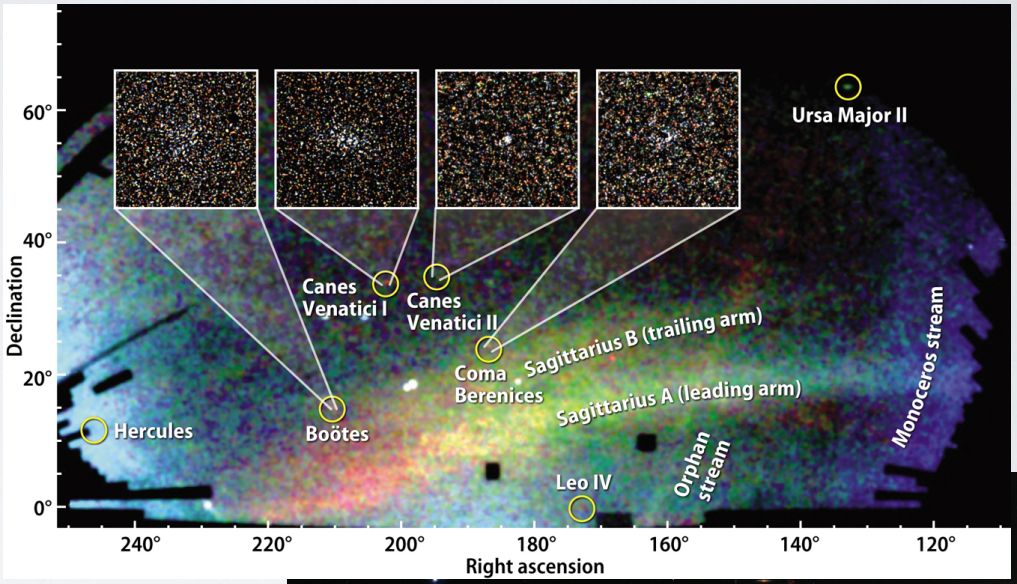
DOES THE MILKY WAY HAVE AN ACCRETED DISK COMPONENT?

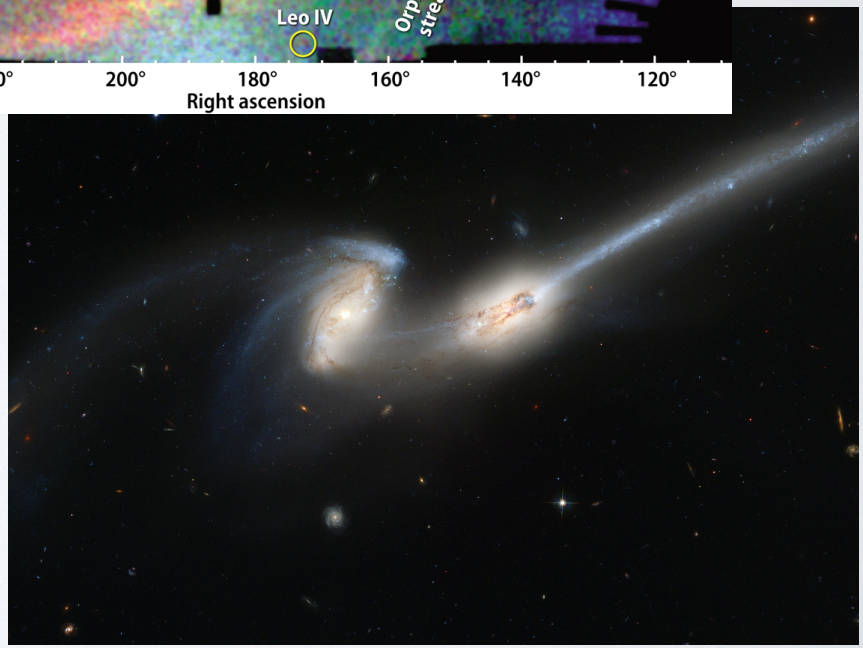
Gregory Ruchti
Lund Observatory

in collaboration with:
Justin Read, Sofia Feltzing, Thomas Bensby, Antonio Pipino

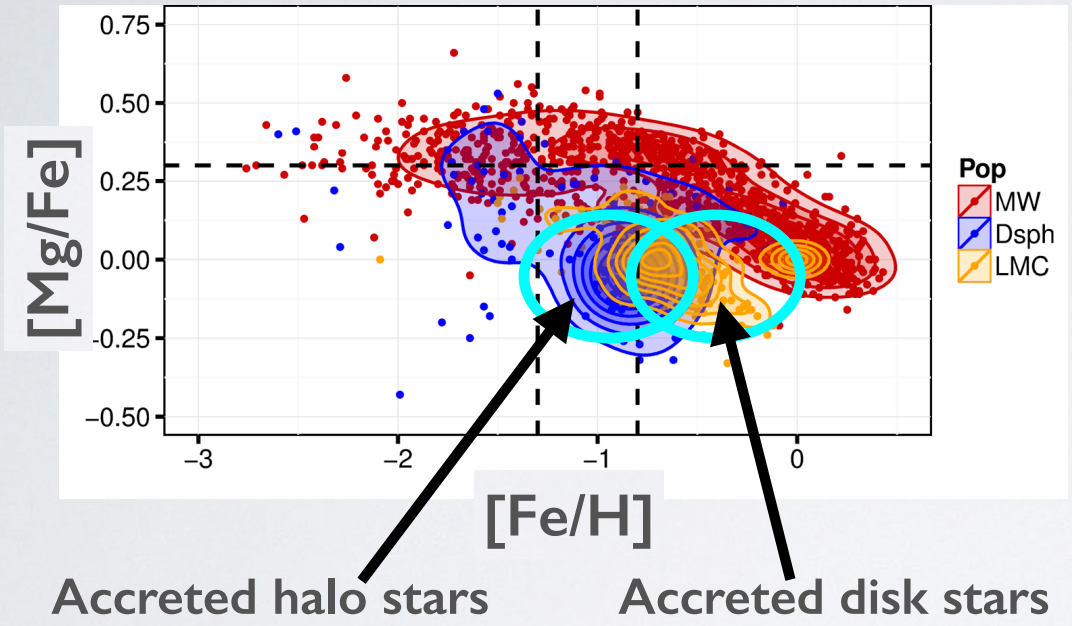
ACCRETED STARS

- Our current cosmology requires the merging and associated accretion of stars and dust to form large-scale structure.
- The halo is most sensitive to small substructures ⟹ *accreted halo stars*
- The disk is more sensitive to massive mergers that reach higher metallicity and suffer from dynamical friction and disk plane dragging
  ⟹ *accreted disk stars*
- Accreted disk stars probe late, massive mergers and the dark matter disk



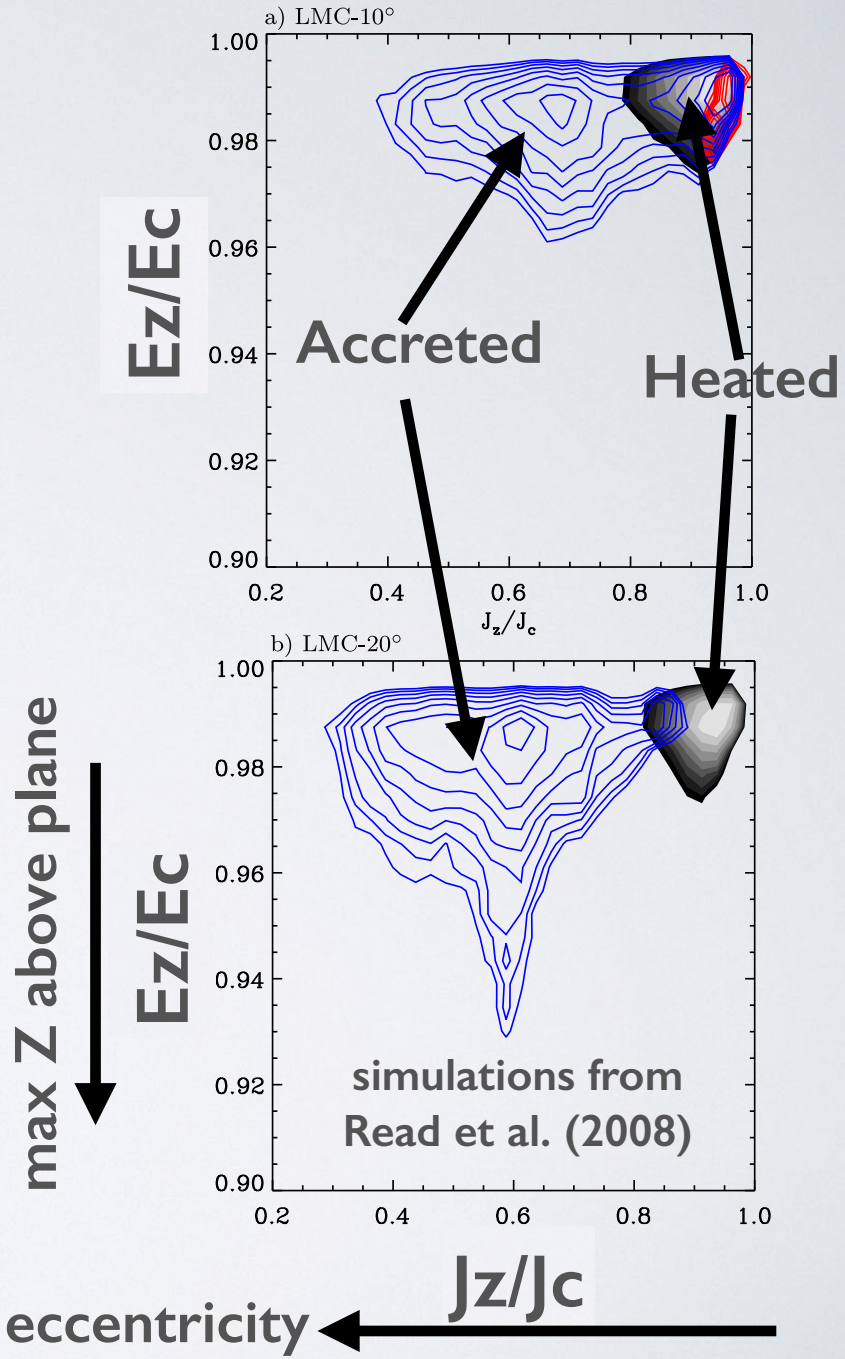


THE CHEMO-DYNAMICAL TEMPLATE

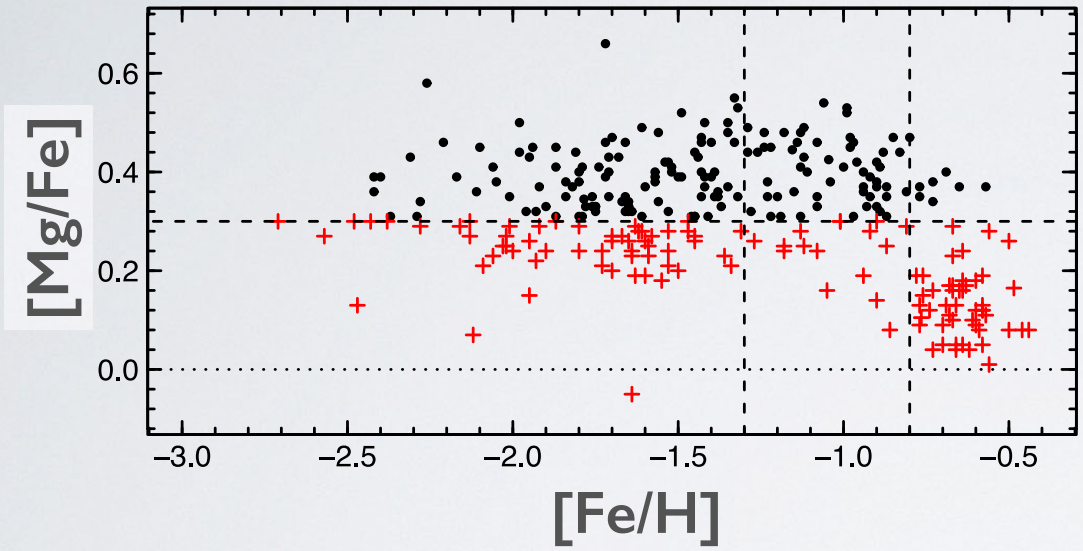


Accreted disk stars inhabit low Ez/Ec and Jz/Jc and low [α/Fe], distinct from Galactic disk stars.

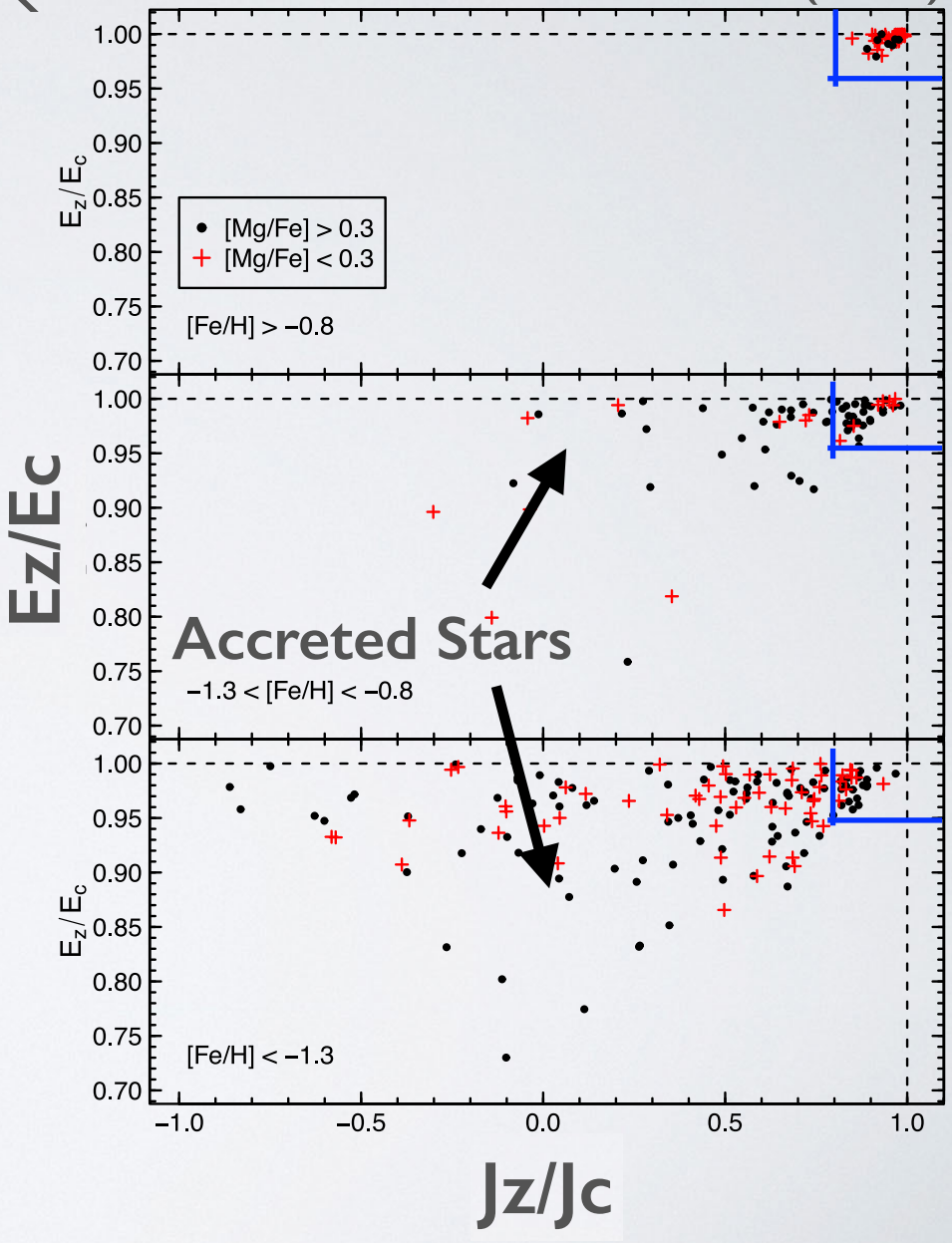
Ruchti et al. (2014)



SEARCHING FOR THE ACCRETED DISK

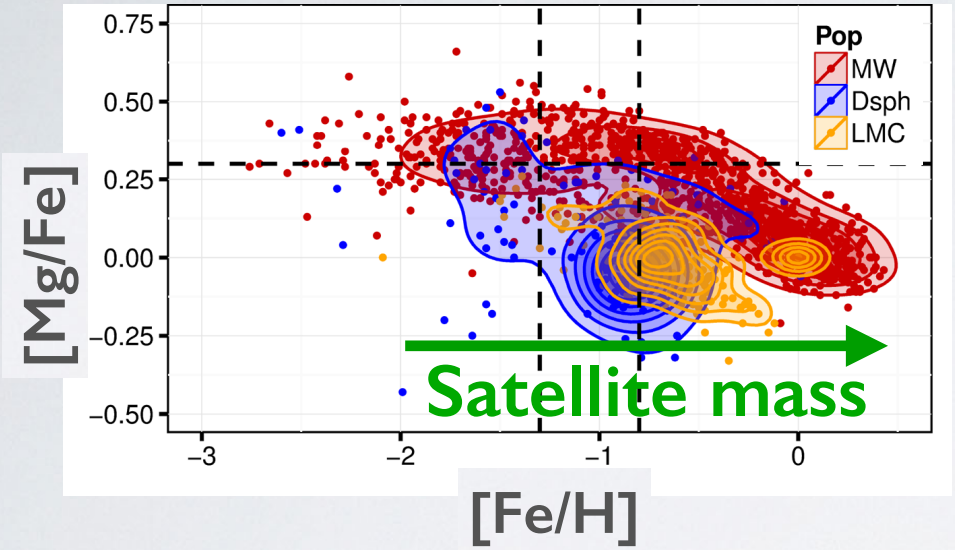


Ruchti et al. (2014)



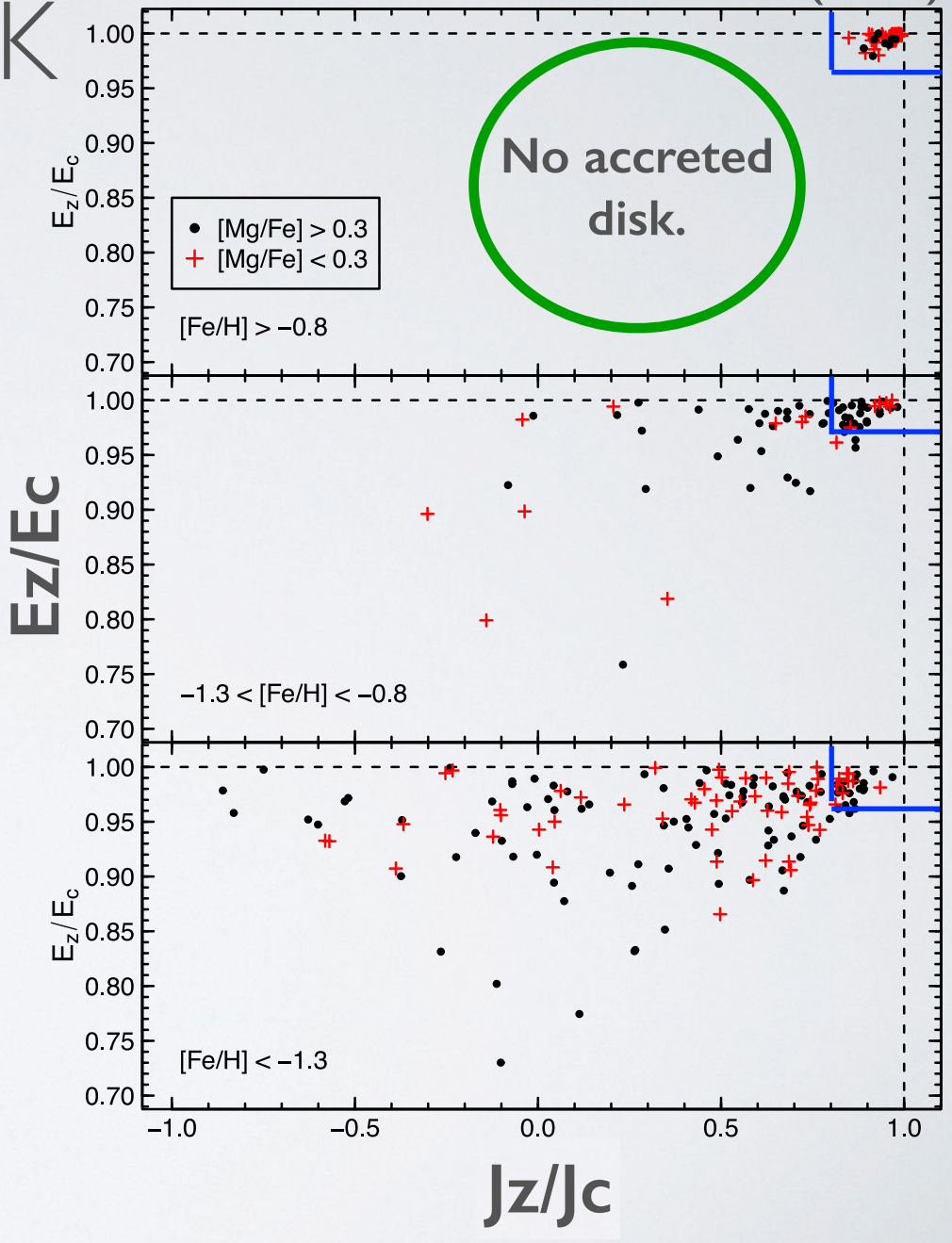
Sample from Ruchti et al. (2011;2013) ~300 stars initially selected to investigate metal-poor disk.

SEARCHING FOR THE ACCRETED DISK



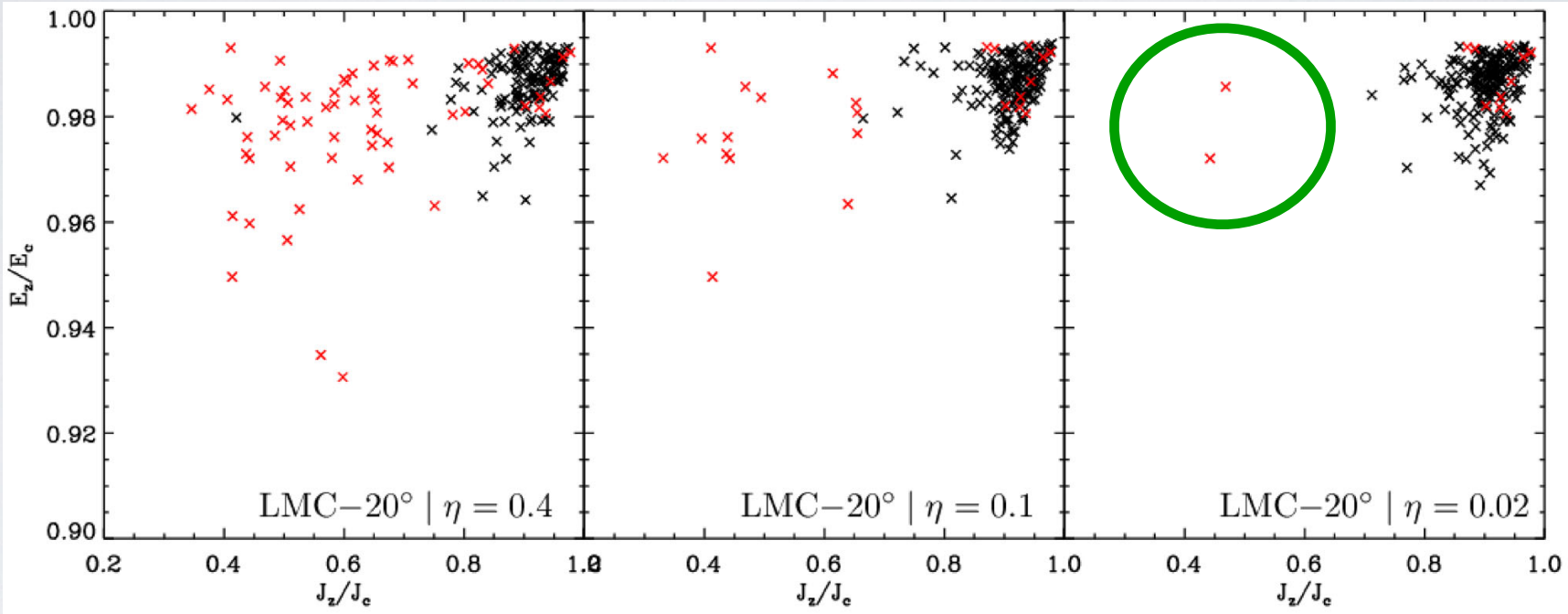
More massive satellites should reach higher [Fe/H], and *we see none* at the highest metallicities!

Ruchti et al. (2014)



COPING WITH SAMPLE BIAS

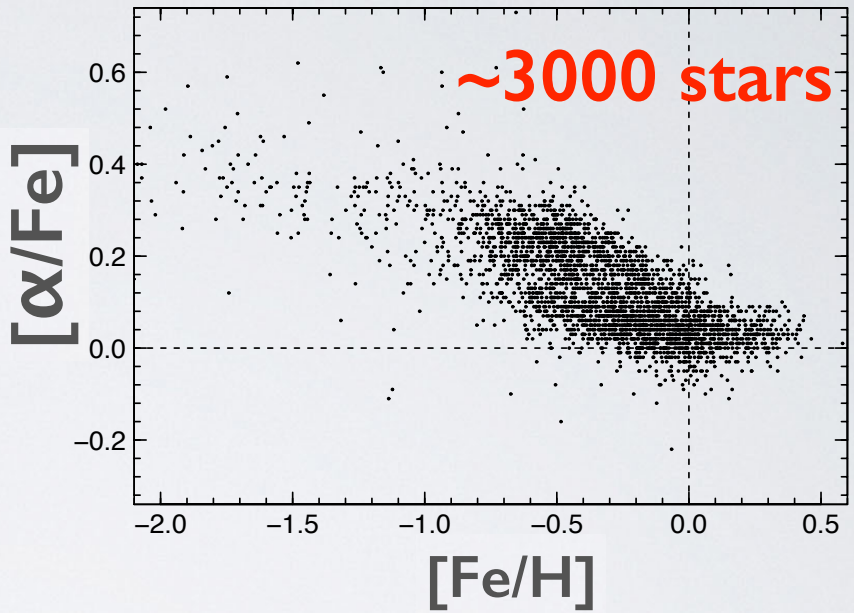
Ruchti et al. (2014)

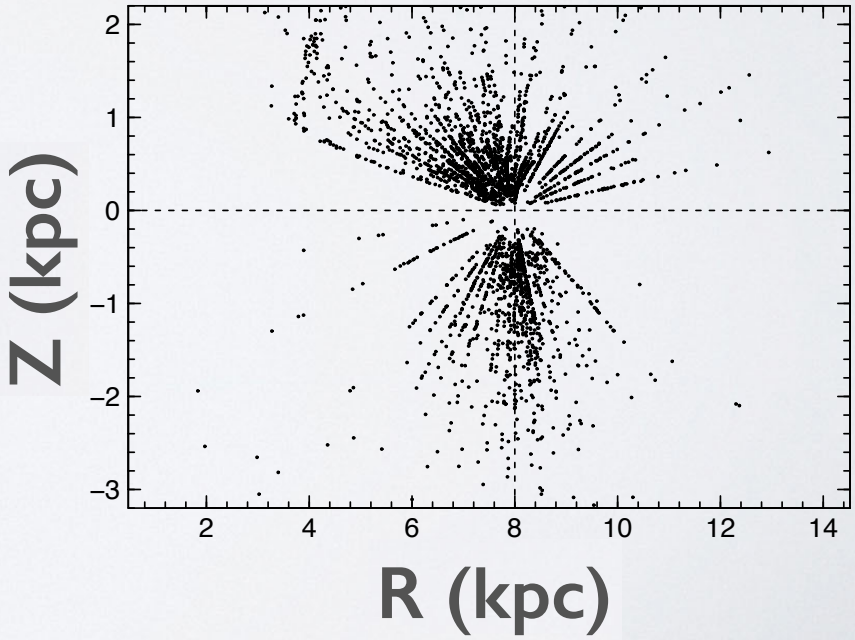


With biases there should be *at least two* at [Fe/H] > -0.8, and *we see none*…

THE GAIA-ESO SURVEY

- Five year survey using ESO VLT to obtain ~100,000 spectra in the Milky Way (see Gilmore et al. 2012).
  - kinematically unbiased!
- DR2 just released, much larger sample to work with.





CONCLUSIONS

- **We built a chemo-dynamical template to identify an *accreted disk component* — detritus from late, massive mergers.**
- **Current evidence suggests the Milky Way had a quiescent merger history and a correspondingly light dark matter disk.**
- **BUT! Possible signs of an accreted disk in the Gaia-ESO Survey.**
- **Stay tuned…**