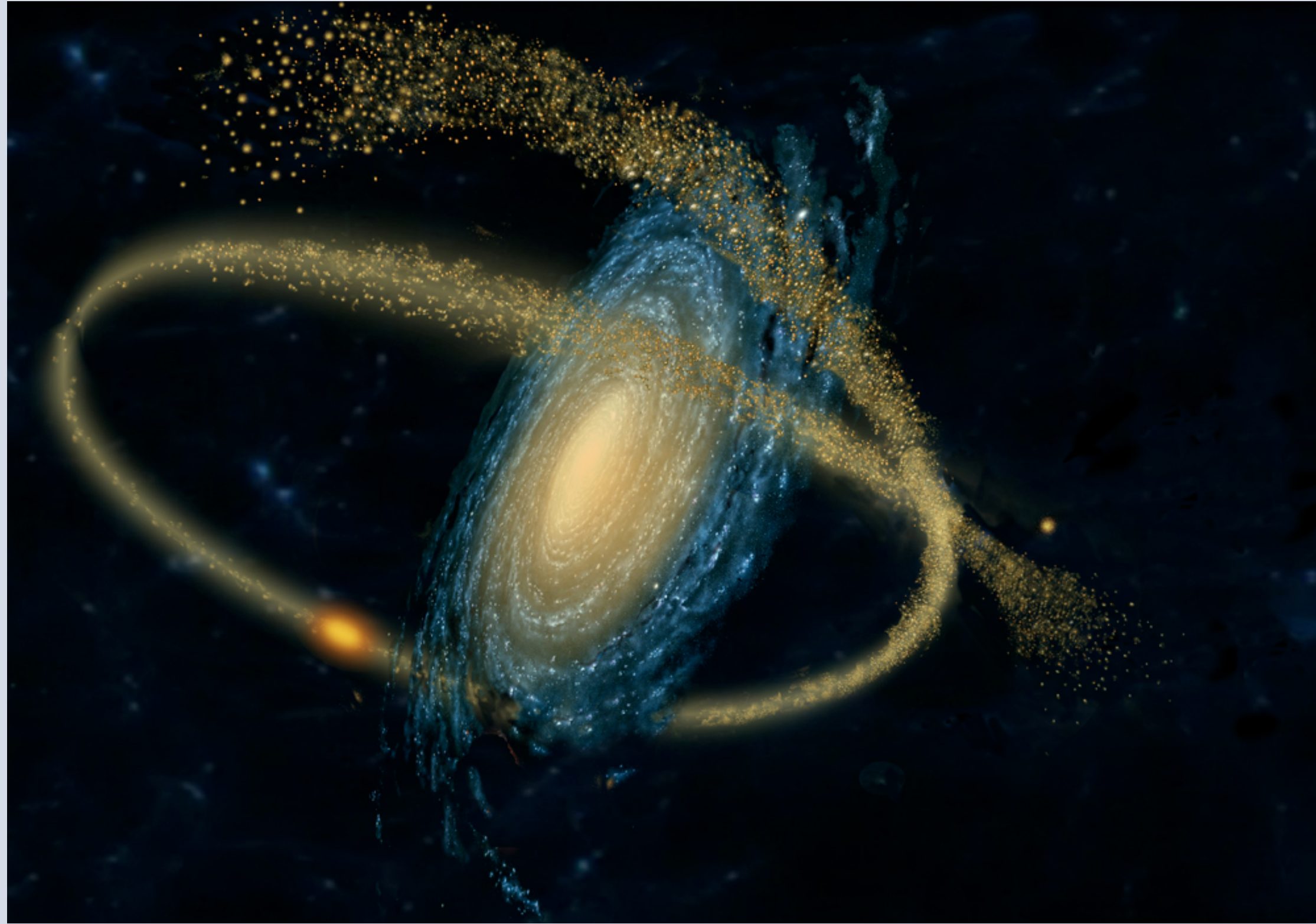
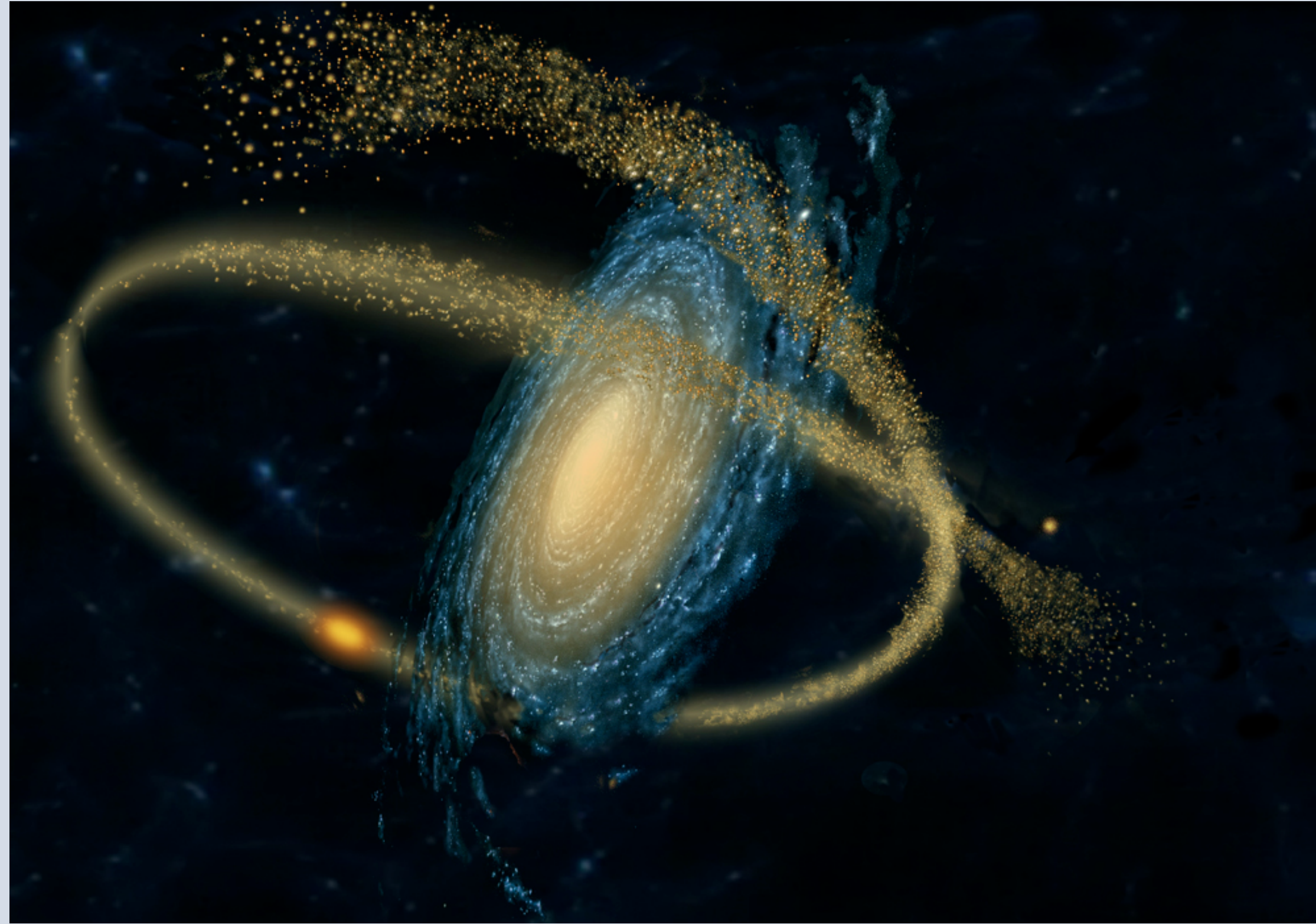


A stellar stream is a sparse, coherent structure embedded in a local field of $\sim 10^5$ stars, with $<1\%$ positives.

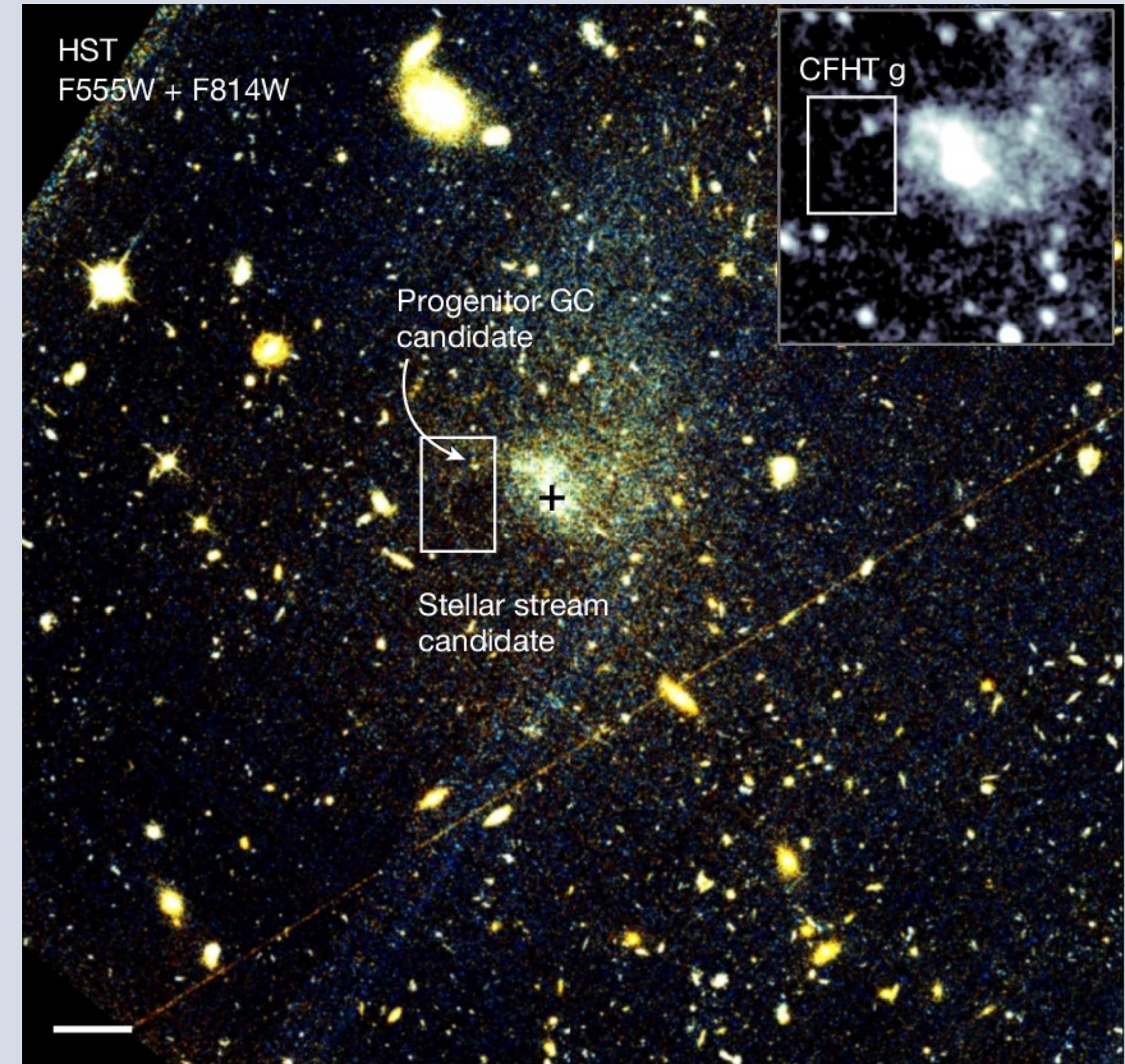


Artist's visualization, Jon Lomberg

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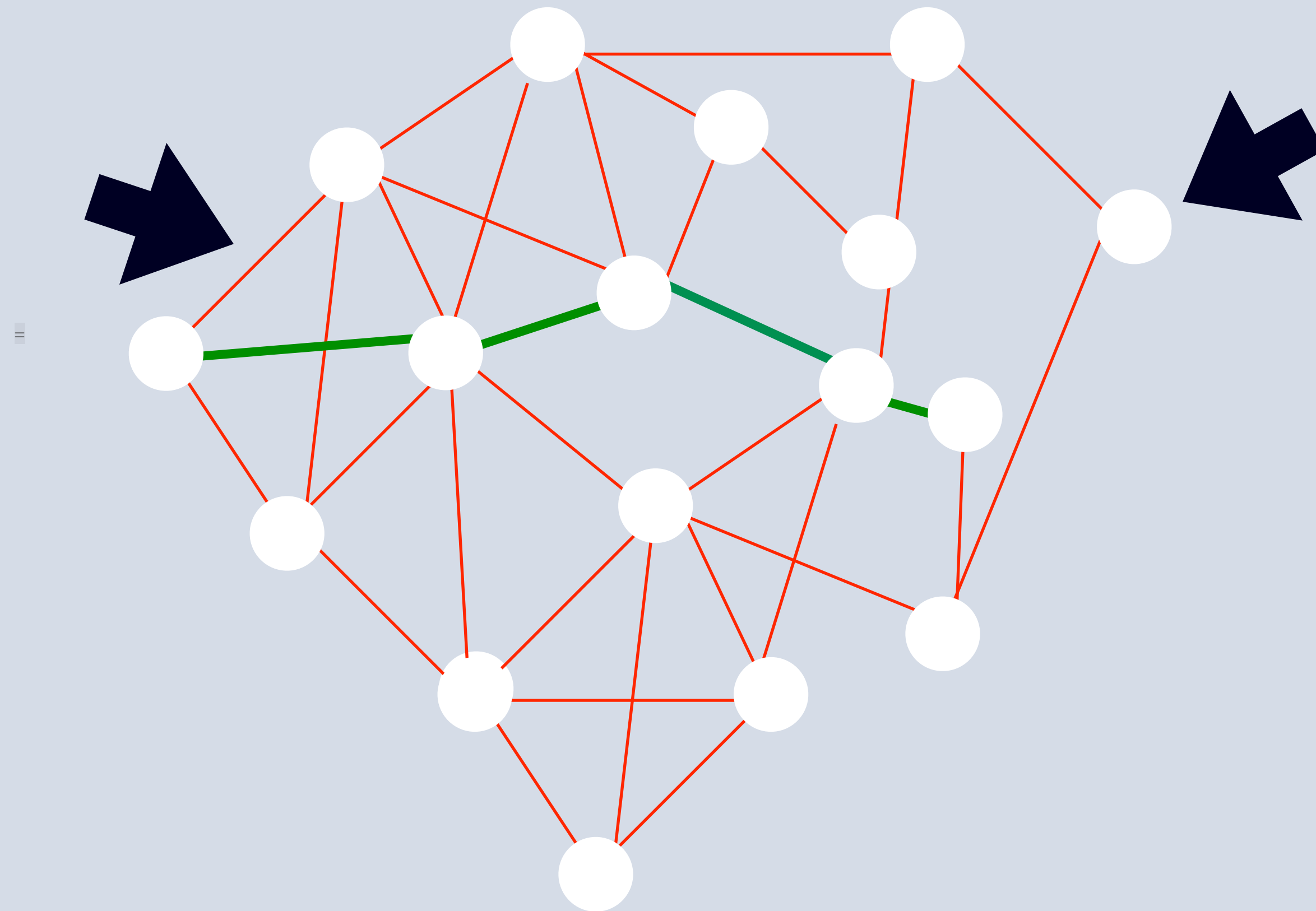


Kiel Holm, Pearson et al. (2026), Nature "Evidence for the first globular cluster stellar stream beyond the Milky Way"

Can relational information between stars recover structure that is ambiguous at the individual-node level?

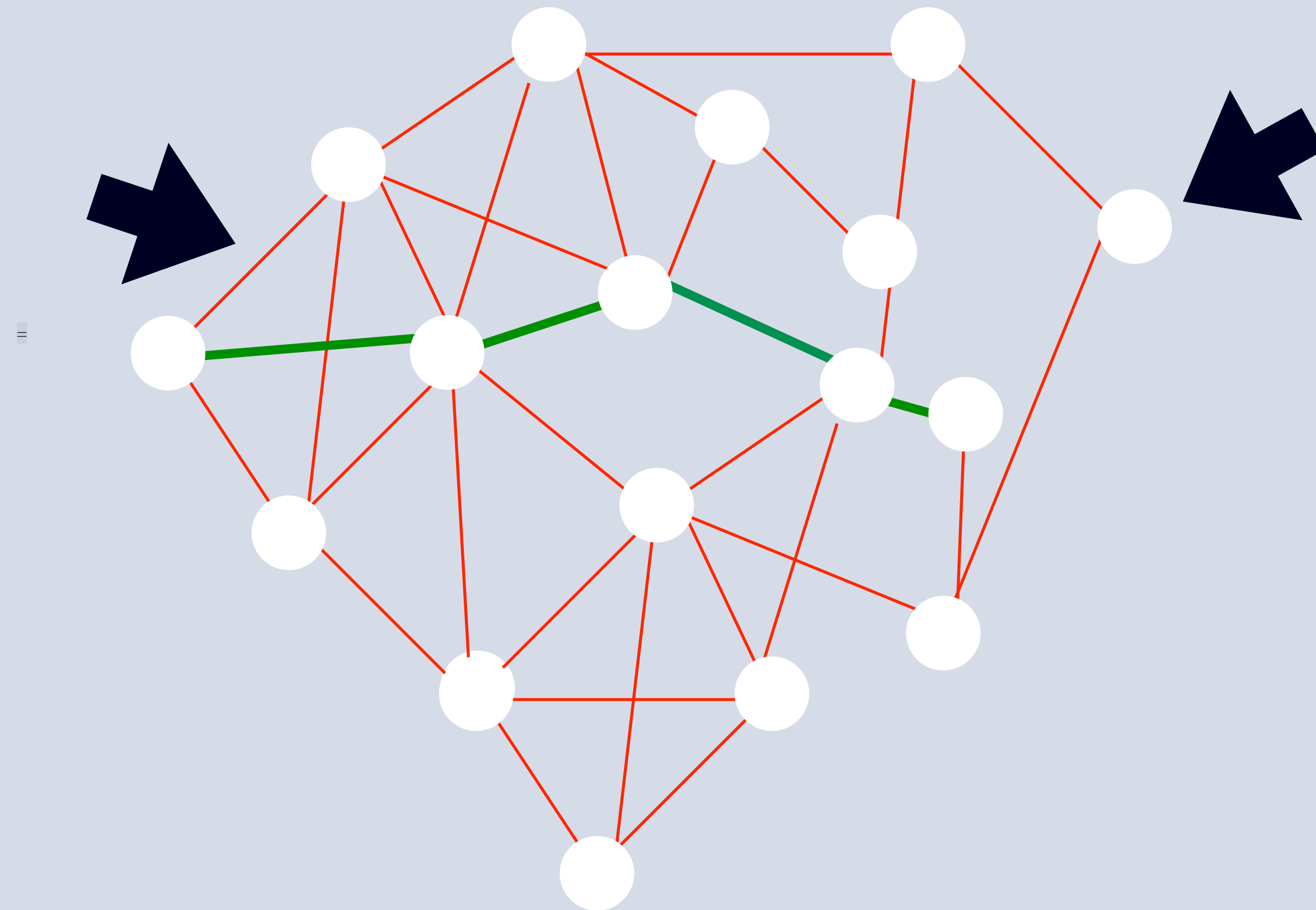
Coupled Particle-Edge Networks for stellar stream identification

Gage DeZoort's talk on Monday!



Coupled Particle-Edge Networks for stellar stream identification

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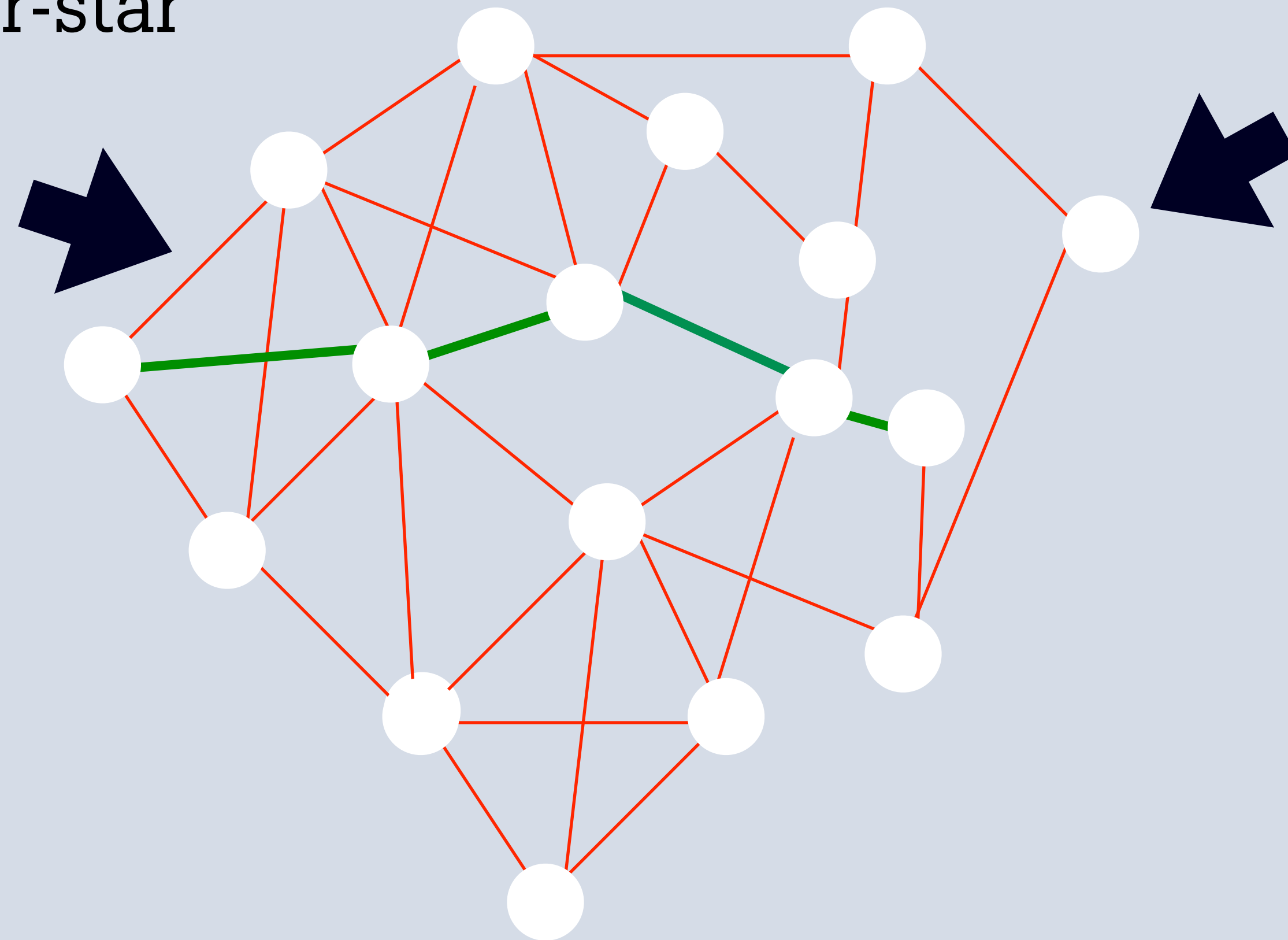


At the node: available
positions, velocities,
photometry

Coupled Particle-Edge Networks for stellar stream identification

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At the edge: star-star relationships

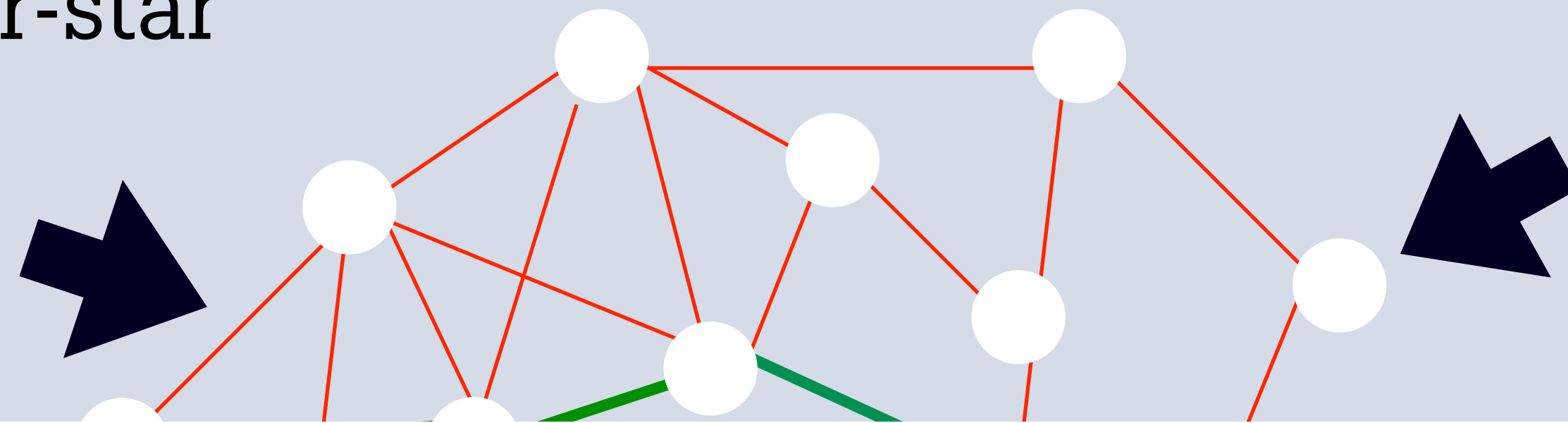


At the node: available positions, velocities, photometry

Coupled Particle-Edge Networks for stellar stream identification

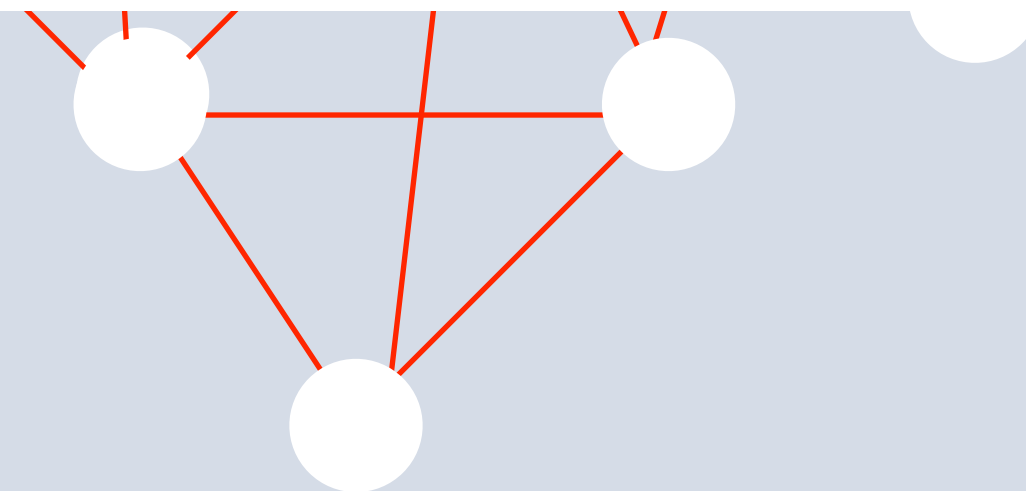
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At the edge: star-star relationships

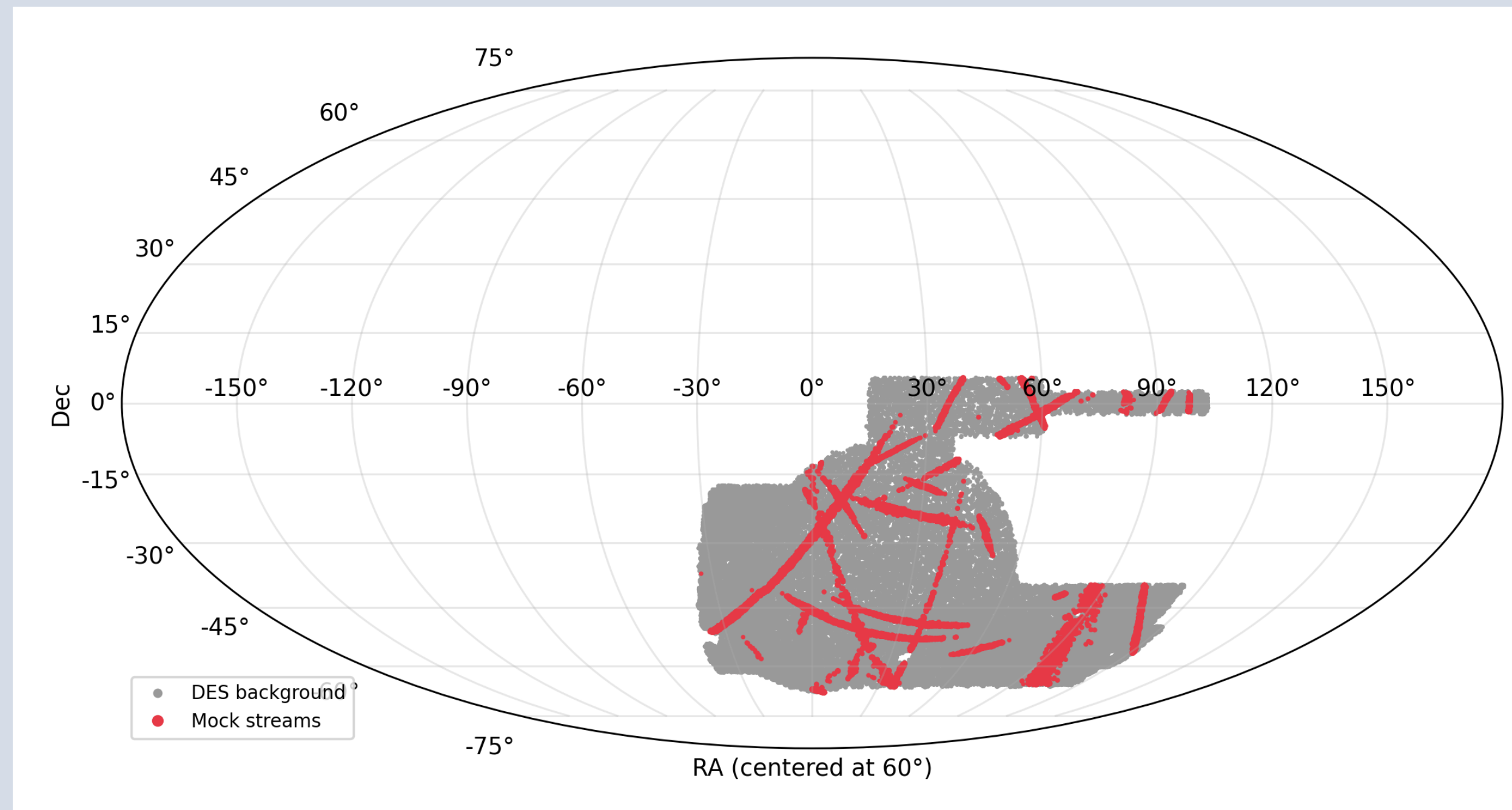
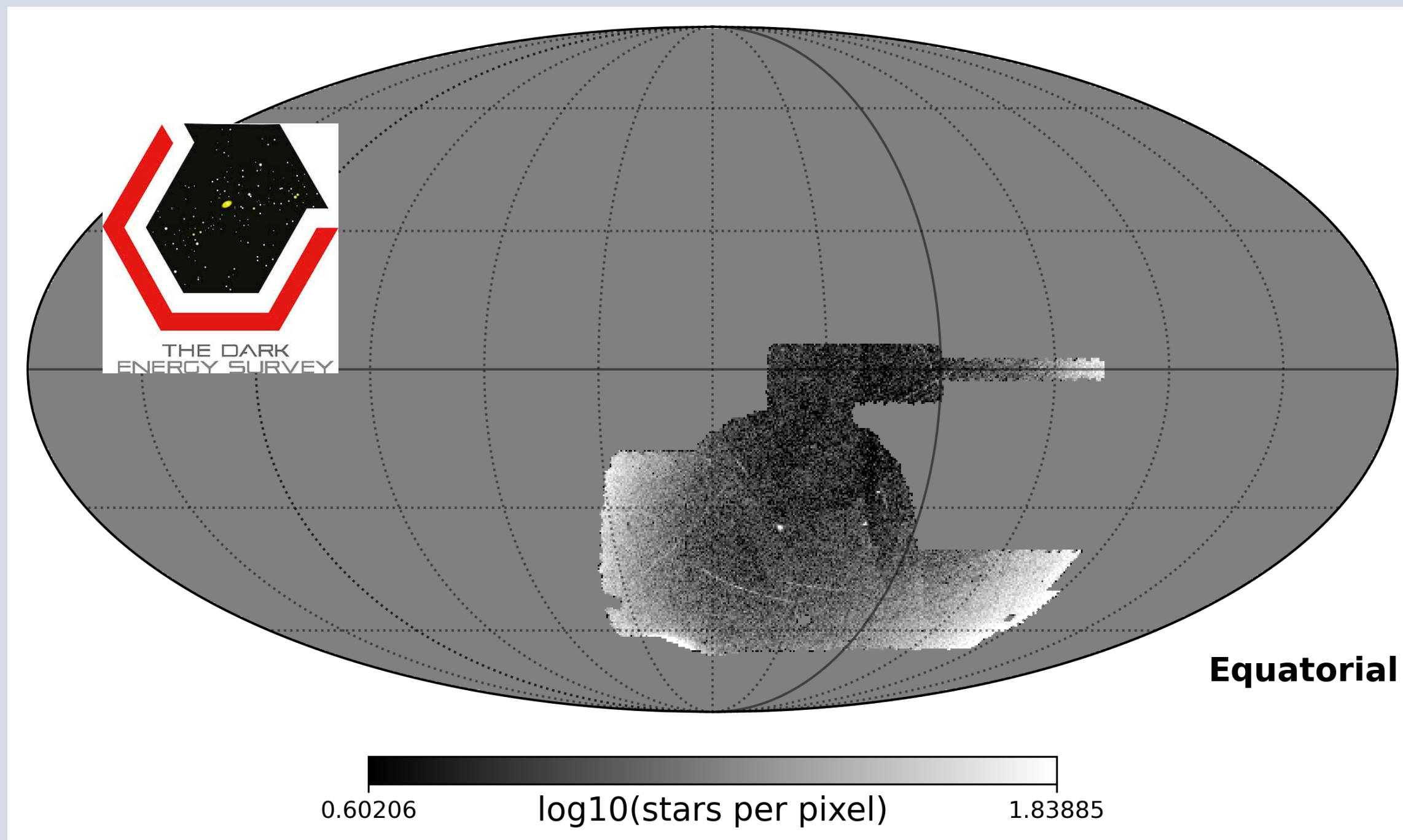


At the node: available positions, velocities, photometry

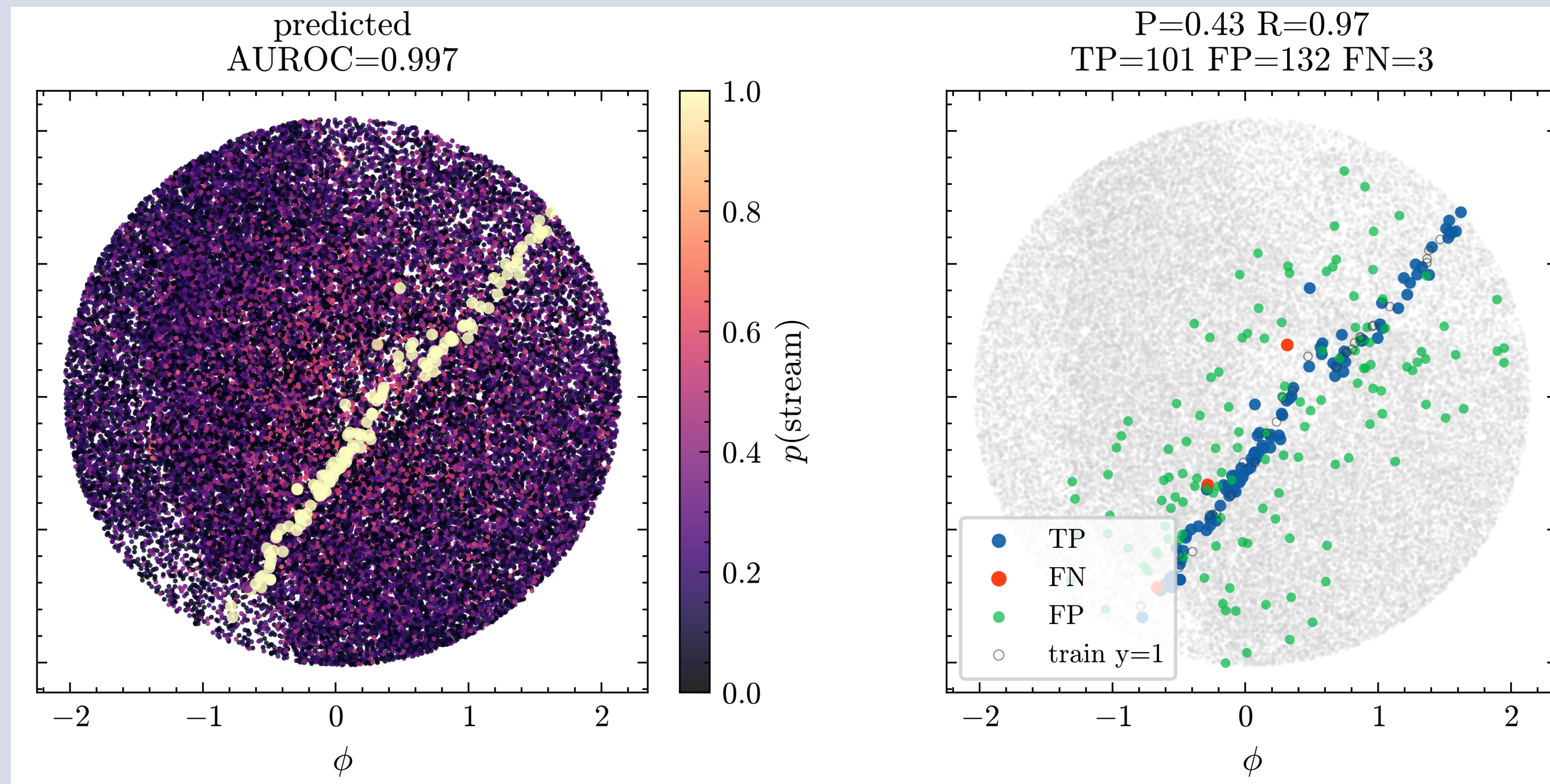
The inductive bias is that membership is not independent: whether a star belongs to a stream should be informed by whether its local relationships are consistent with a coherent structure.



Controlled supervision: partial labels by construction



Next steps: what we actually want to learn / scaling



- Optimization/ hyper parameter transfer
- Preparing for upcoming surveys Rubin, Roman
- Minimum info to find stream
- Do edges help? *including hyperedges!