



The Quenching of a Distant Milky Way Satellite

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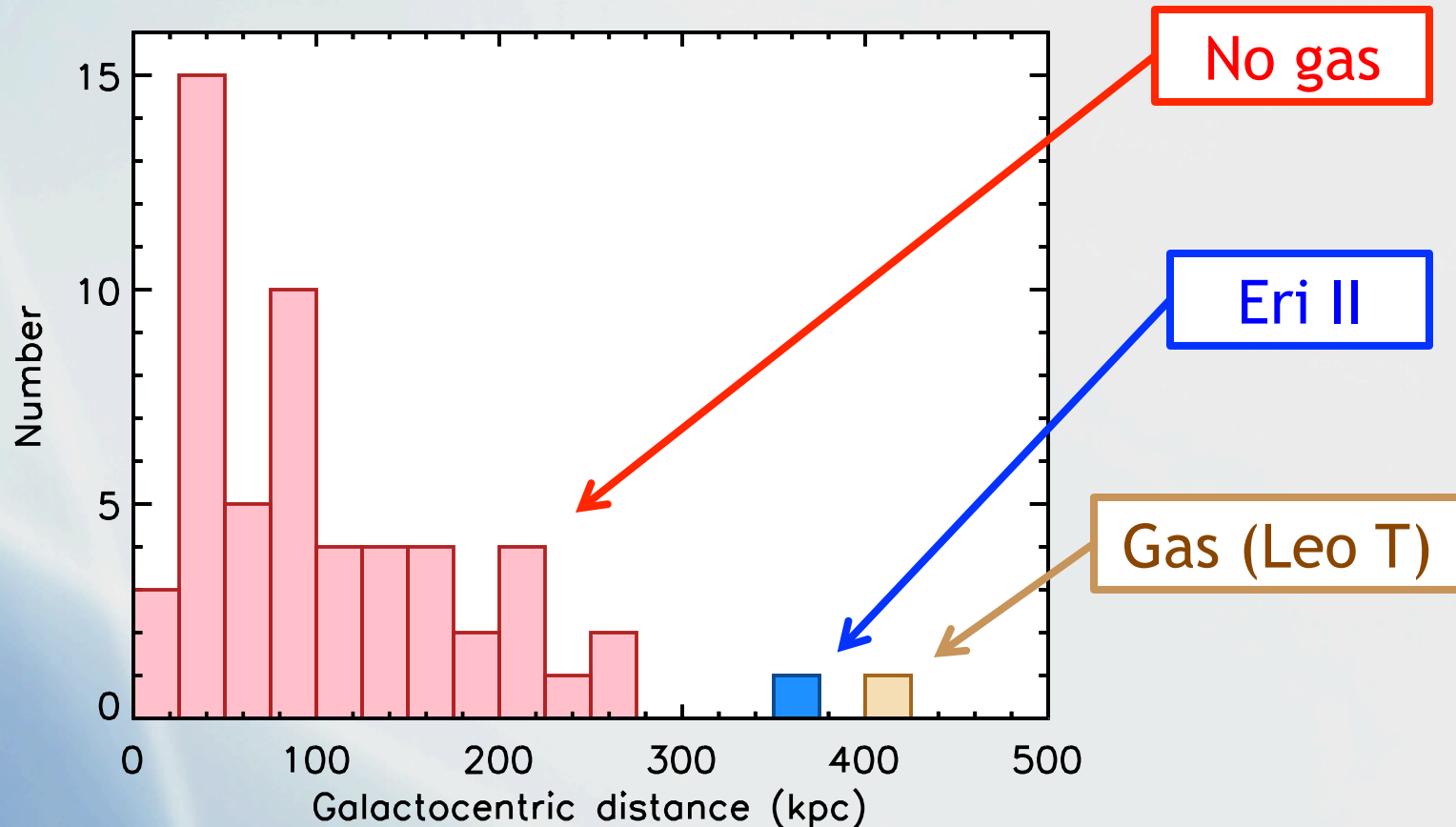
Also featuring: Tom Brown, Roberto Avila, Keith Bechtol, Gisella Clementini, Denija Crnojevic, Alex Drlica-Wagner, Marla Geha, Dave Sand, Jay Strader, and Beth Willman

Basic Properties of Eri II

- $M_V = -7.1 \pm 0.3$
 - $r_{\text{half}} = 277 \pm 14 \text{ pc}$
 - $D = 366 \pm 17 \text{ kpc}$
- Crnojevic et al. (2016)
- $v_{\text{hel}} = 75.6 \pm 1.3 \text{ km s}^{-1}$
 - $\sigma = 6.9^{+1.2}_{-0.9} \text{ km s}^{-1}$
 - $[\text{Fe}/\text{H}] = -2.38 \pm 0.14$
 - $\sigma_{[\text{Fe}/\text{H}]} = 0.47^{+0.12}_{-0.09} \text{ dex}$
- Li et al. (2017)

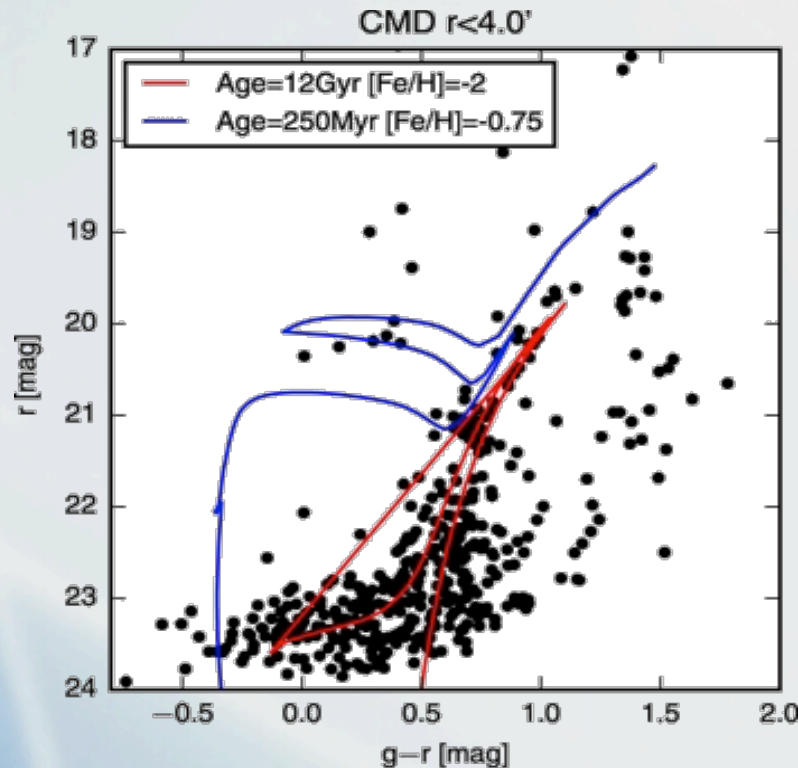
Why Is Eridanus II Interesting?

- Very distant; insight into quenching?



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- Very distant; insight into quenching?
- Possible evidence for young stars



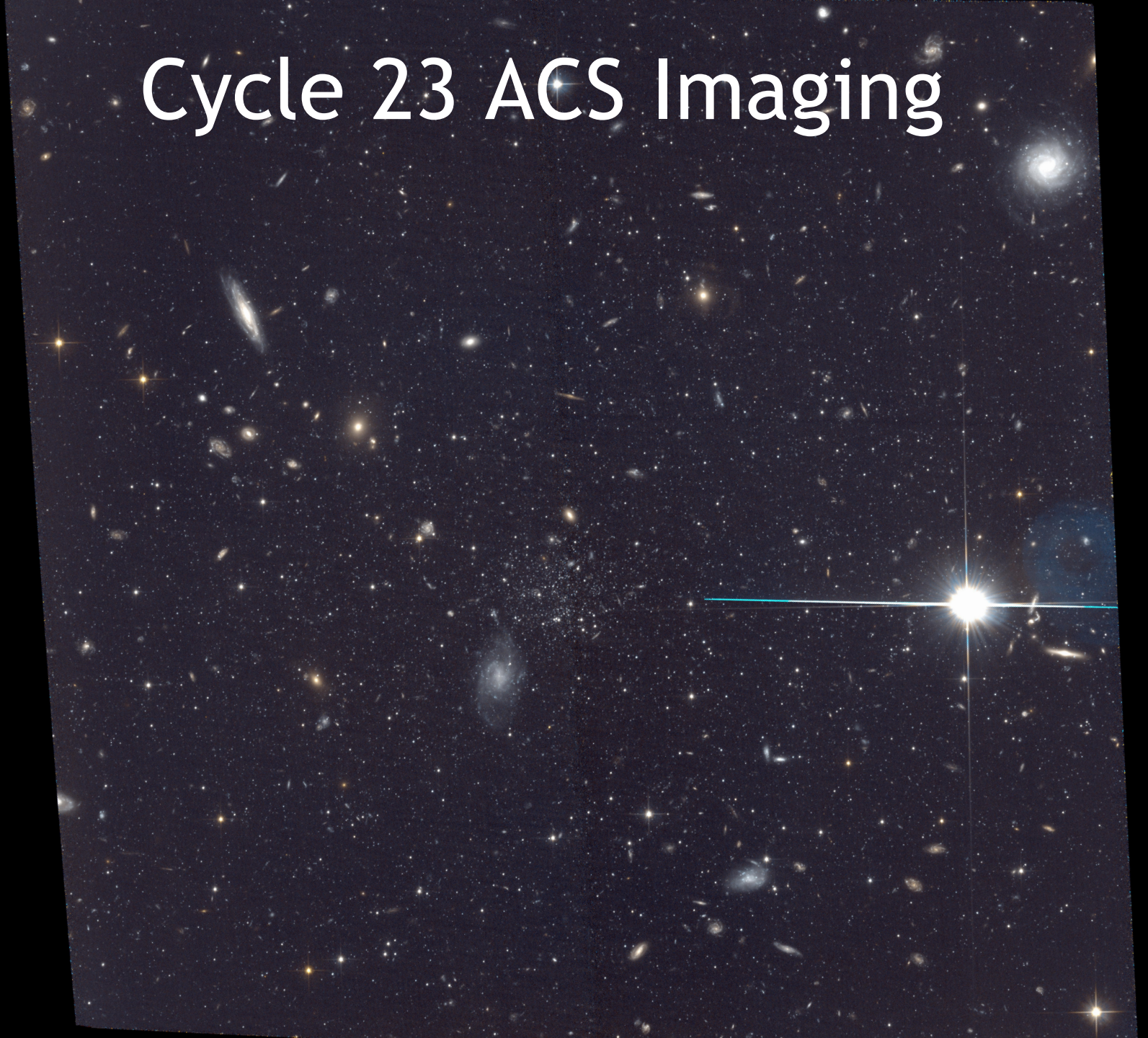
Would be the
lowest luminosity
star-forming galaxy

Why Is Eridanus II Interesting?

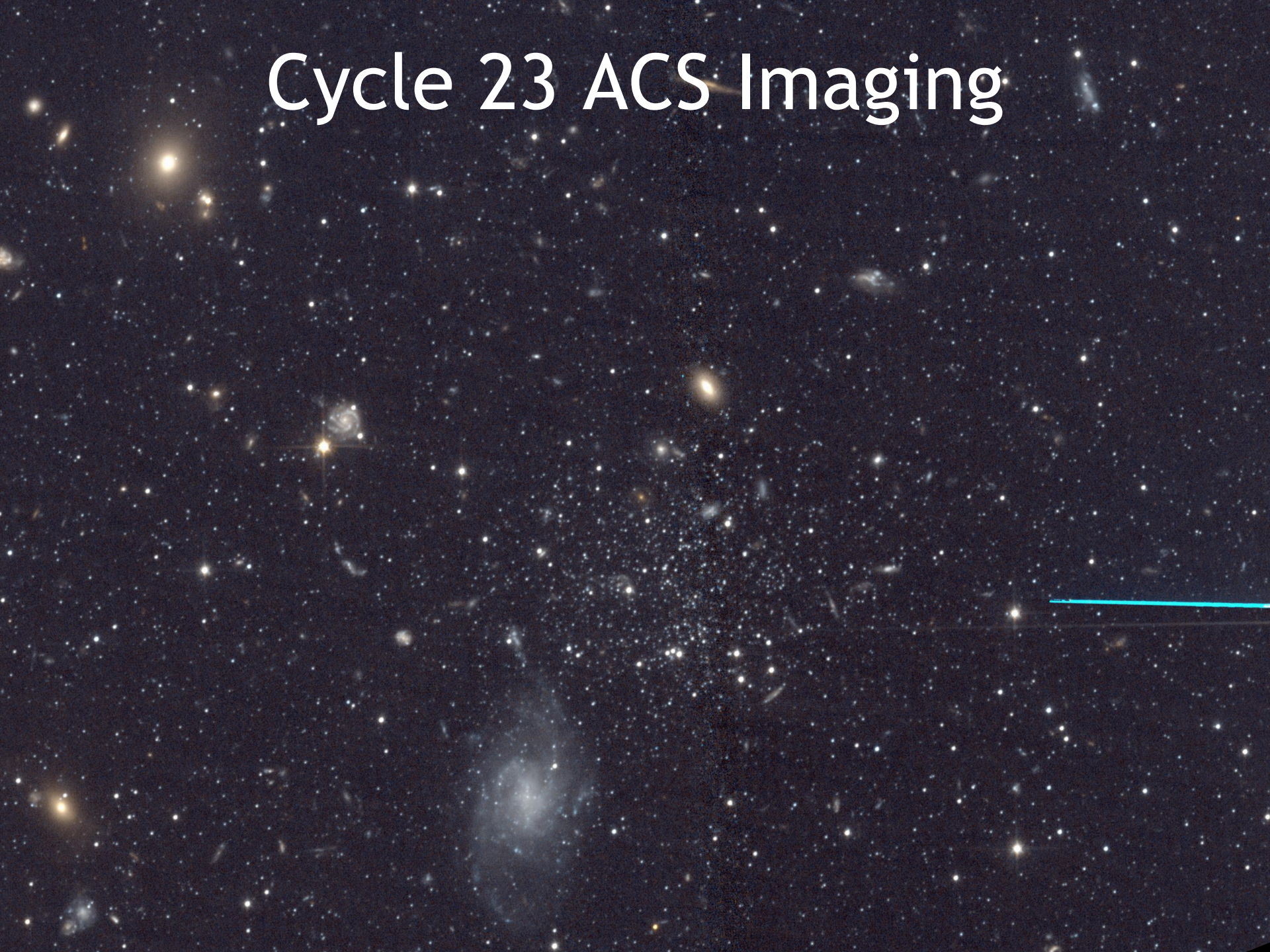
- Very distant; insight into quenching?
- Possible evidence for young stars
- Possible nuclear star cluster



Cycle 23 ACS Imaging



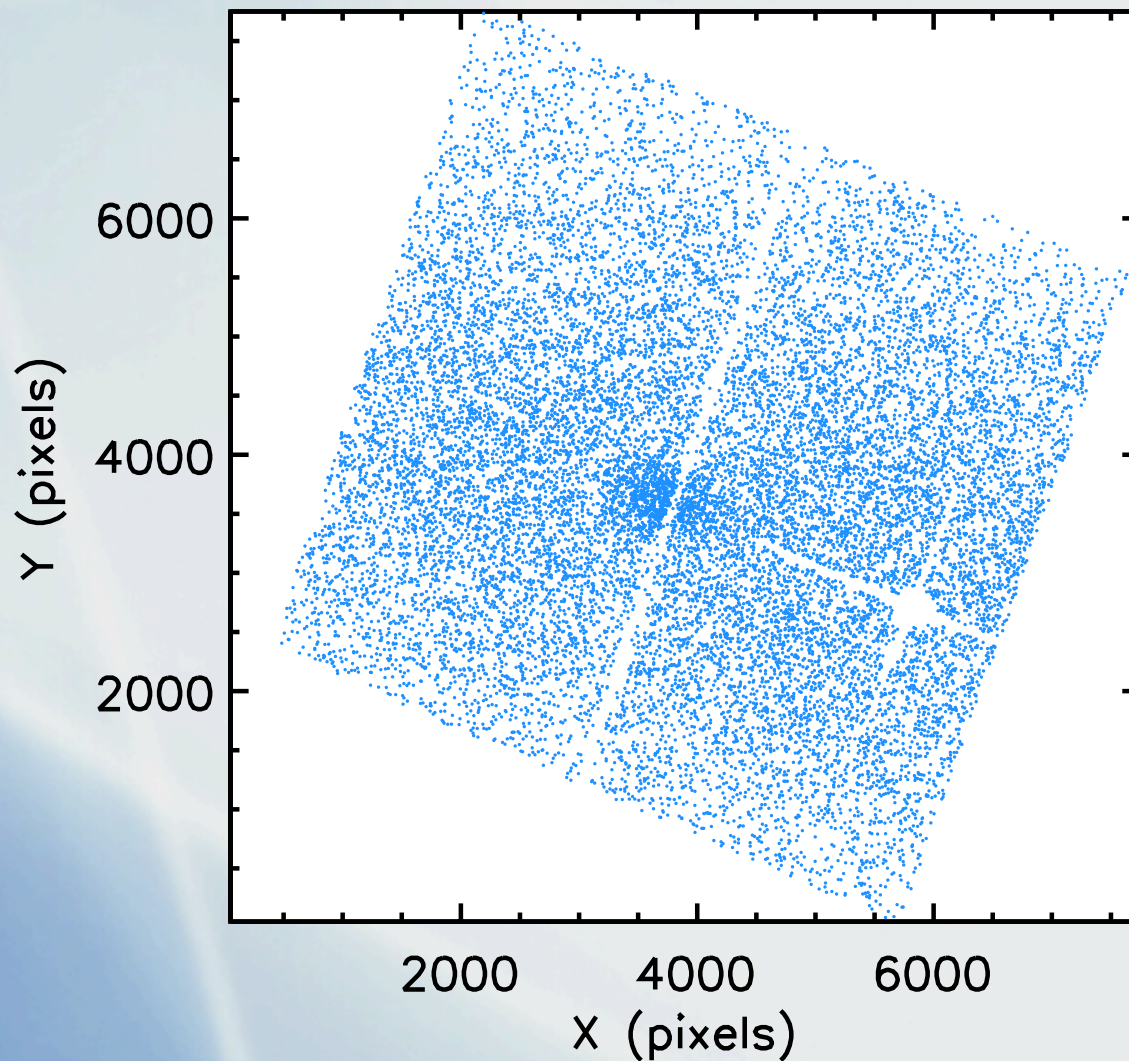
Cycle 23 ACS Imaging



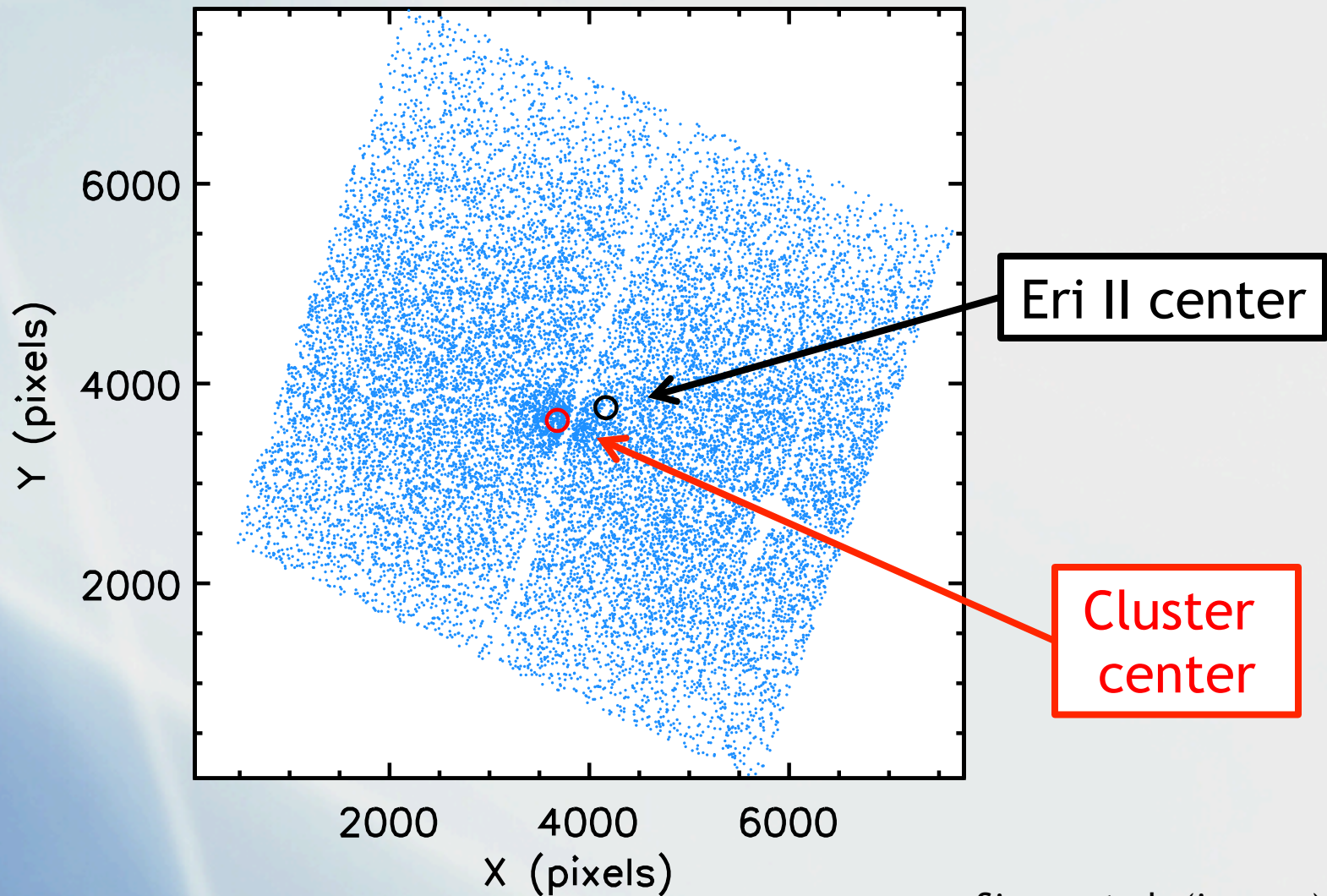
Magellan/Megacam Imaging



Spatial Map of Eri II Stars



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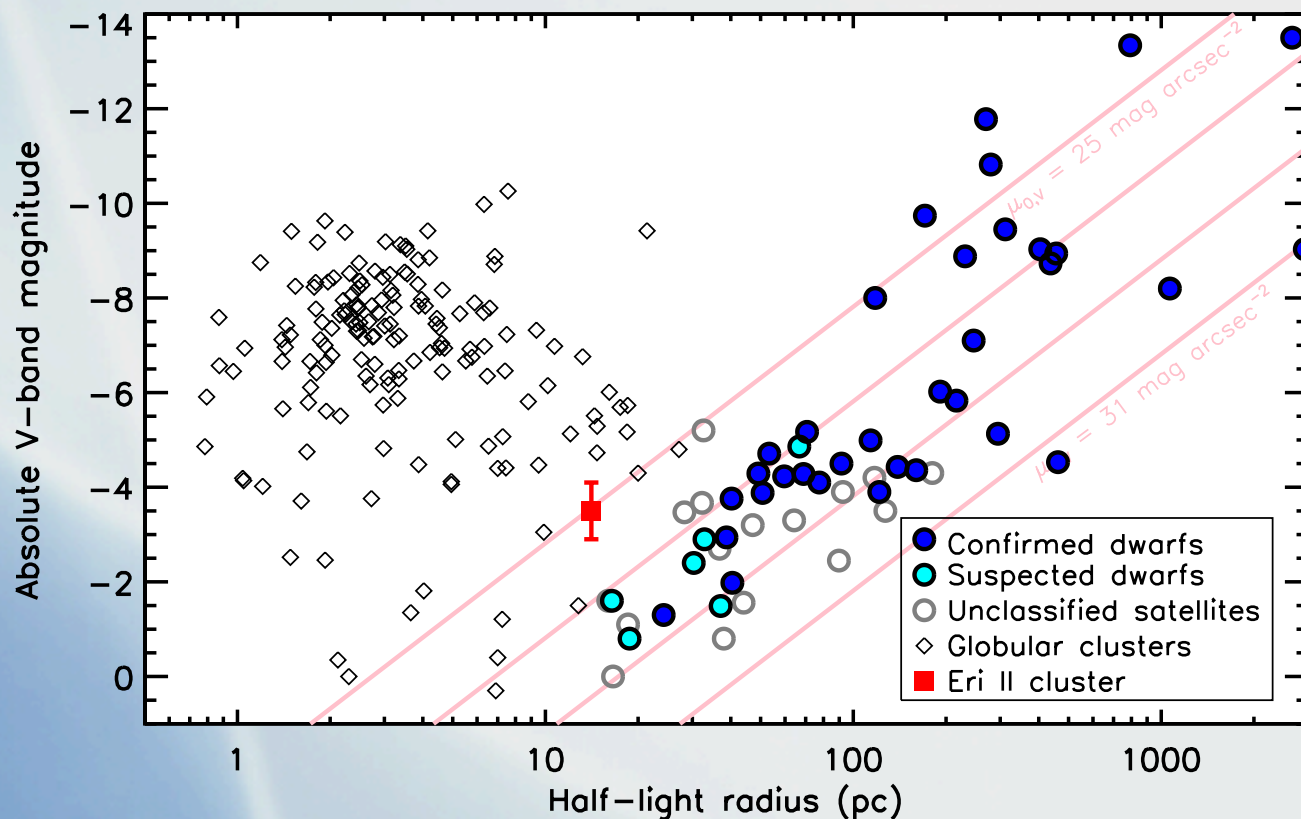


Structural Fit Results

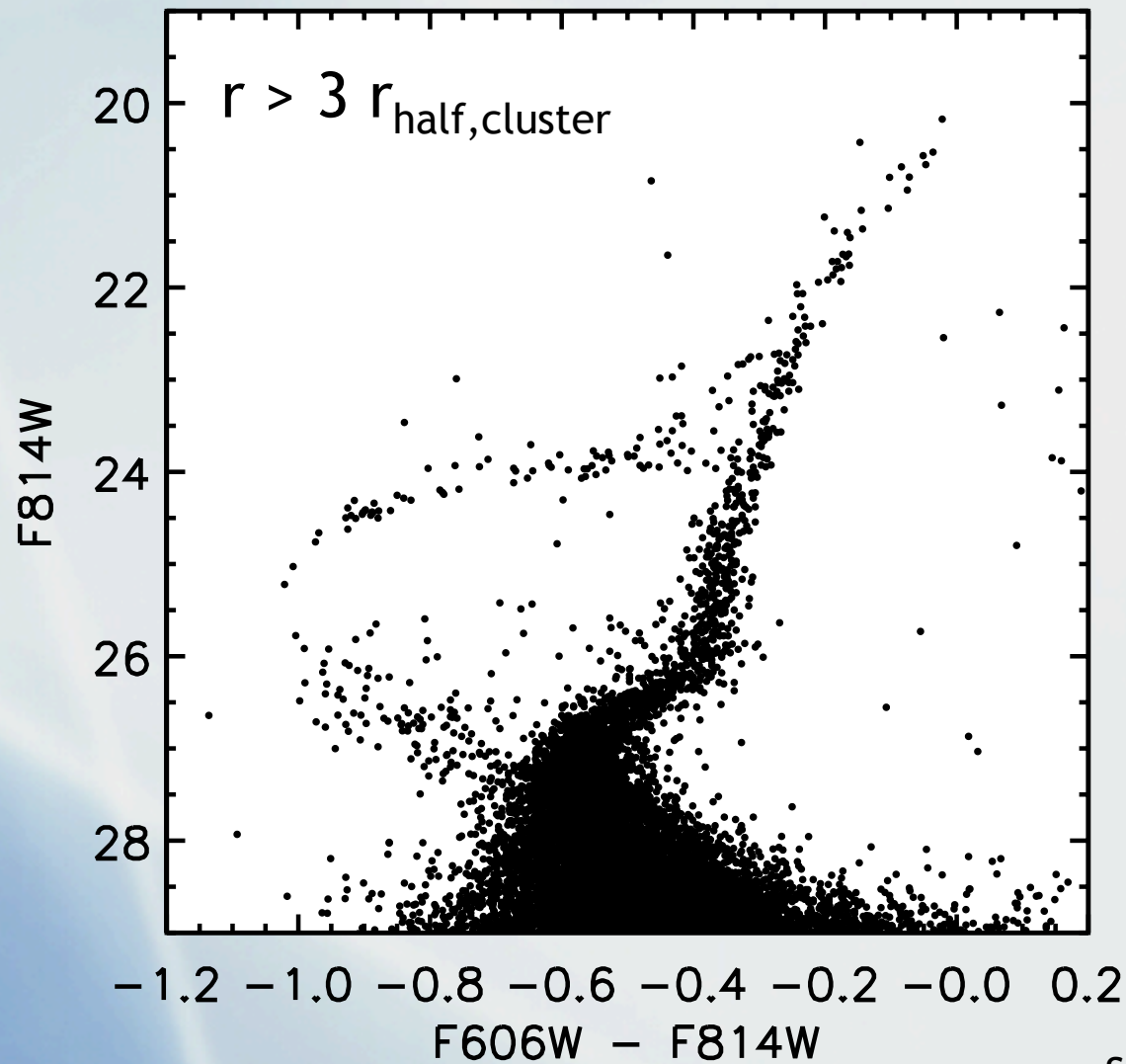
- Cluster is located 13.8 ± 1.1 arcsec (24 ± 2 pc) away from center of Eri II
- Cluster and galaxy are aligned to within 2 degrees

Eri II Cluster in Context

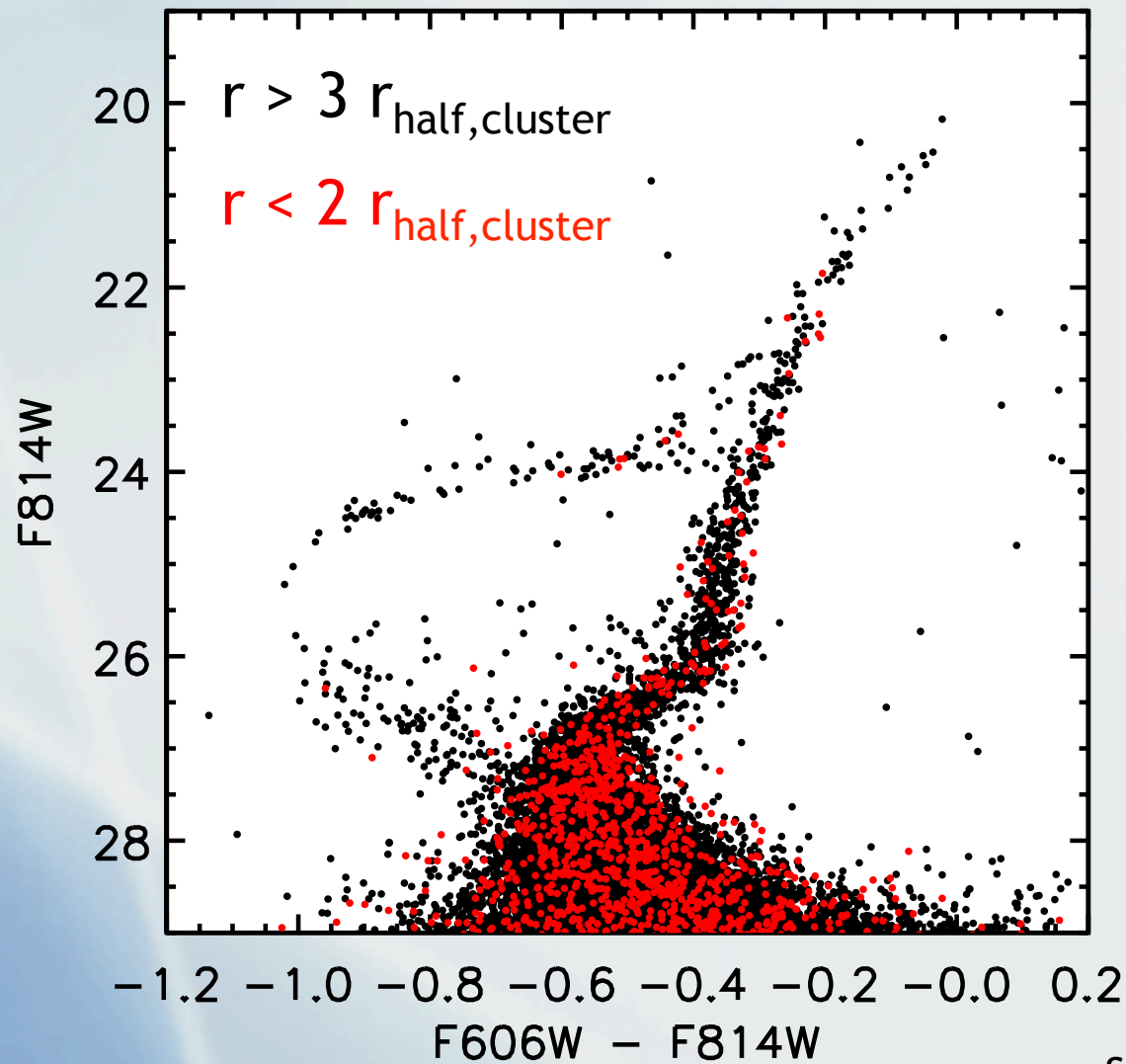
- Cluster is similar to the most diffuse known globulars



Eri II CMD

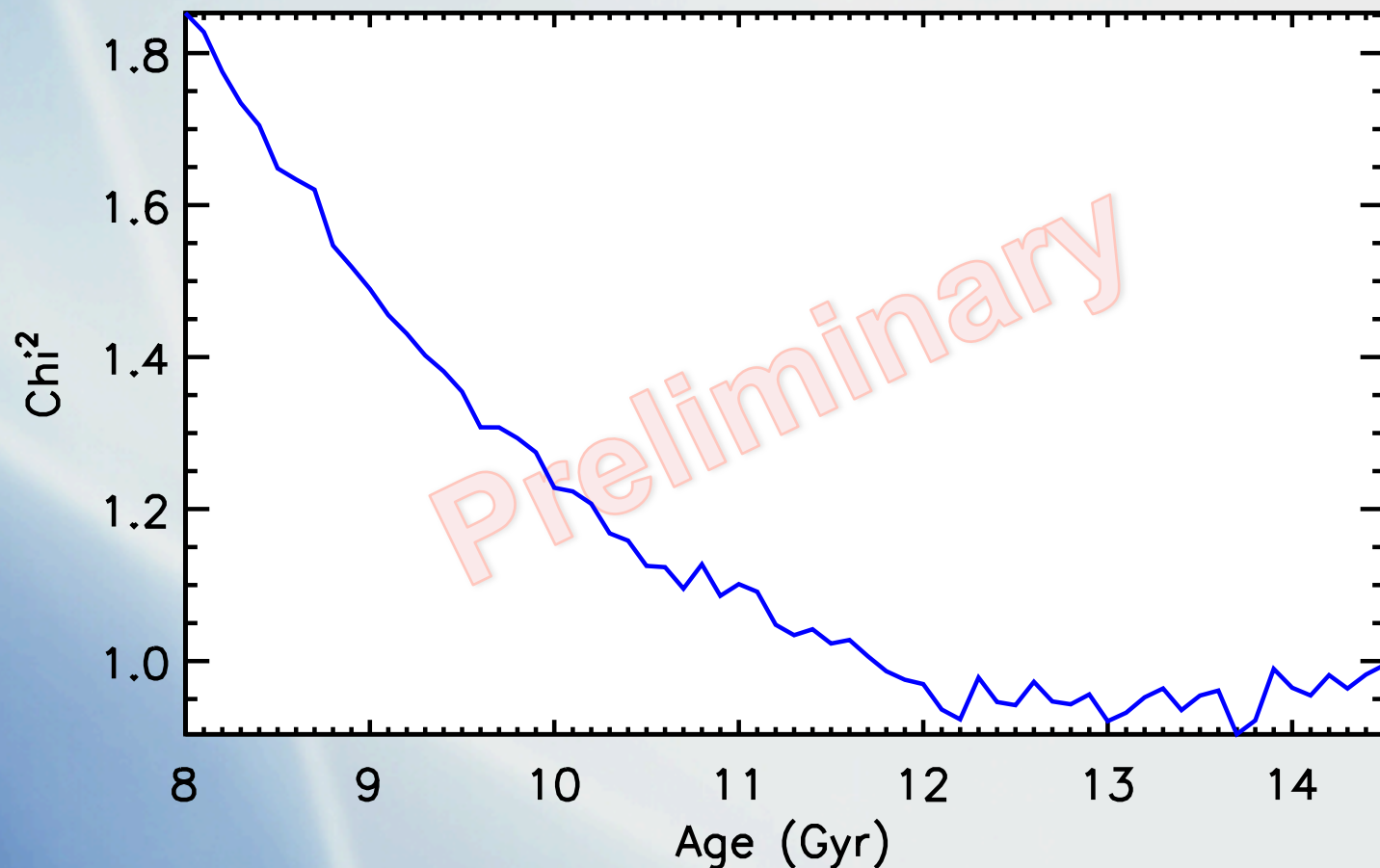


Eri II CMD



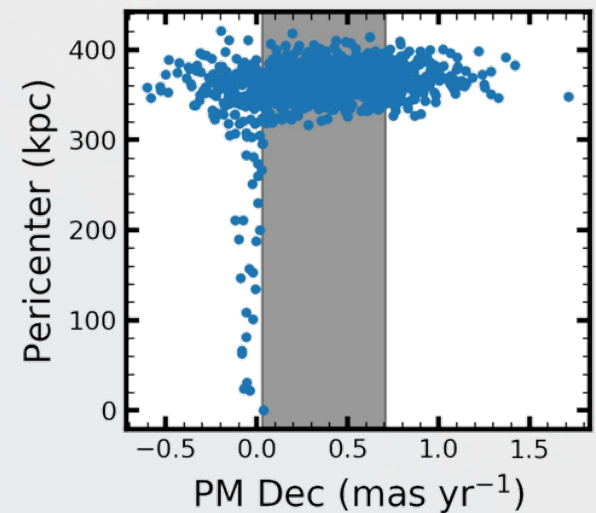
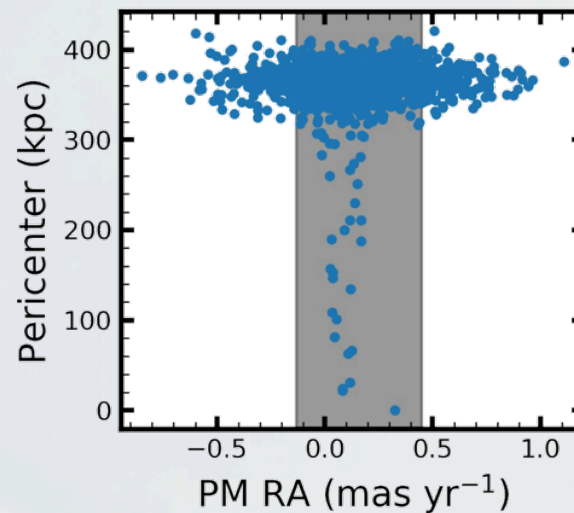
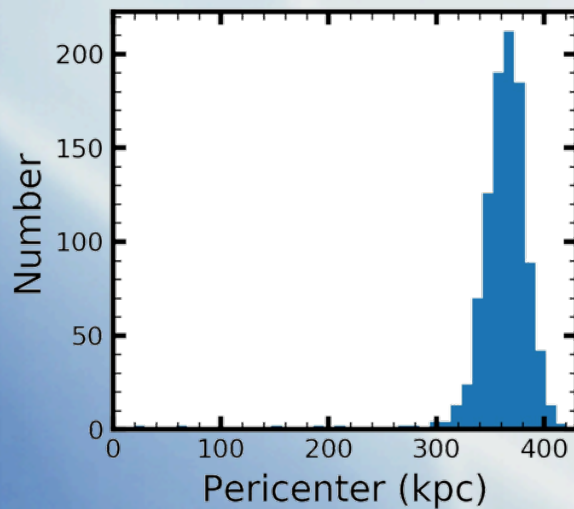
How Old Is Eri II?

- Best-fit age for Eri II is $\sim 13 \pm 1$ Gyr



The Orbit of Eri II

- Eri II is making its first (only?) approach to the Milky Way
- Likely quenched by reionization



RV from Li et al. (2017)

PM from Fritz et al. (2018)

Distance from Crnojevic et al. (2016)

Simon et al. (in prep)

Summary

- HST imaging of Eridanus II down to the MSTO shows:
 - 1) Cluster is offset by 24 ± 2 pc from center of Eri II
 - 2) Both cluster and dwarf are uniformly old
 - 3) Age is consistent with time of reionization
 - 4) Orbit suggests Eri II is on its first approach to MW

Eri II likely formed as an isolated UFD
that was quenched by reionization