

Detailed study of the faintest Milky Way satellites using the Pristine CaH&K survey

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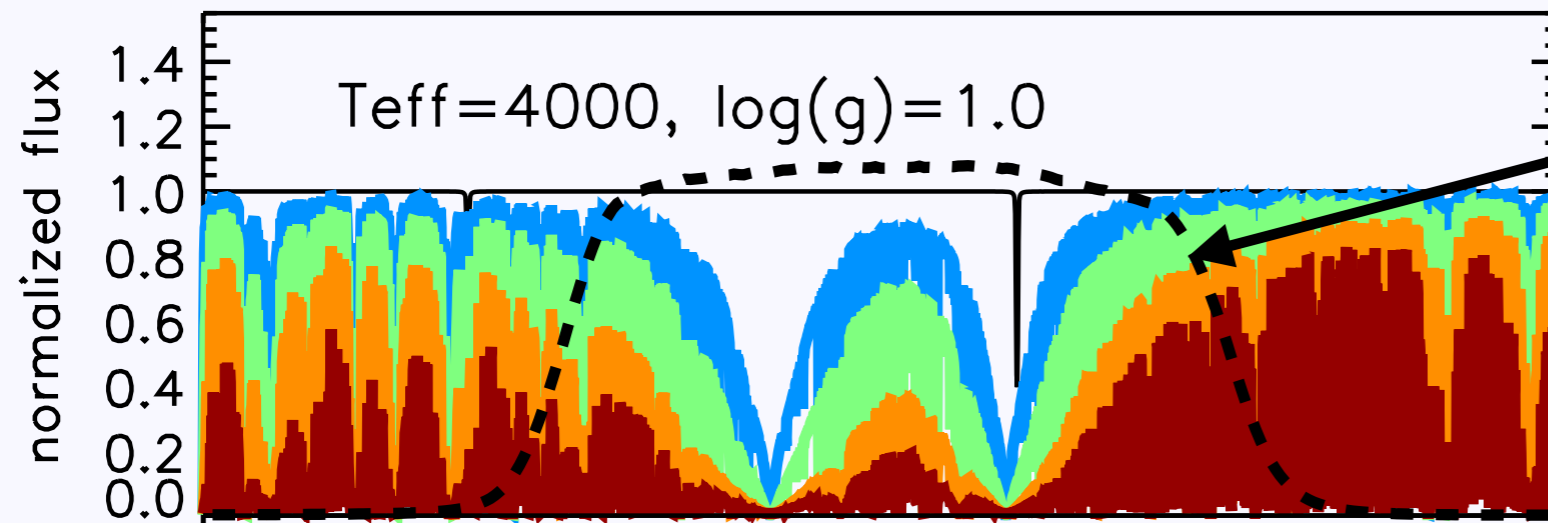
Jean-Charles Cuillandre

What is Pristine ?

- ◆ Narrow-band photometric survey centred on the metallicity-sensitive CaH&K doublet lines
- ◆ 3.6 meters Canadian-France Hawaii Telescope (CFHT) with the wide-field imager Megacam
- ◆ Now covering more than 2000 deg² in the northern hemisphere
- ◆ First data in 2015

CaH&K doublet

Starkenburg, Martin et al. (2017)



CaHK Filter

$[Fe/H] = -3.0$

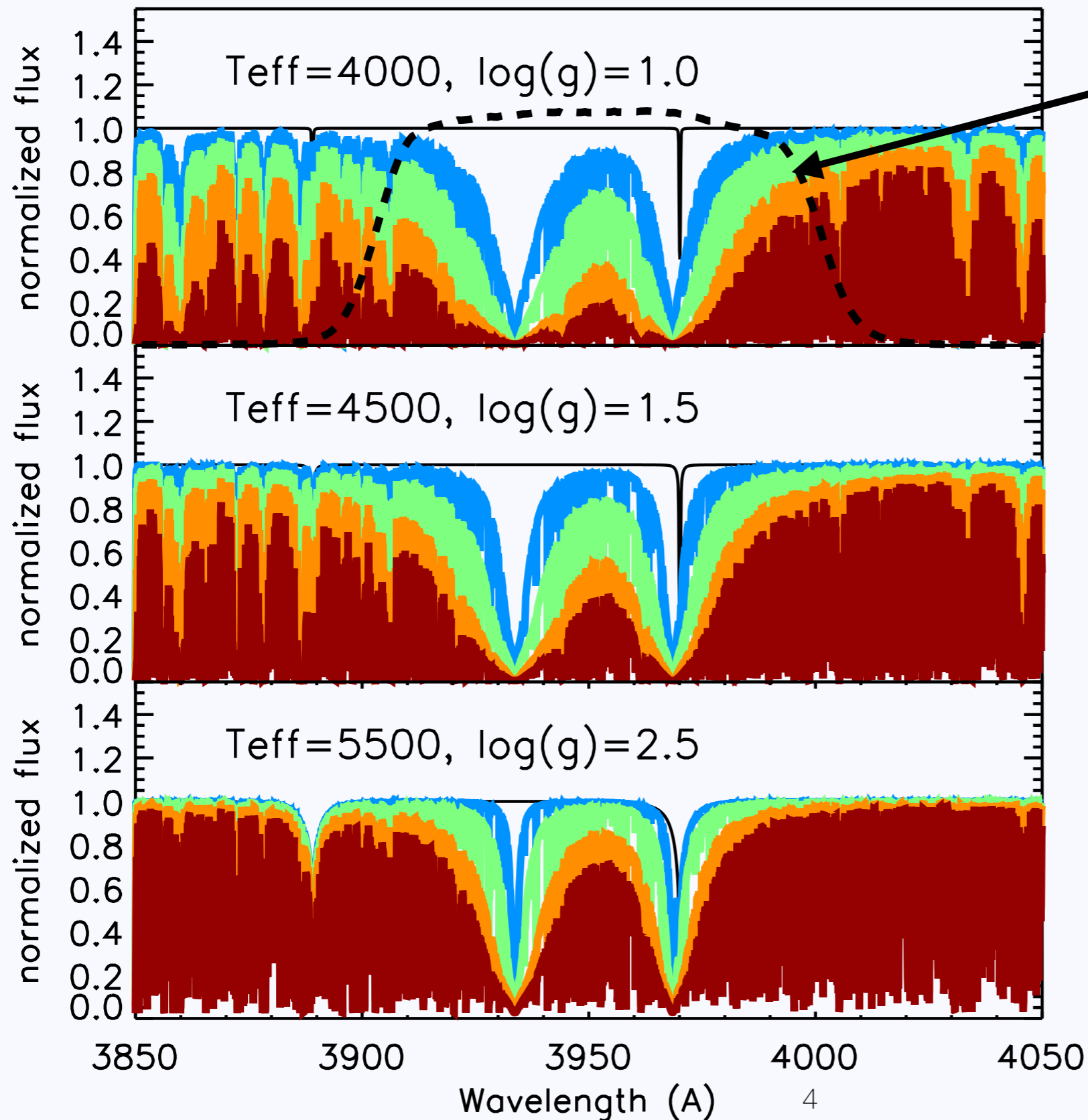
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CaH&K doublet

Starkenburg, Martin et al. (2017)



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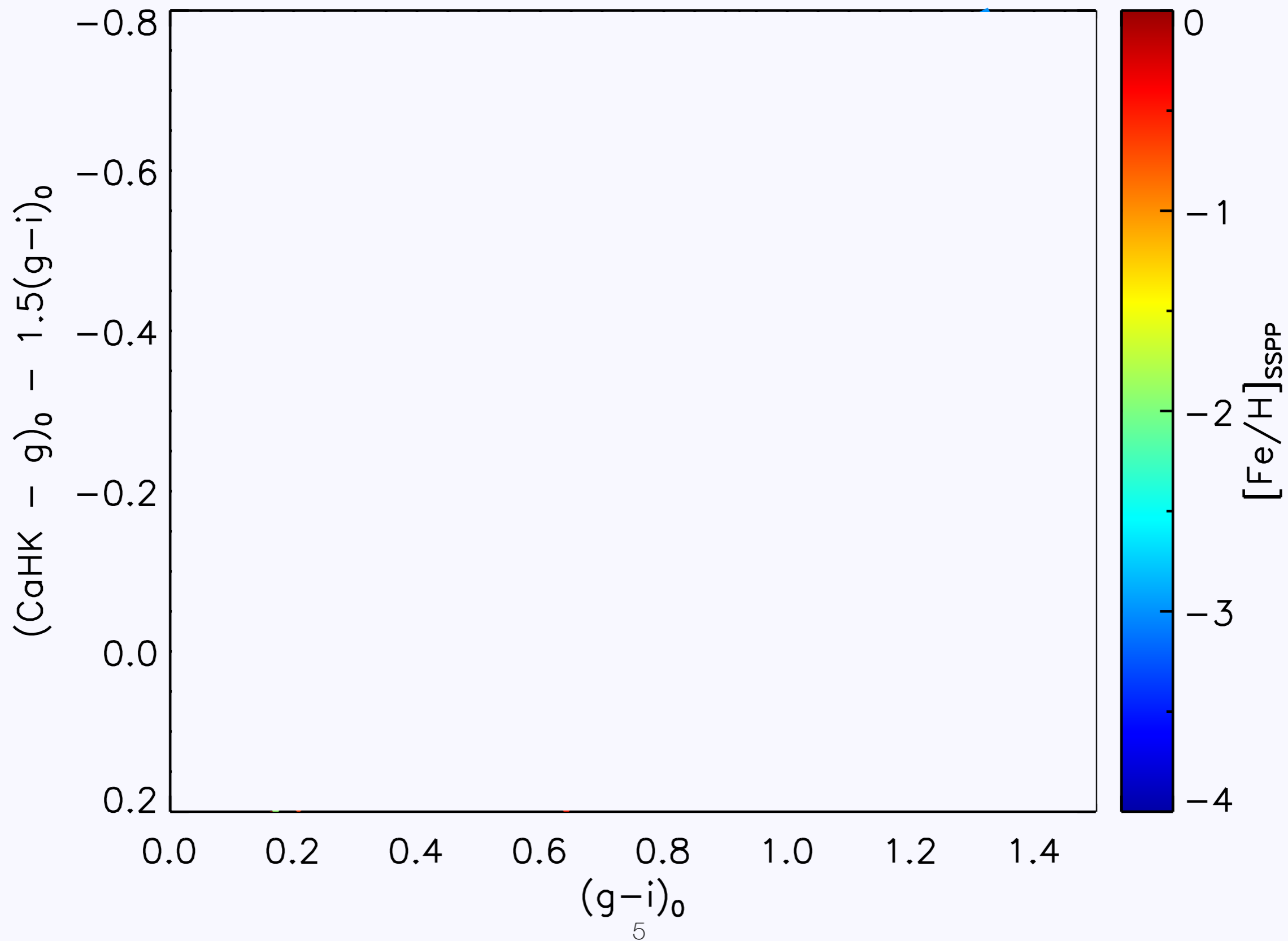
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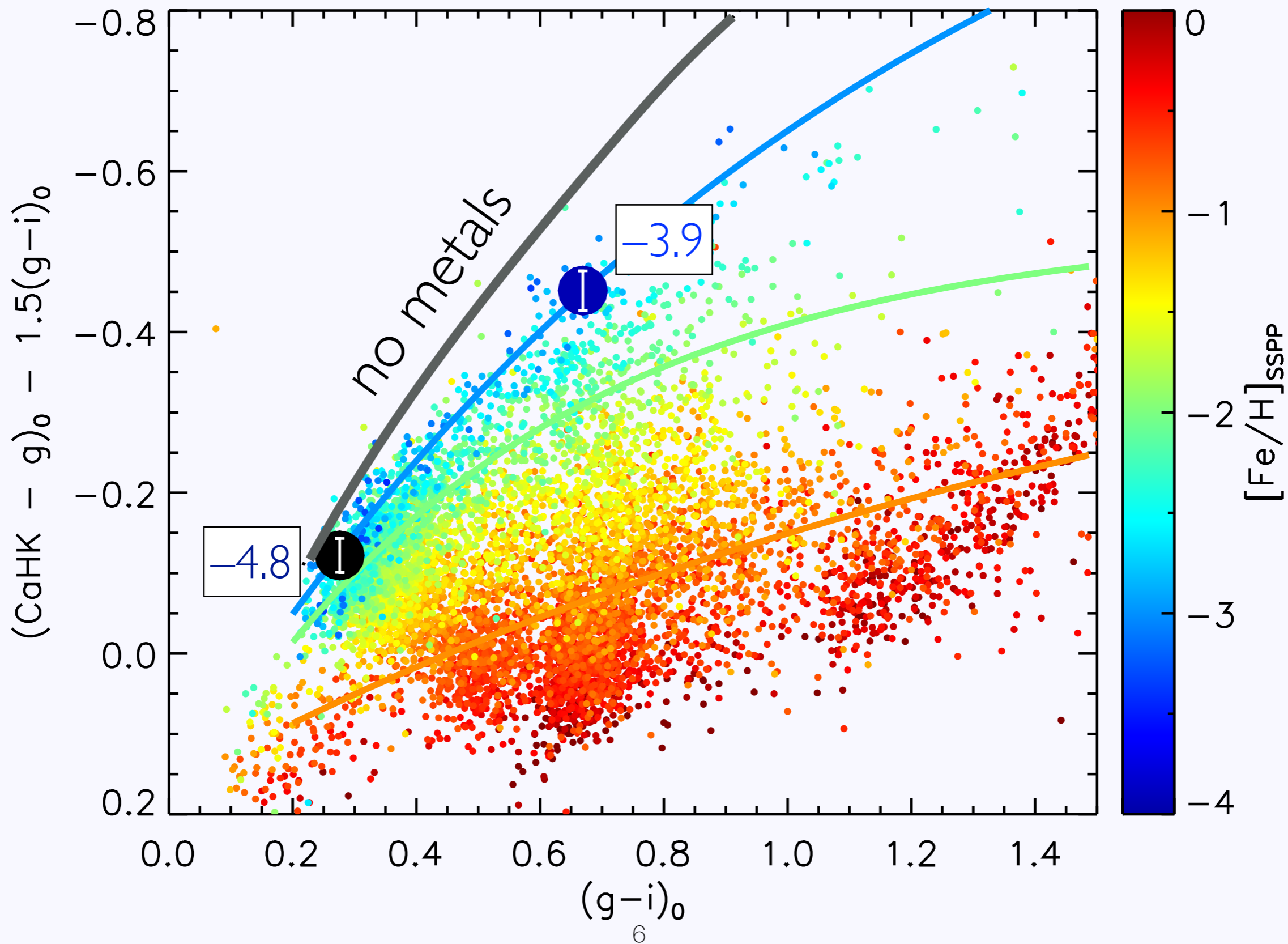
Pristine observations

Starkenburg, Martin et al. (2017)



Pristine observations

Starkenburg, Martin et al. (2017)



Pristine Dwarf Galaxy

Old (> 10 Gyr), metal-poor systems ($[Fe/H] < -2.0$)

- ◆ Faint galaxies
- ◆ Thought to be among the most dark-matter dominated objects
- ◆ Cosmological probes (Missing satellites problem ...)

→ Perform a detailed study of the faintest satellite of the Milky Way

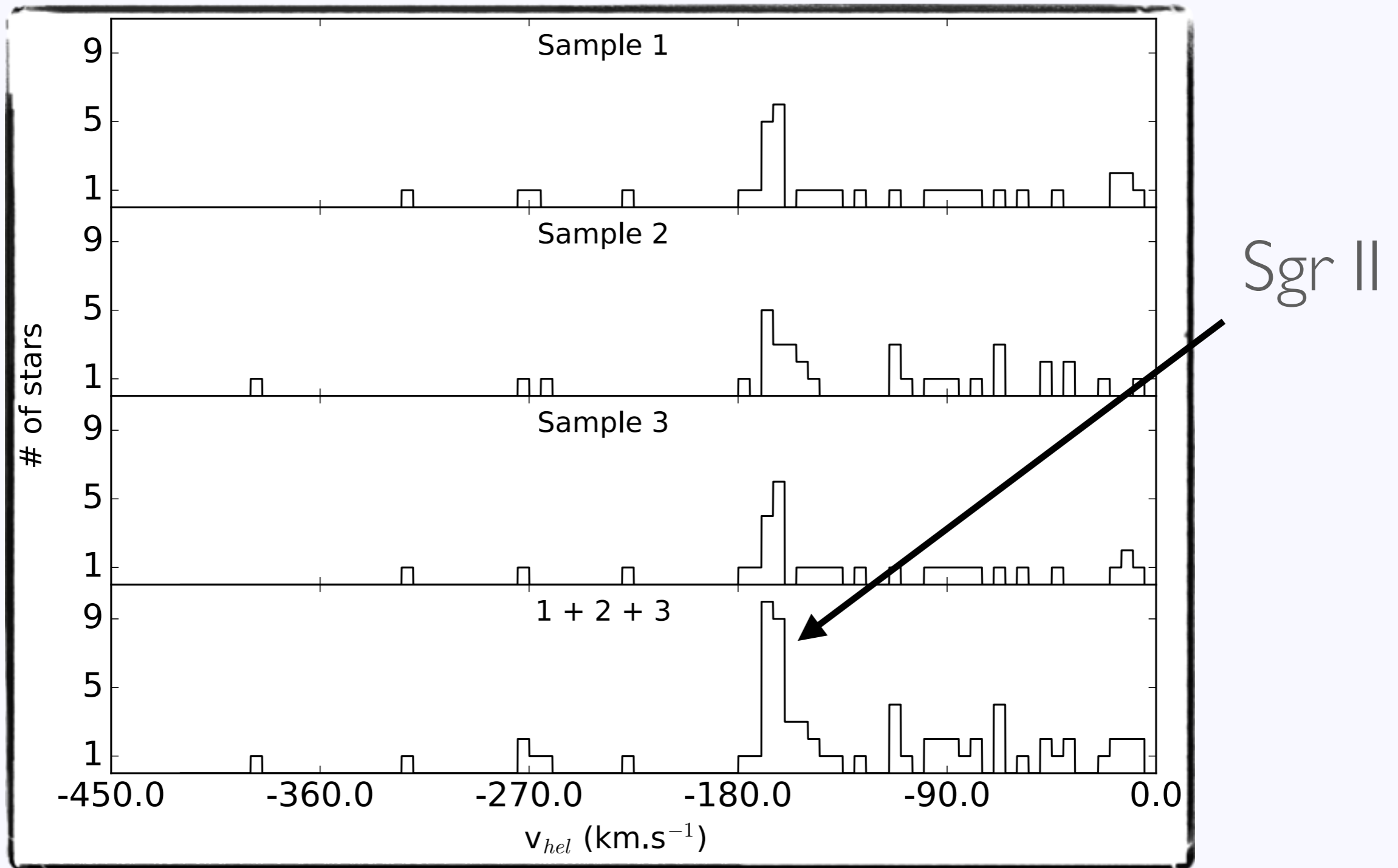
The case of Sagittarius II

- ◆ Discovered in PAN-STARRS by Laevens et al. 2015
- ◆ Size of 38 pc, at a distance of 68 kpc
- ◆ ~ 8000 solar luminosities

→ Metallicity ? Dynamics ?

The case of Sagittarius II

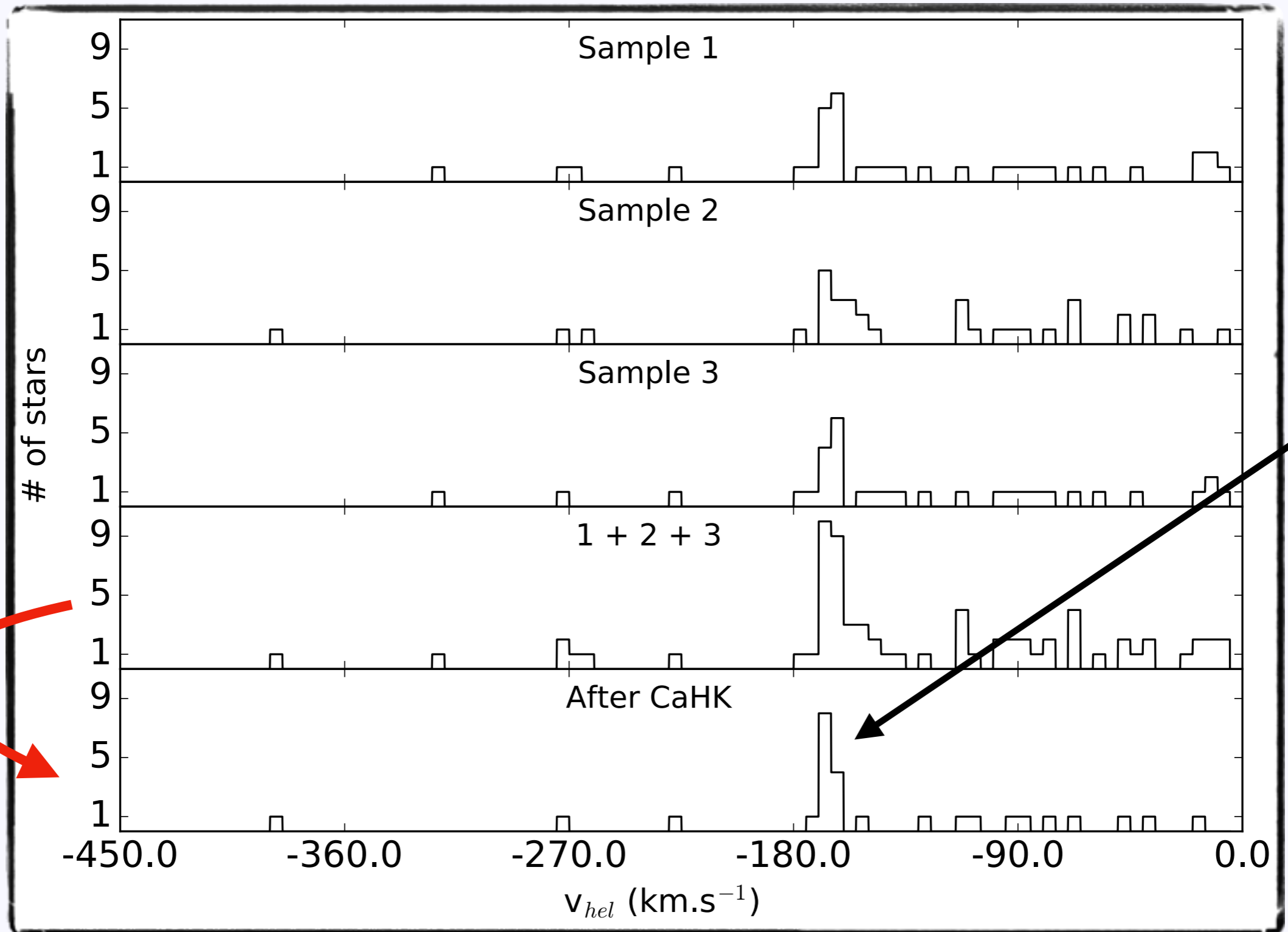
Longeard, Martin et al. (in prep.)



Only a handful of stars → Contamination sensitive

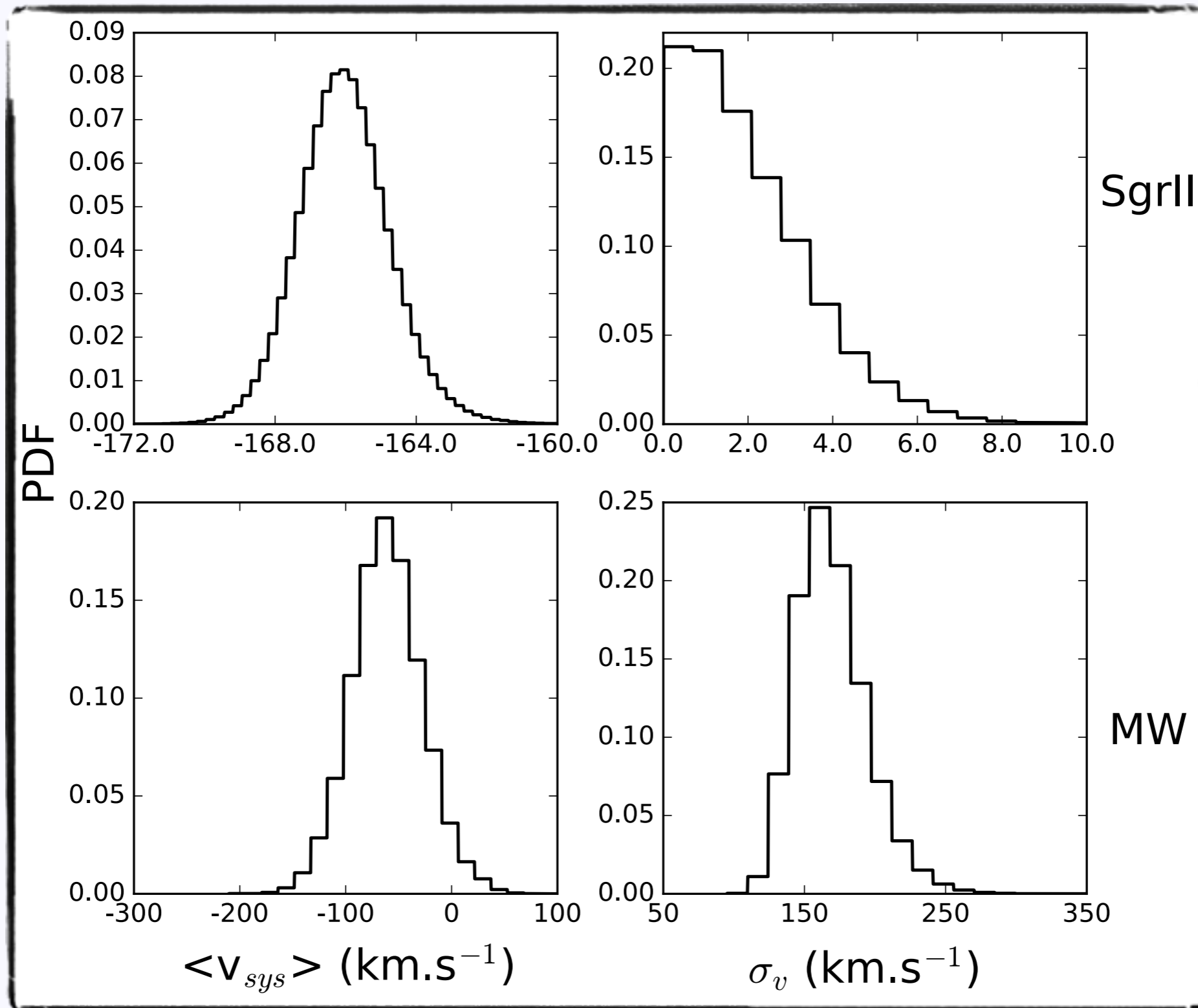
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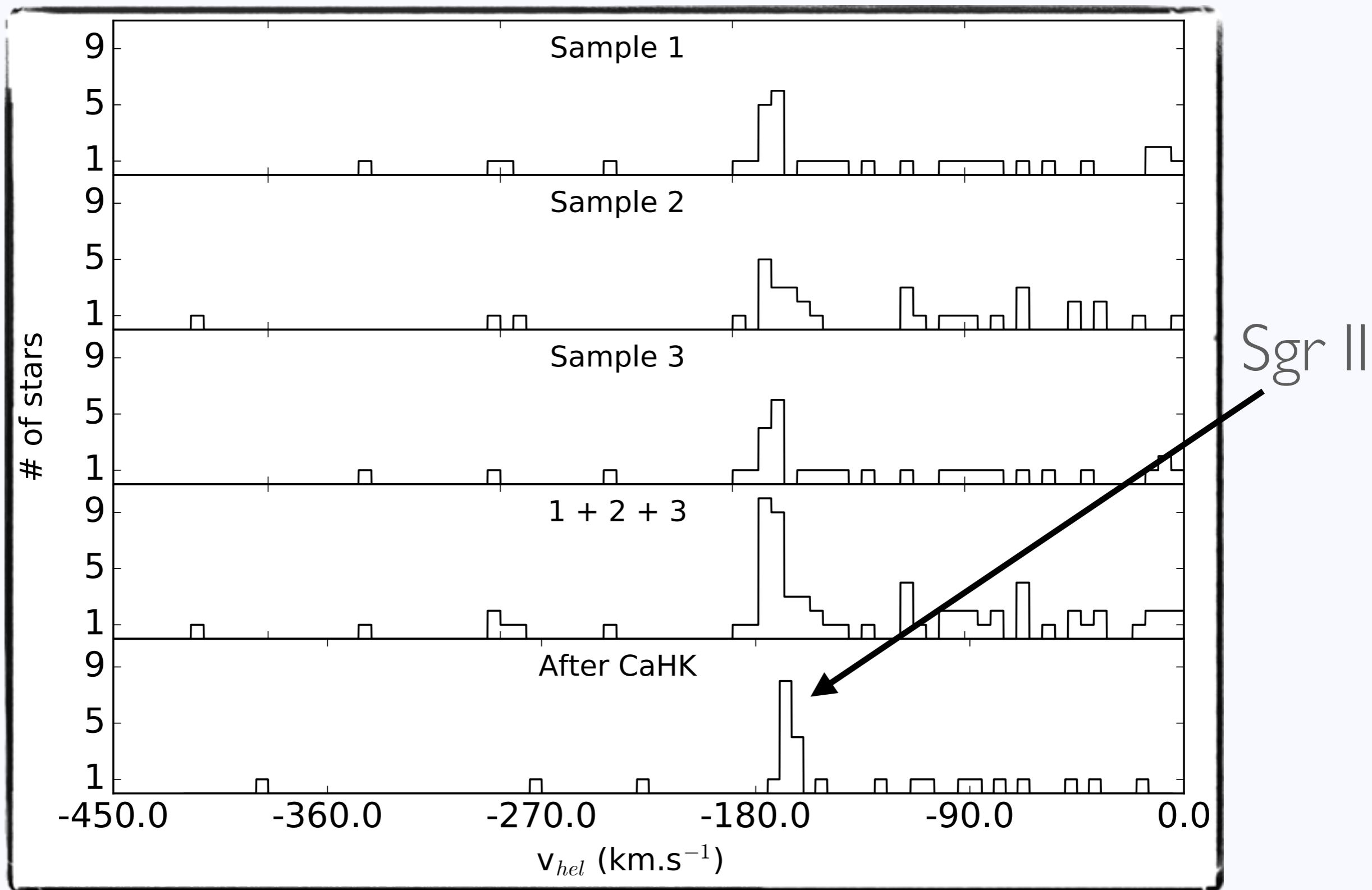
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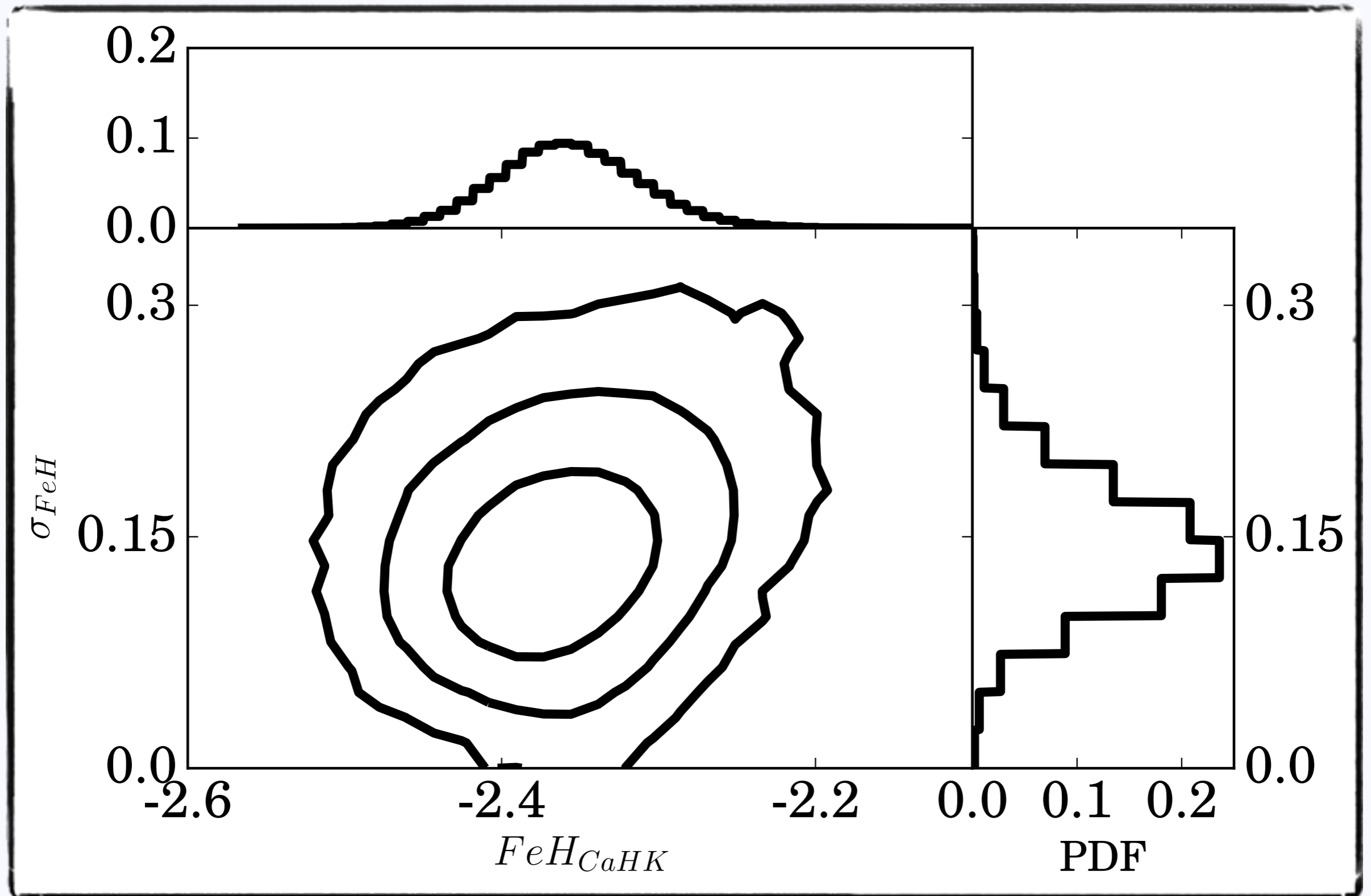
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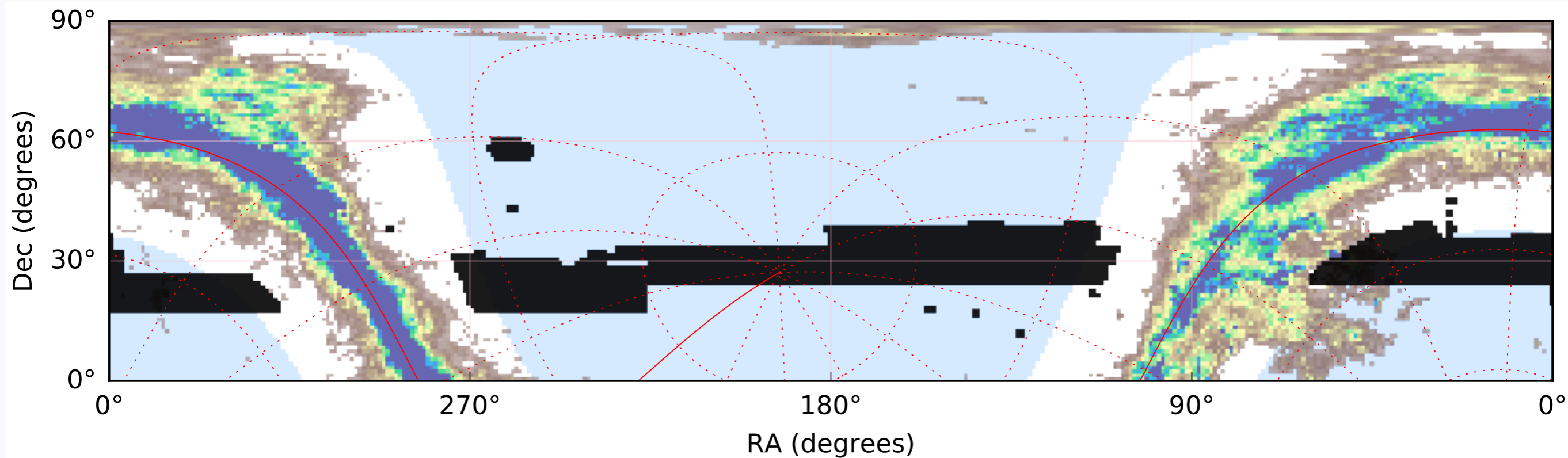
Things to bring back home

- ◆ Pristine is a survey that uses a CaHK filter to find metallicities of stars only by photometry
 - Find the most metal-poor stars
- ◆ Very useful to study the faintest satellites of the MW
 - Getting rid of the foreground MW contamination
 - Identify member stars
 - Estimate the chemical properties of a system

Things to bring back home

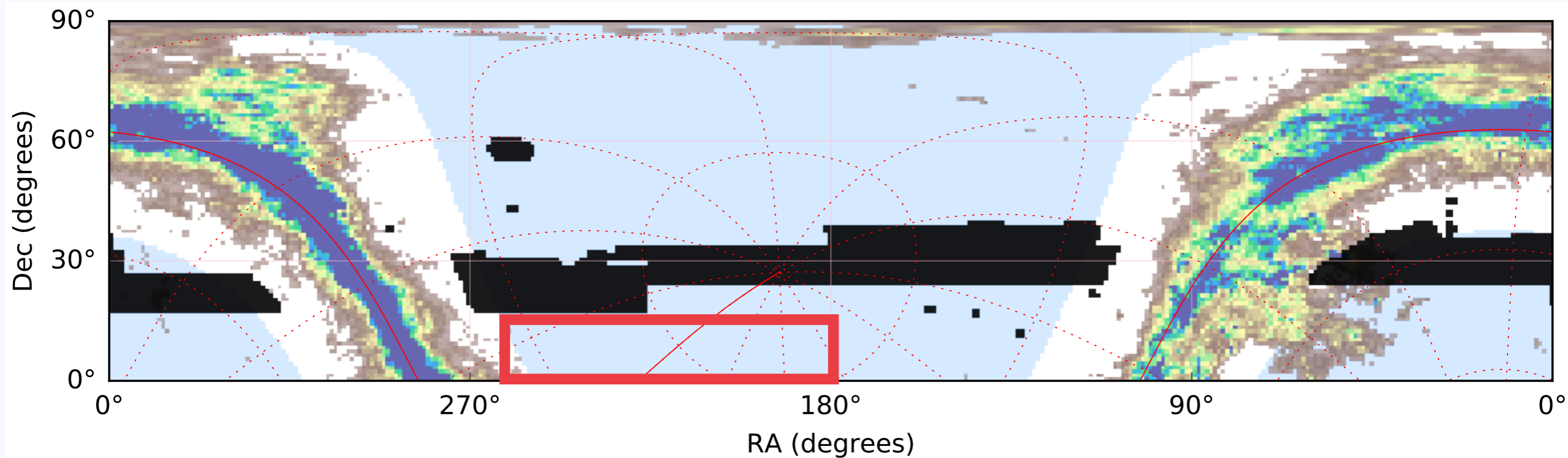
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Pristine footprint



Ibata et al. (2017)

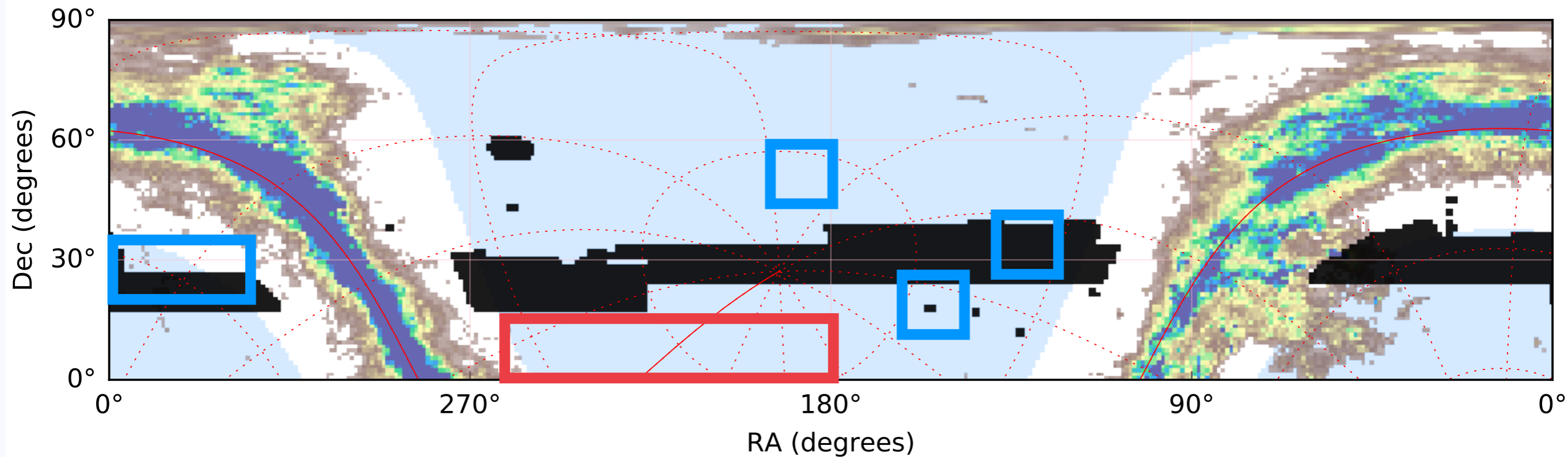
Pristine footprint



Pristine I5A+I6A
with CFHT/MegaCam

Ibata et al. (2017)

Pristine footprint



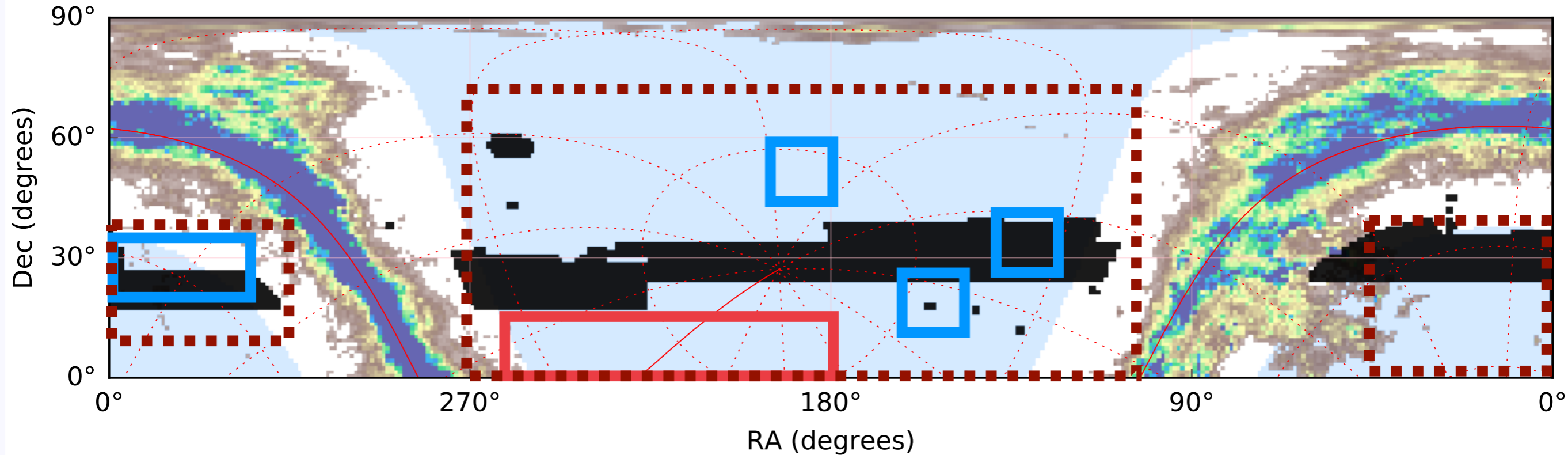
Pristine I5A+I6A
with CFHT/MegaCam

Observed/planned
for I6B+I7A

Ibata et al. (2017)

Pristine footprint

Ultimate goal



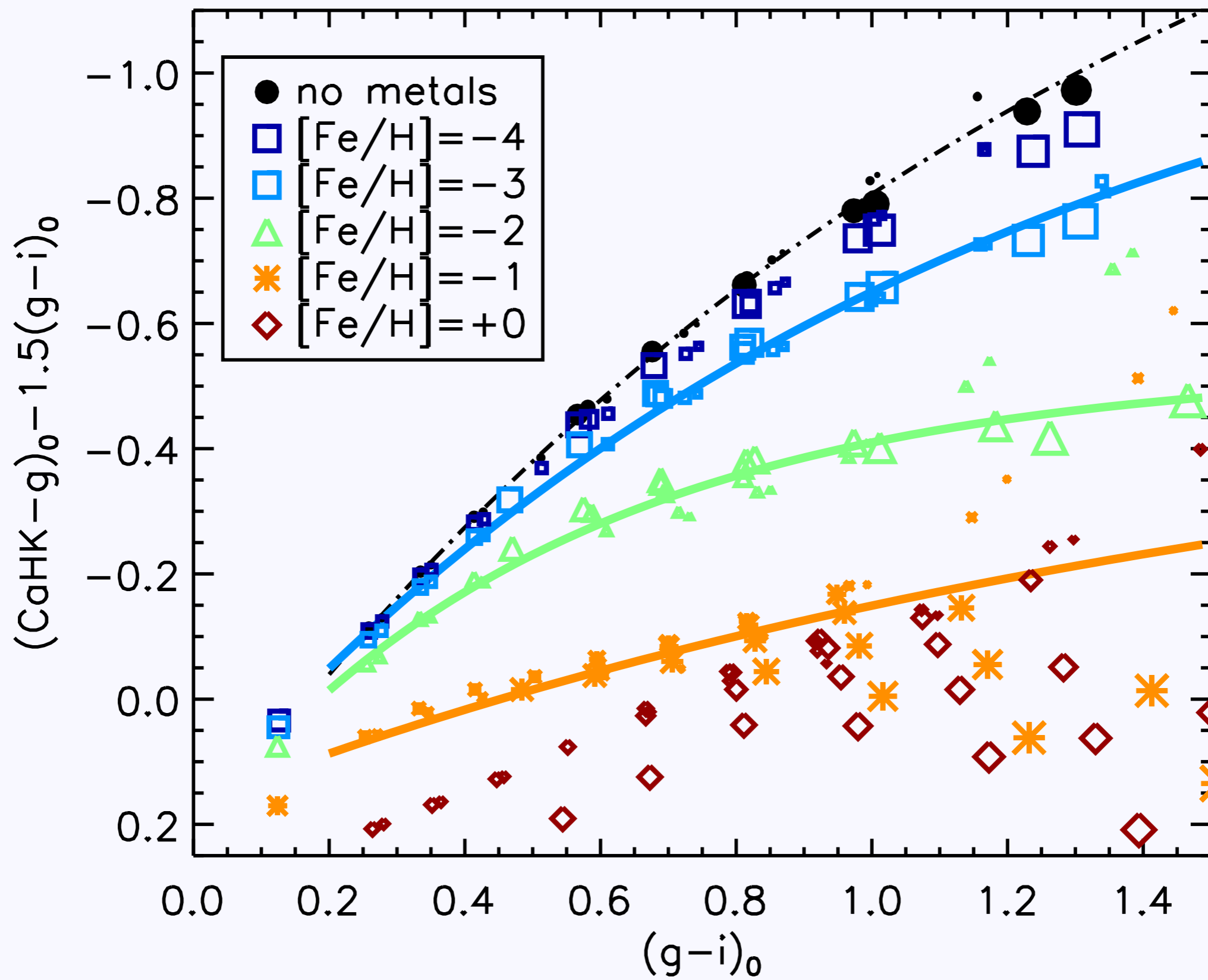
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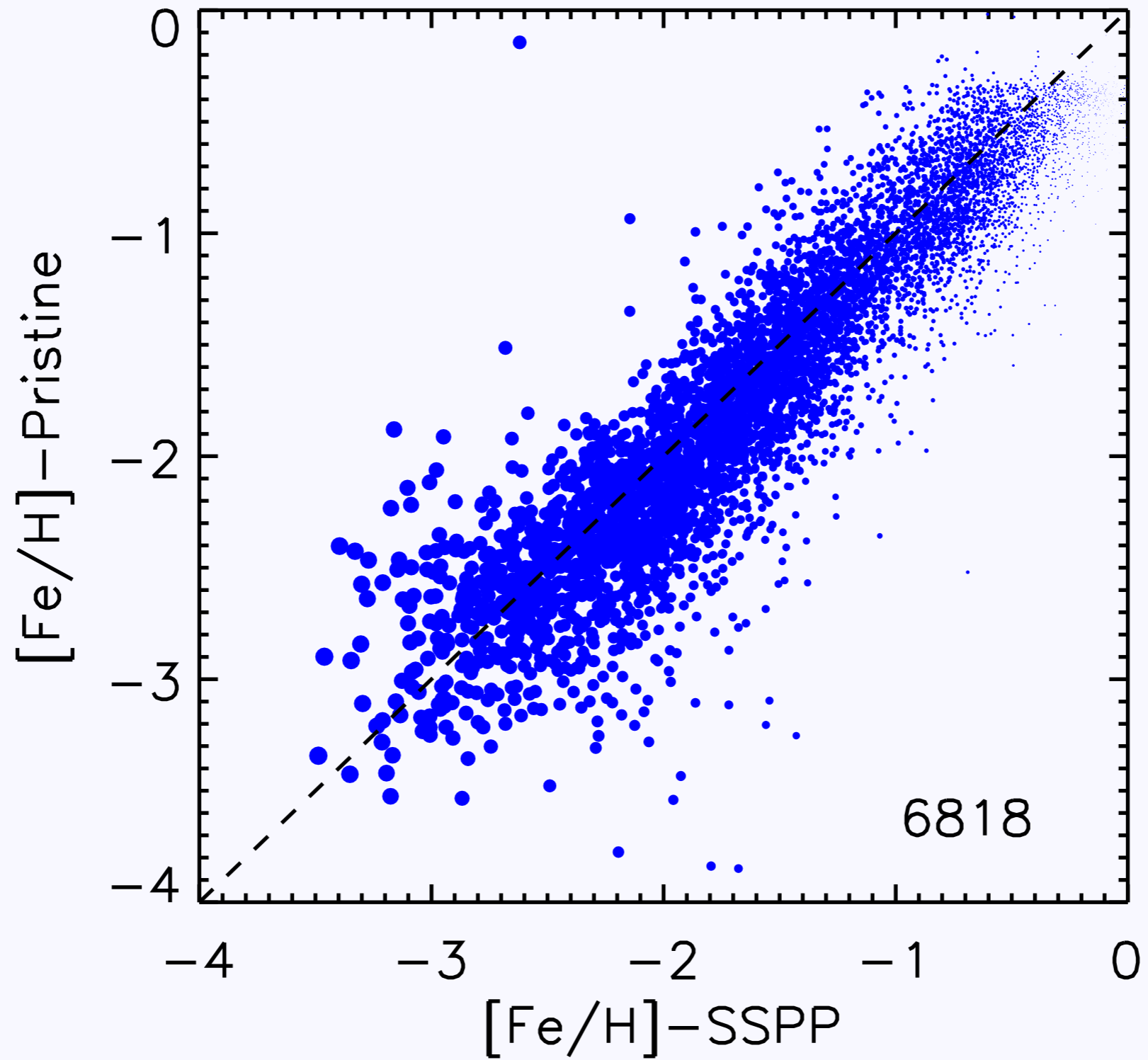
CaH&K model

Starkenburg, Martin et al. (2017)



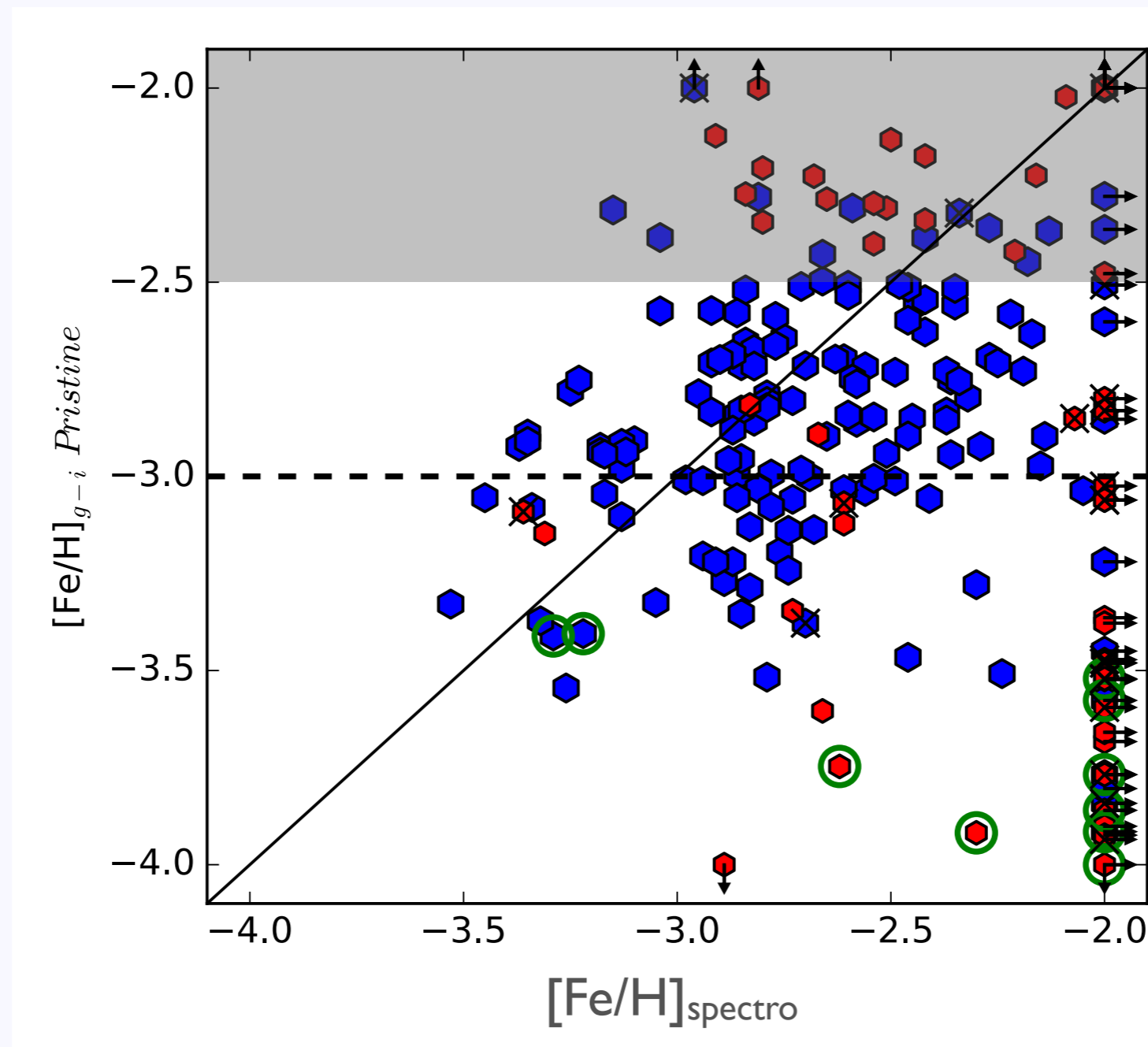
Pristine model

Pristine Ca H&K



*Starkenburg,
Martin et al.
(2017)*

Preliminary spectroscopic results



*Youakim et al.
(2017)*

Survey	$[\text{Fe}/\text{H}] < -3$	$[\text{Fe}/\text{H}] < -2.5$	$[\text{Fe}/\text{H}] < -2$
Pristine	22%	70%	81%
HES	3.8%	22%	40%
SC14	3.8%	-	32%

The case of Draco II

Longeard, Martin et al. (in prep.)

