

Highlights of the LAMOST survey

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Outlines

- Current status of LAMOST survey
- Highlights of science works
- Summary

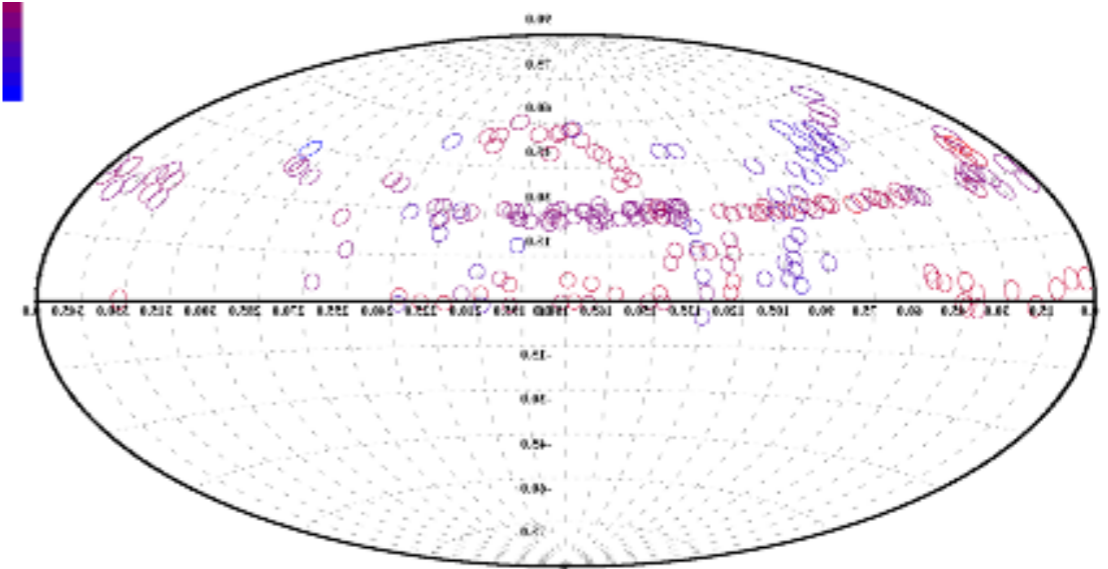
Big questions

- How is the Milky Way assembled? How does it evolve?
 - Disk: structure; kinematics; chemo-dynamics; thick disk; outskirts region; mass distribution;
 - Halo: total mass, anisotropy, substructure; extremely metal-poor stars; hypervelocity stars
- From MW to general galaxies, how does a galaxy form and evolve in the universe? Is our Galaxy special?

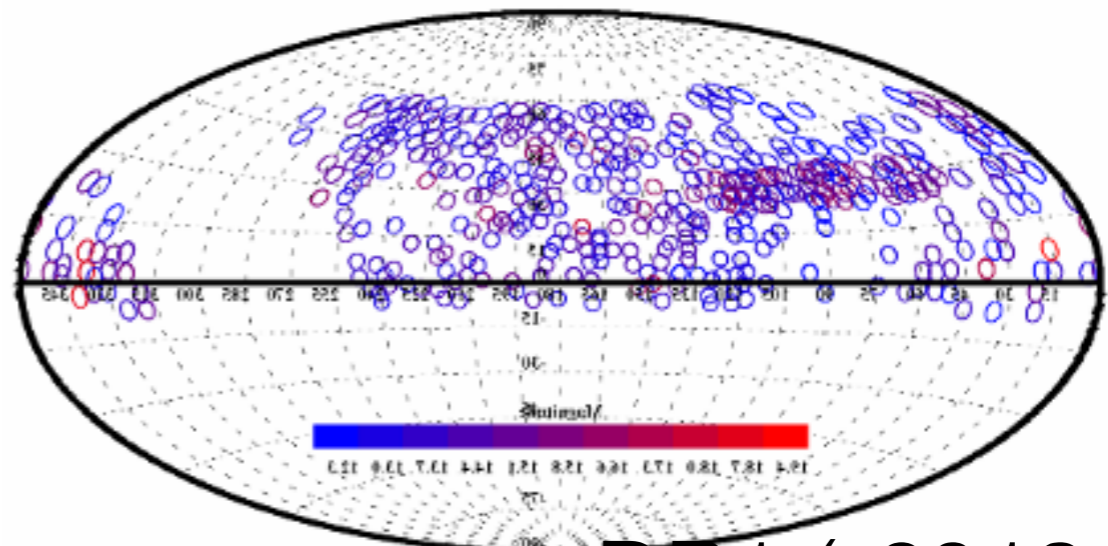
Pilot Survey
2011.10-2012.6
PDR: 2012.8

Regular survey
1st year: 2012.9-2013.6
DR1 (2013.9) public
2nd year: 2013.9-2014.6
DR2 (2014.12)
3rd year: 2014.9-2015.6
DR3 (2015.12)

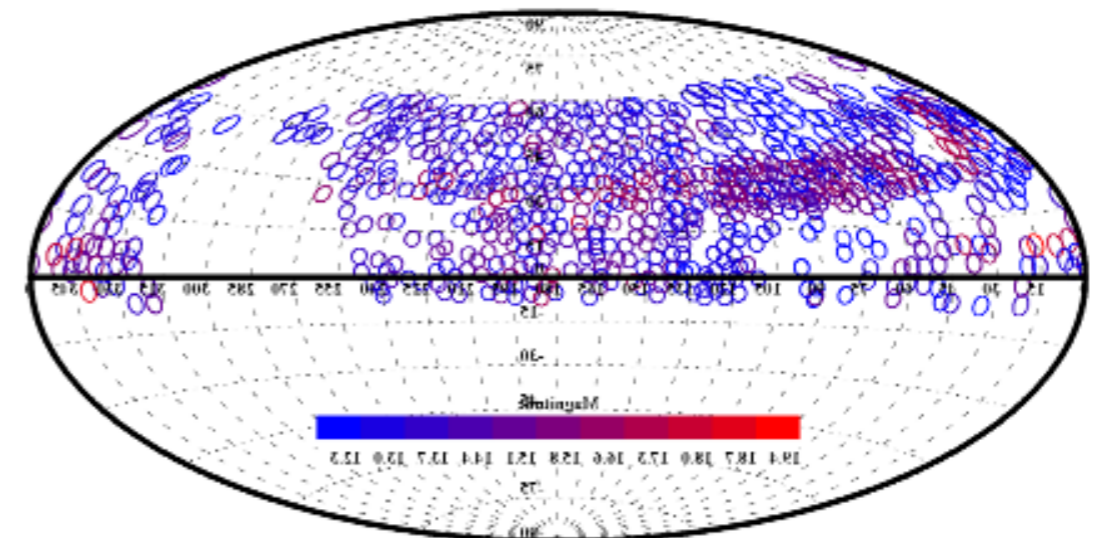
	PDR (1 yrs)	DR1 (2 yrs)	DR2 (3 yrs)
Spectra	717,660	2,204,860	4,158,038
stars	648,820	1,944,406	3,796,583
galaxies	2,723	12,082	37,849
quasars	621	5,017	9,495
Stars (S/N>10)	547,868	1,721,796	3,231,240
AFGK parameters	373,481	1,085,404	2,165,200



Pilot survey (2011.09-2012.06)

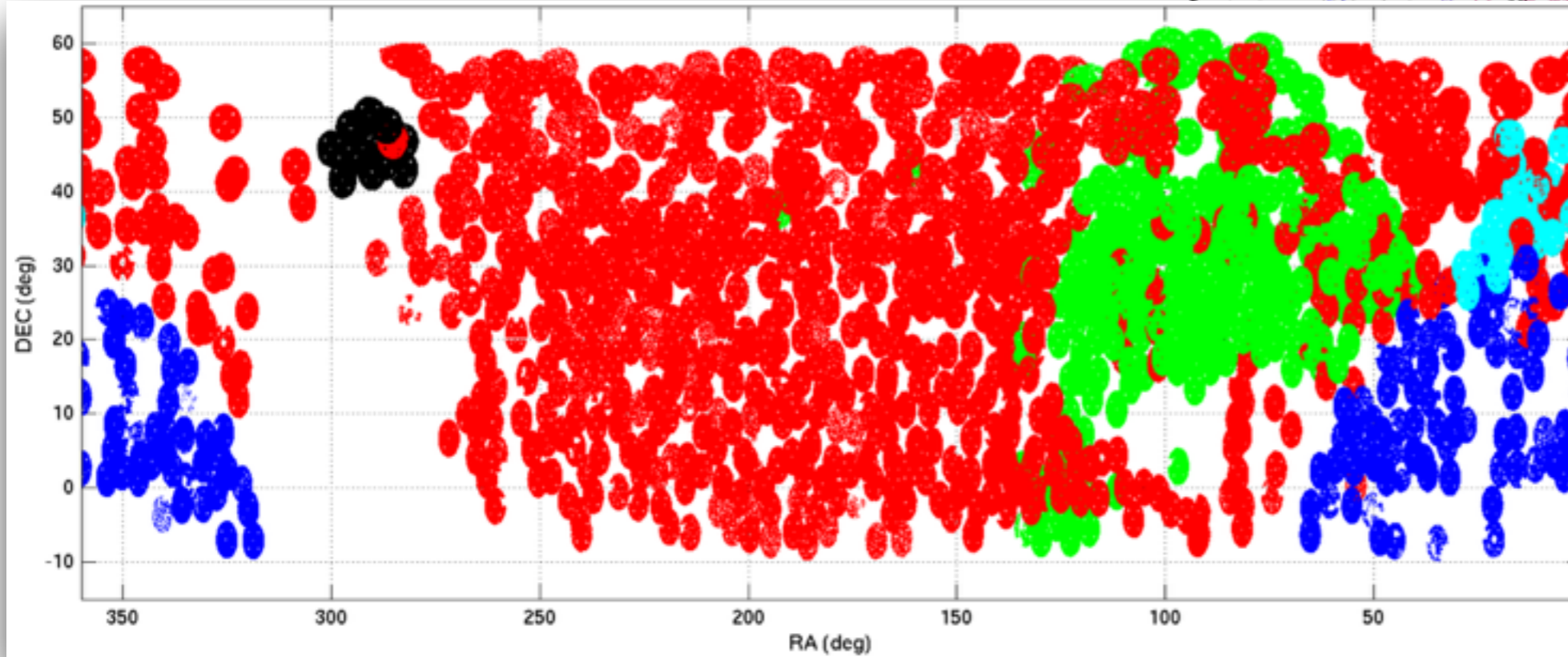


DR1 (-2013-06)



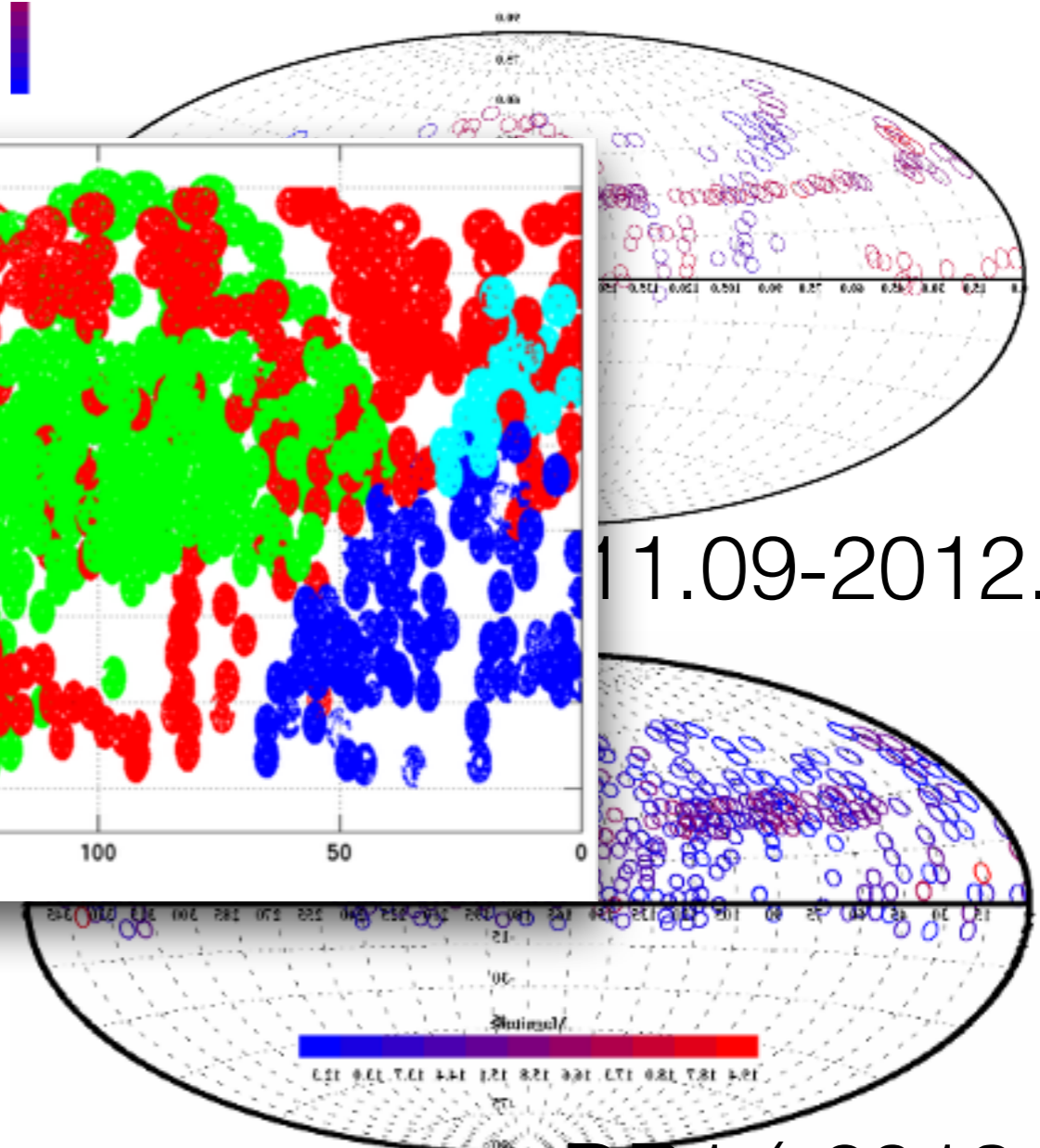
DR2 (2014-06)

DR3 (-2015.06) + 1.5 mil/1 mil

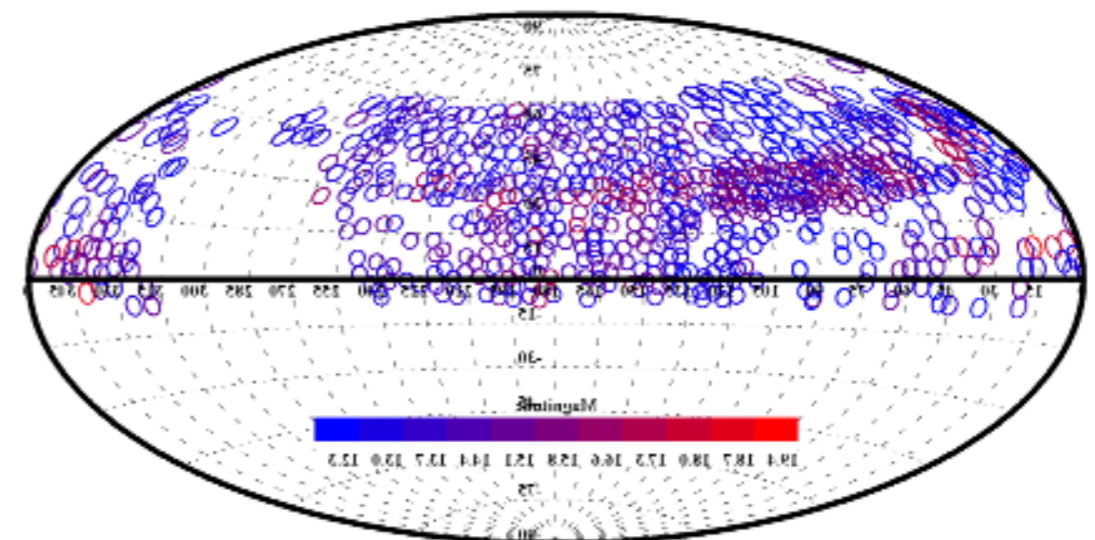


DR3 (2015.12)

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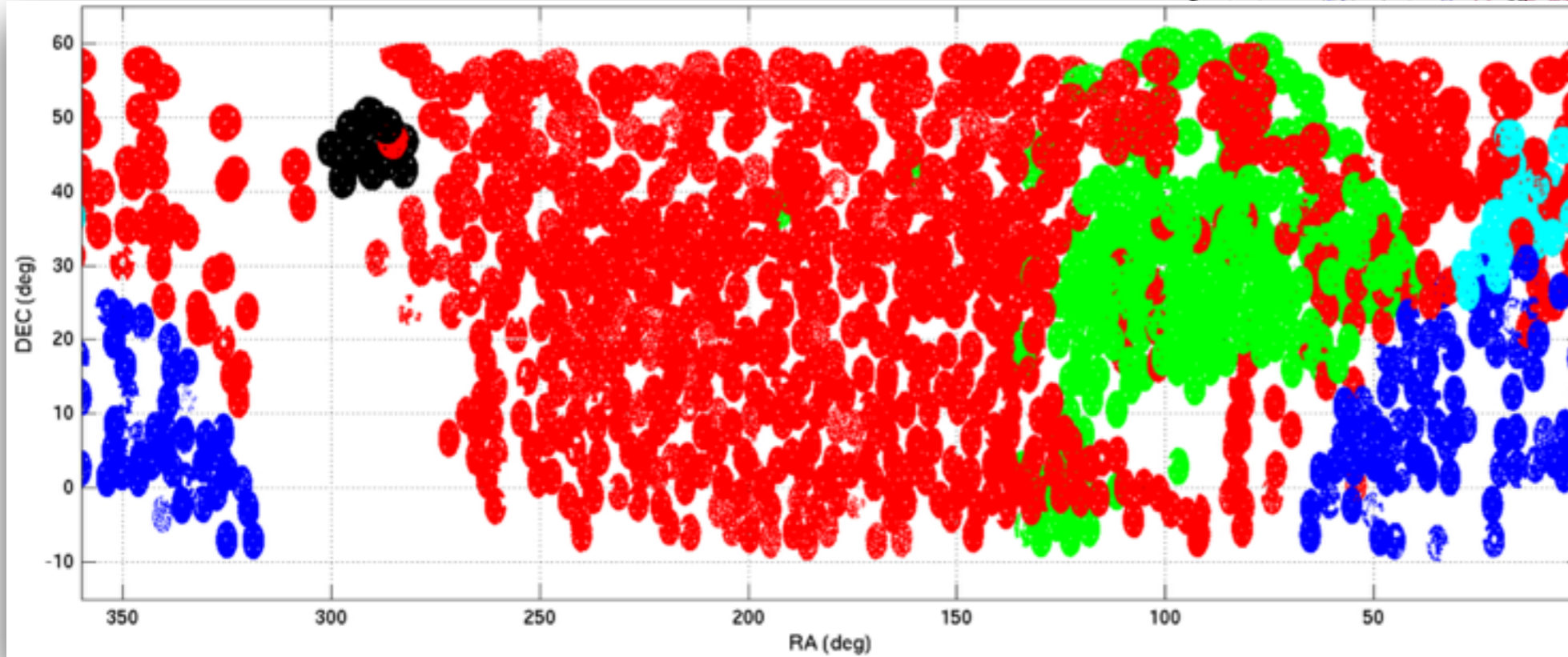


DR1 (-2013-06)

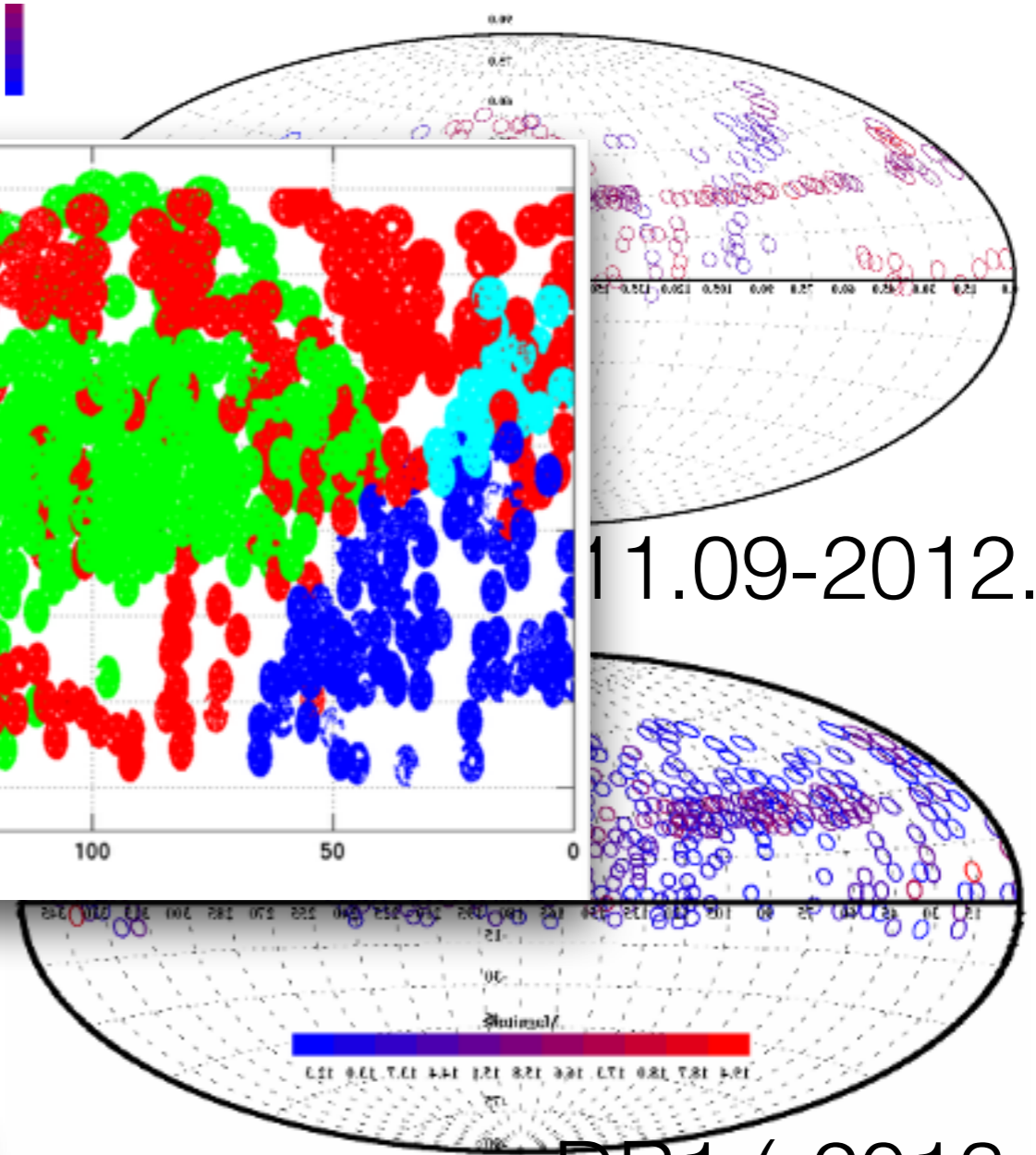


DR2 (2014-06)

DR3 (-2015.06) + 1.5 mil/1 mil



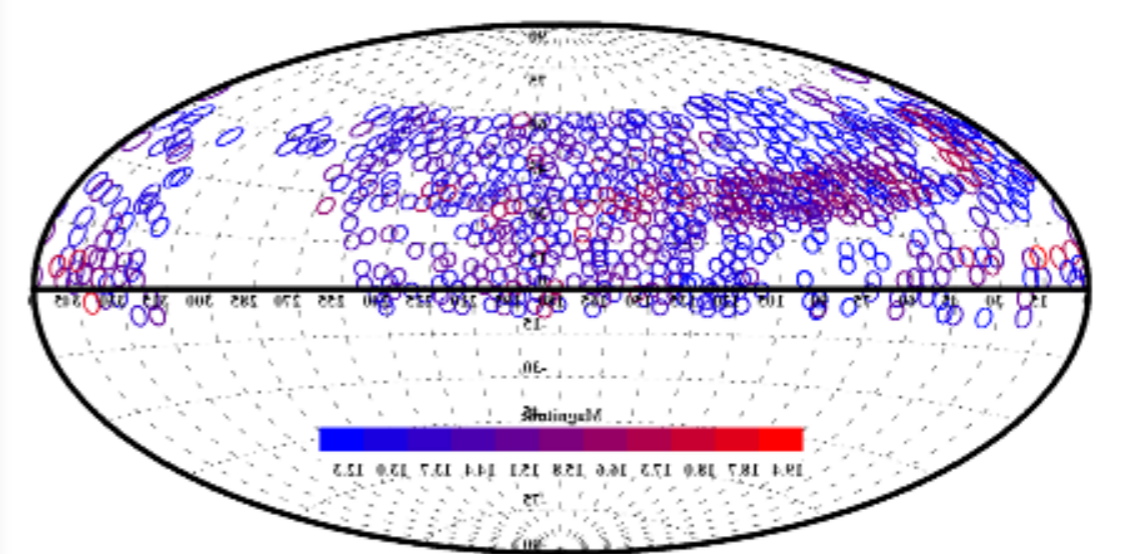
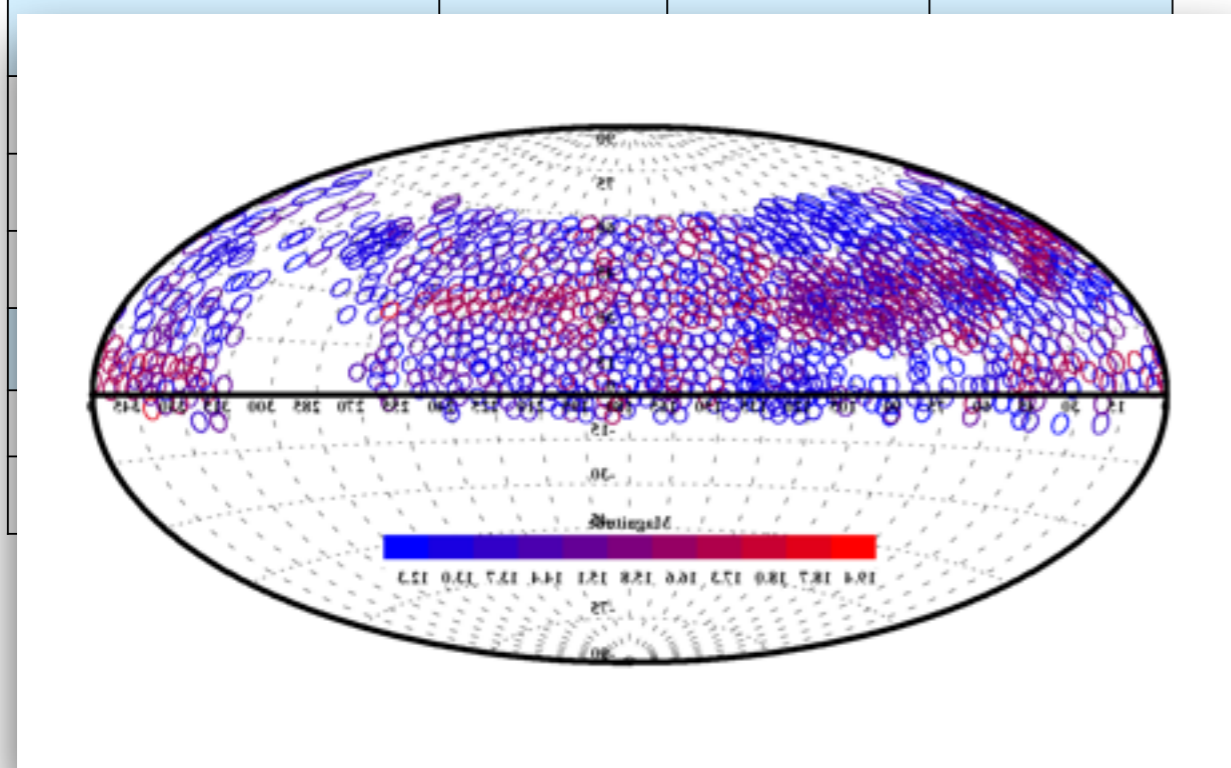
11.09-2012.06)



DR1 (-2013-06)

DR3 (2015.12)

	PDR (1 yrs)	DR1 (2 yrs)	DR2 (3 yrs)
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DR2 (2014-06)

Publications

- ~100 paper have been published and 20+ on the way
- RAA special issue 12 (2012): 7 mostly survey designs and scientific plans, 3 of them have awarded the most cited papers by RAA (citation 100+)
- RAA special issue 15 (2015): 20+ mostly scientific results

The highlight works

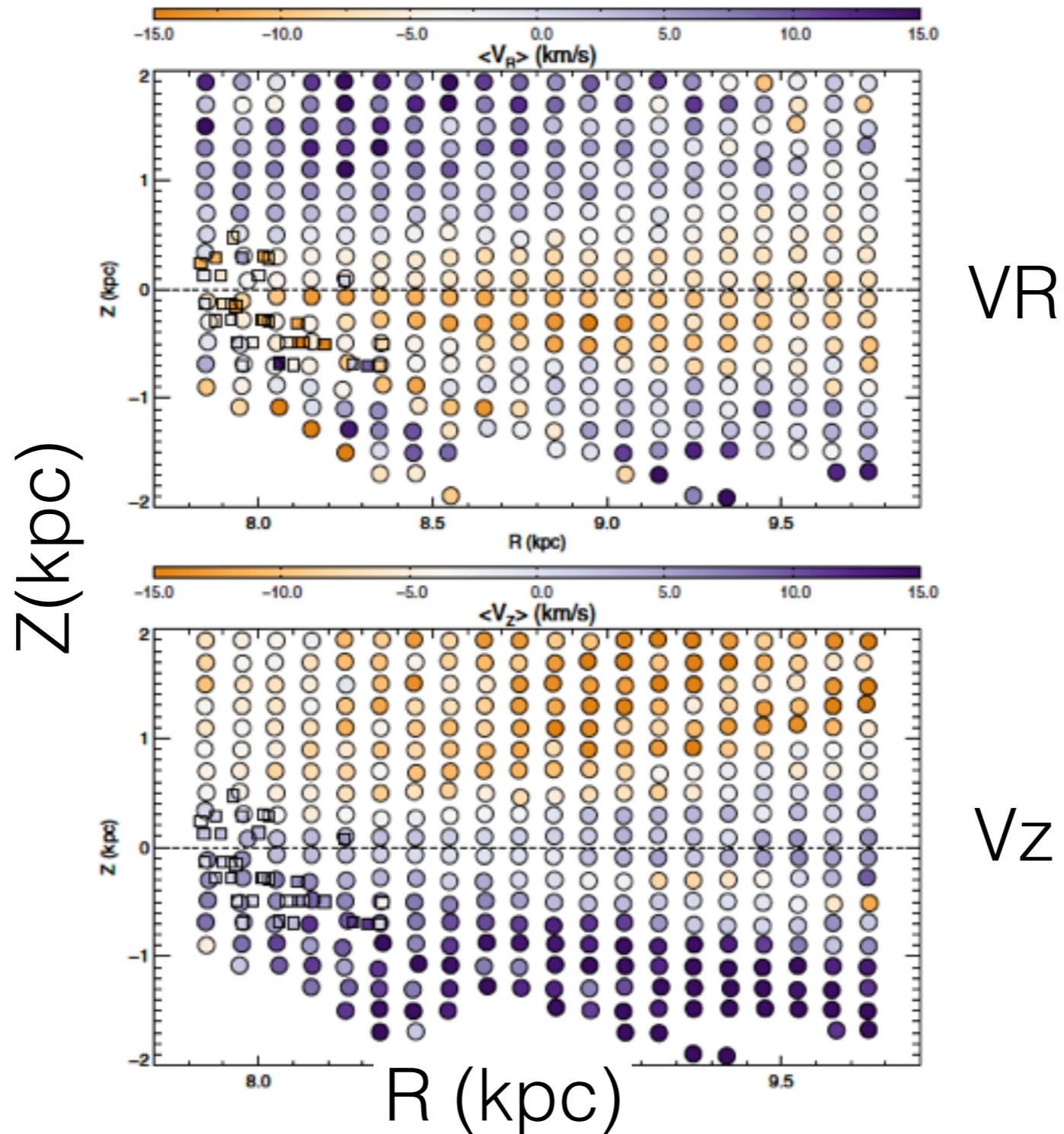
- The bulk motions in the Galactic disk (Carlin et al. 2013 ApJL)
- The first hypervelocity star (Zheng et al. 2014 ApJL)
- The local velocity structures (Xia et al. 2015 MNRAS)
- Local stellar kinematics (Tian et al. 2015 ApJ)
- Local dark matter density (Xia et al. submitted to MNRAS)
- Radial migration in the solar neighborhood (Liu et al. submitted to ApJ)
- A disrupted globular cluster (Vickers & Smith submitted to ApJL)

And some relevant works

- The latest catalog for the early type emission line stars (Hou et al. submitted)
- The pre-main sequence group co-moving with Taurus (Fang et al. submitted)
- The open cluster membership from LAMOST (Zhang et al. RAA)

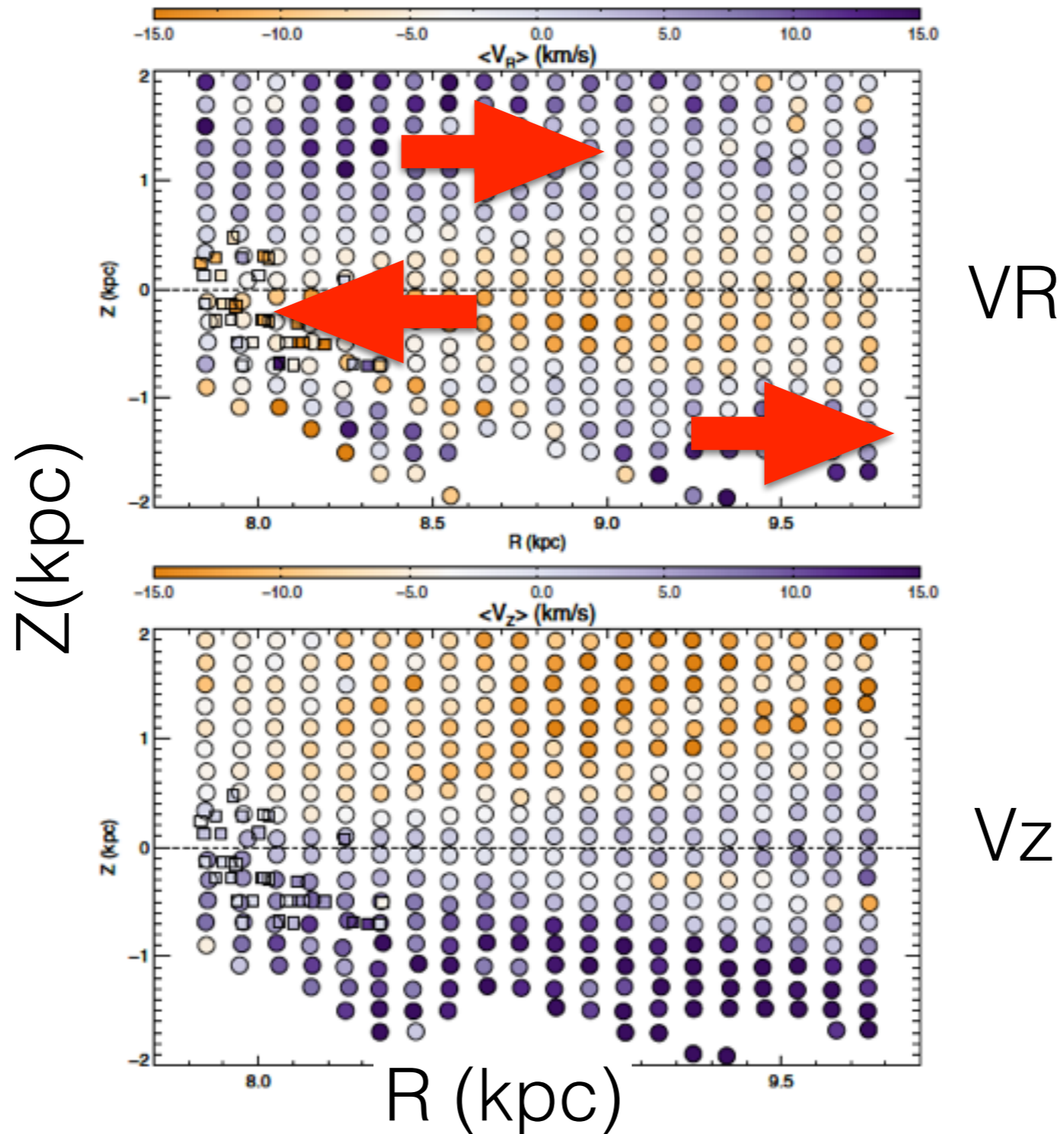
Bulk motions in the Galactic disk

Carlin et al. 2013, ApJ



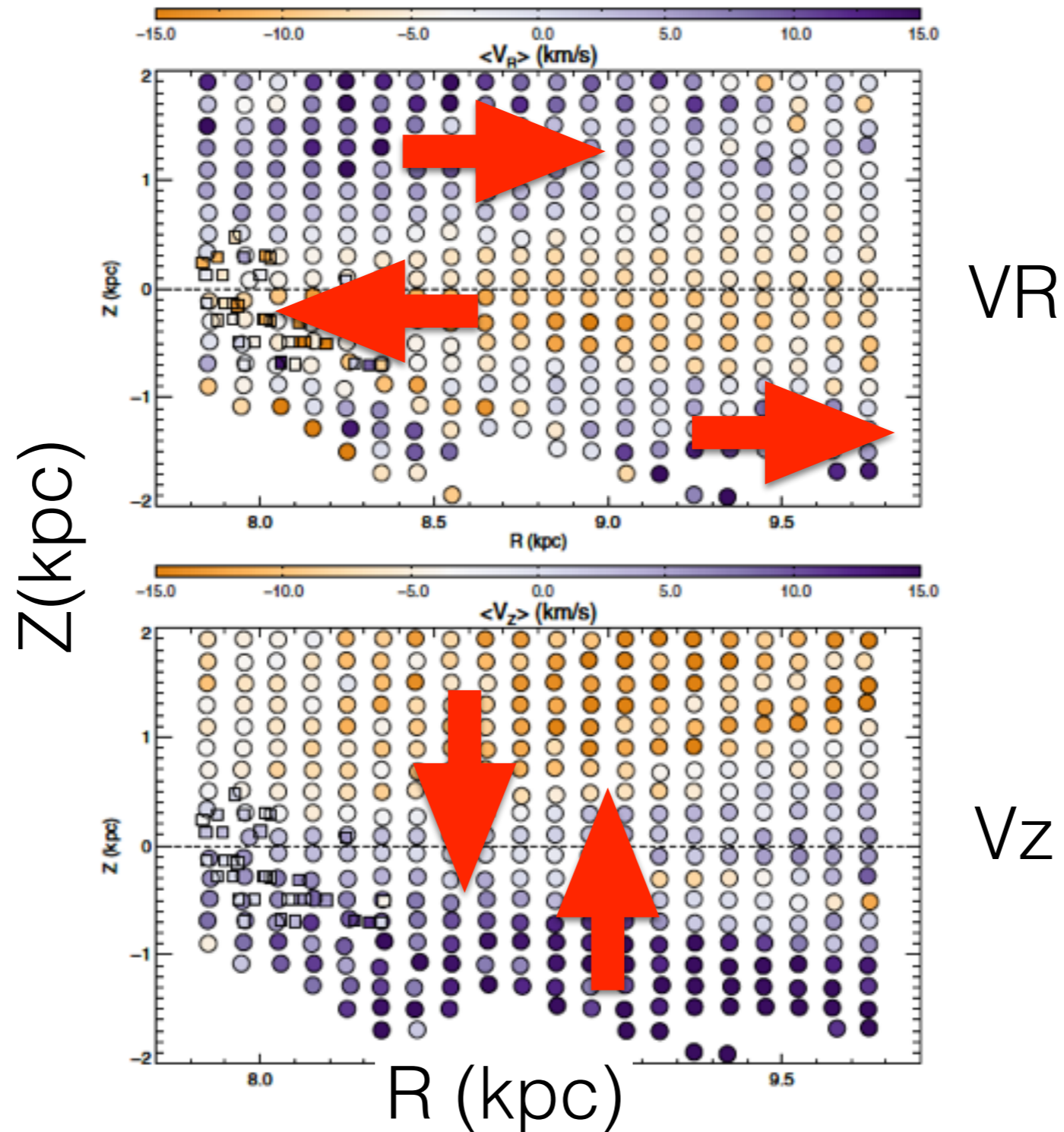
Bulk motions in the Galactic disk

Carlin et al. 2013, ApJ



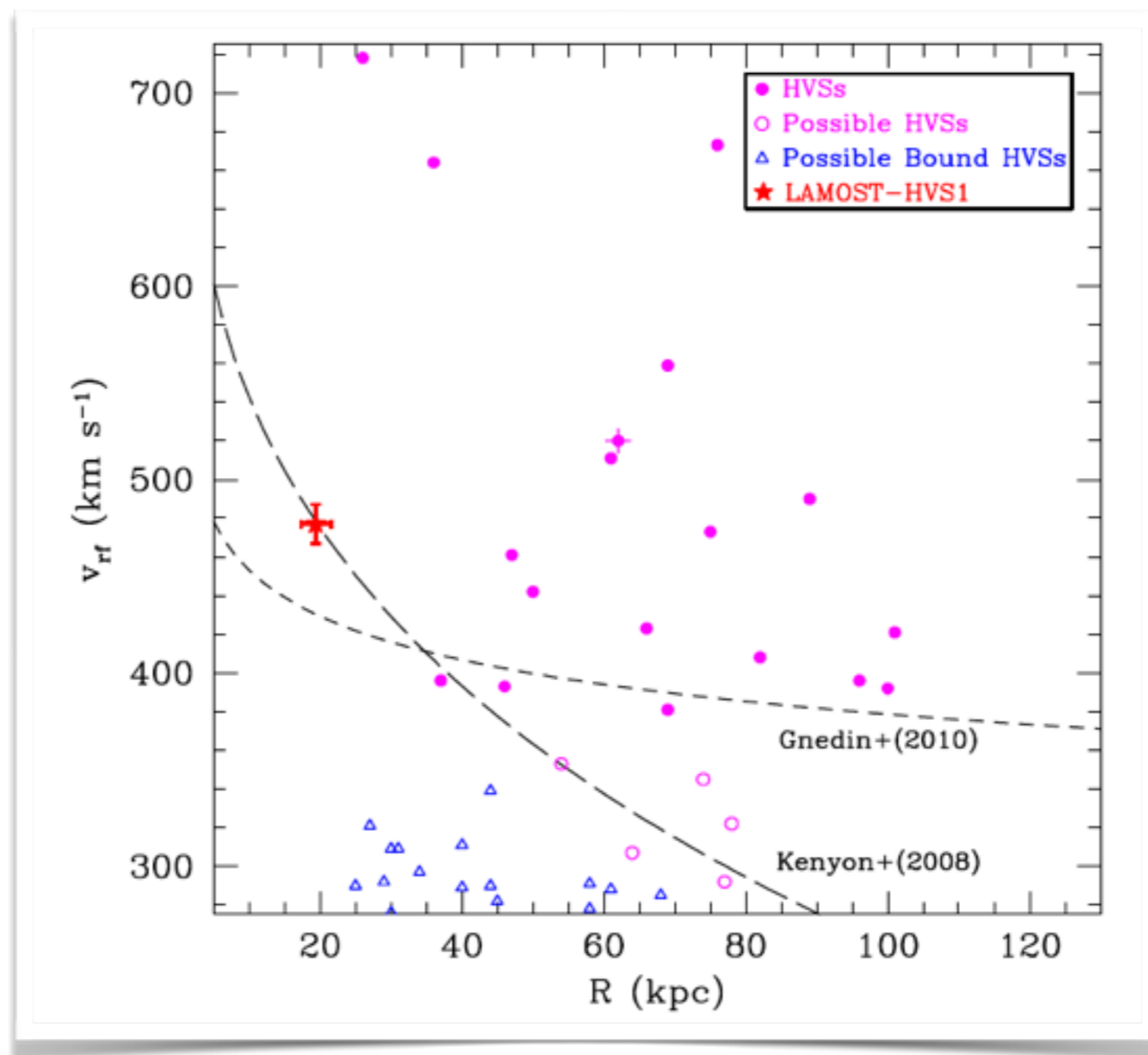
Bulk motions in the Galactic disk

Carlin et al. 2013, ApJ



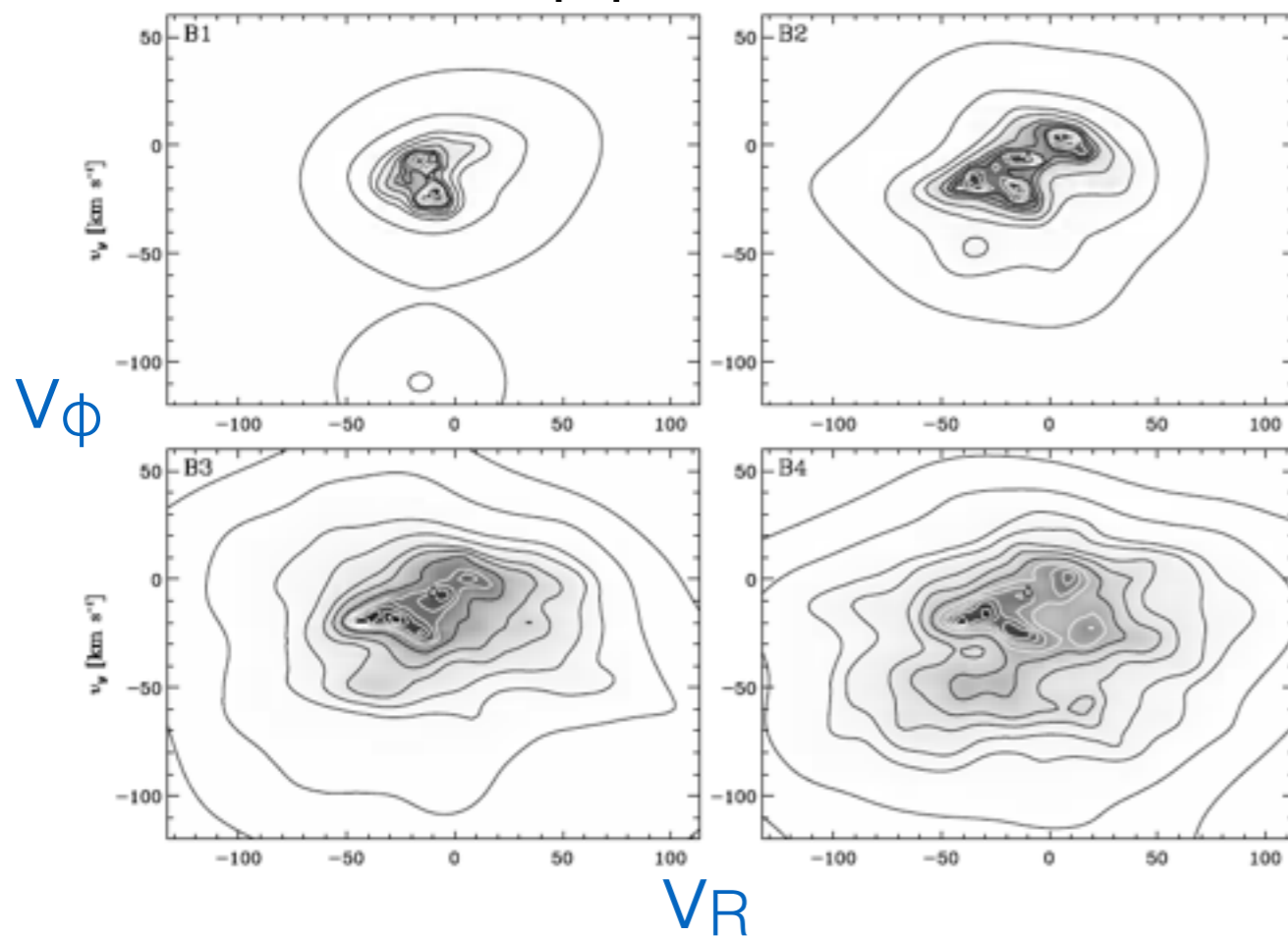
Hypervelocity stars

Zheng et al. 2014, ApJL, 785, 23



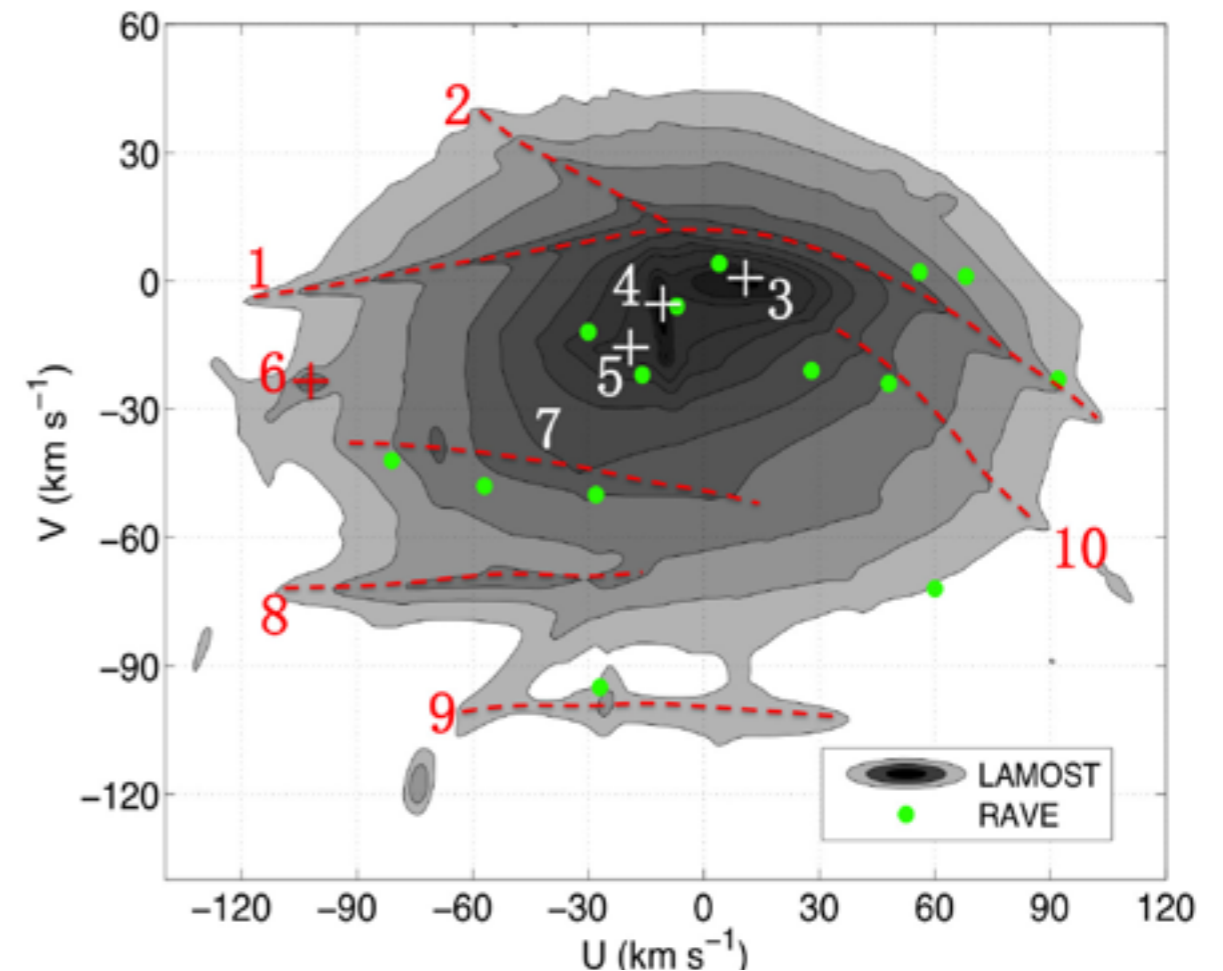
Velocity substructure

Hipparcos



Dehnen 1998

LAMOST

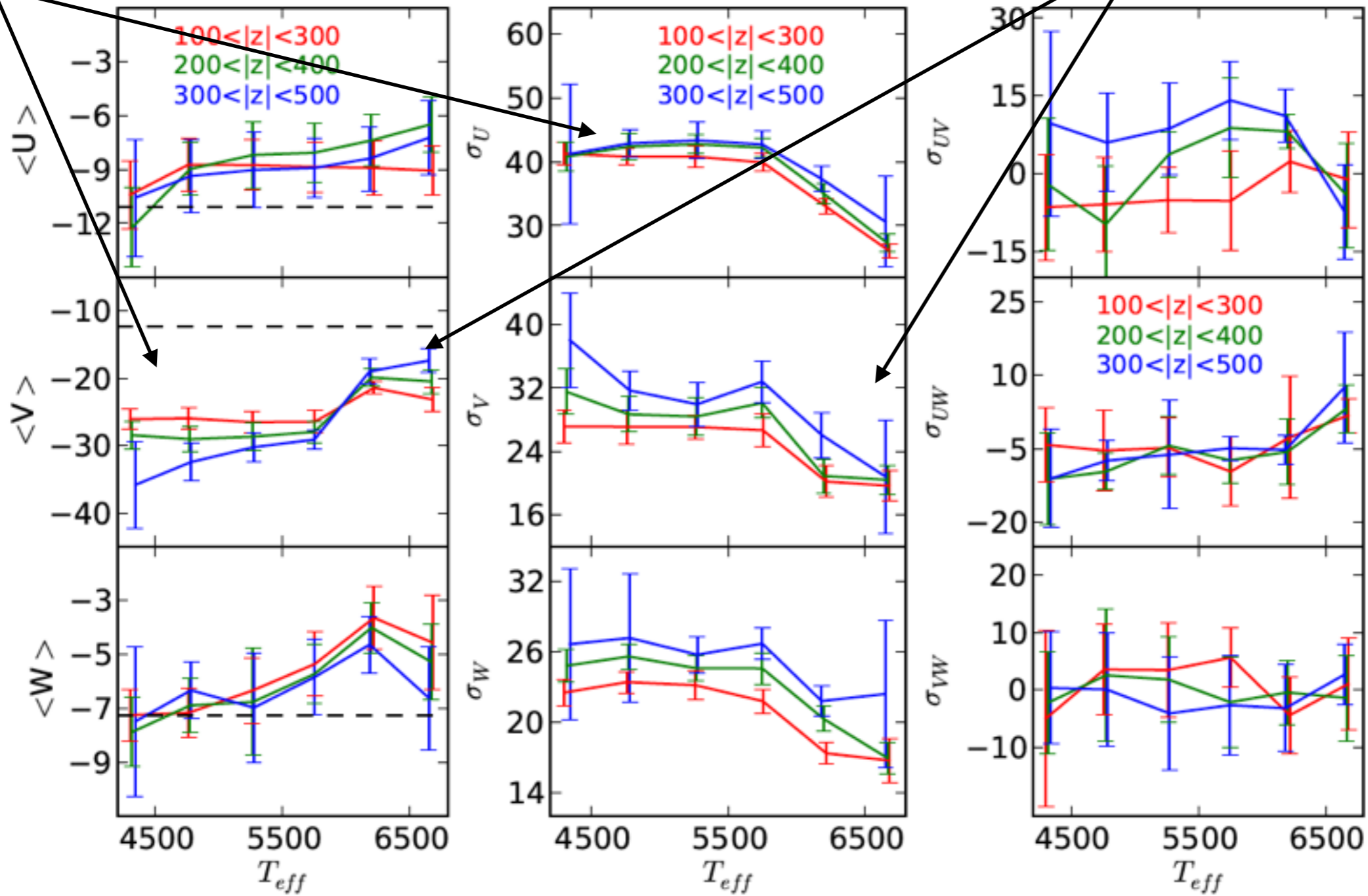


Xia, *CL* et al. 2015
MNRAS

Old

LAMOST DR1

Young

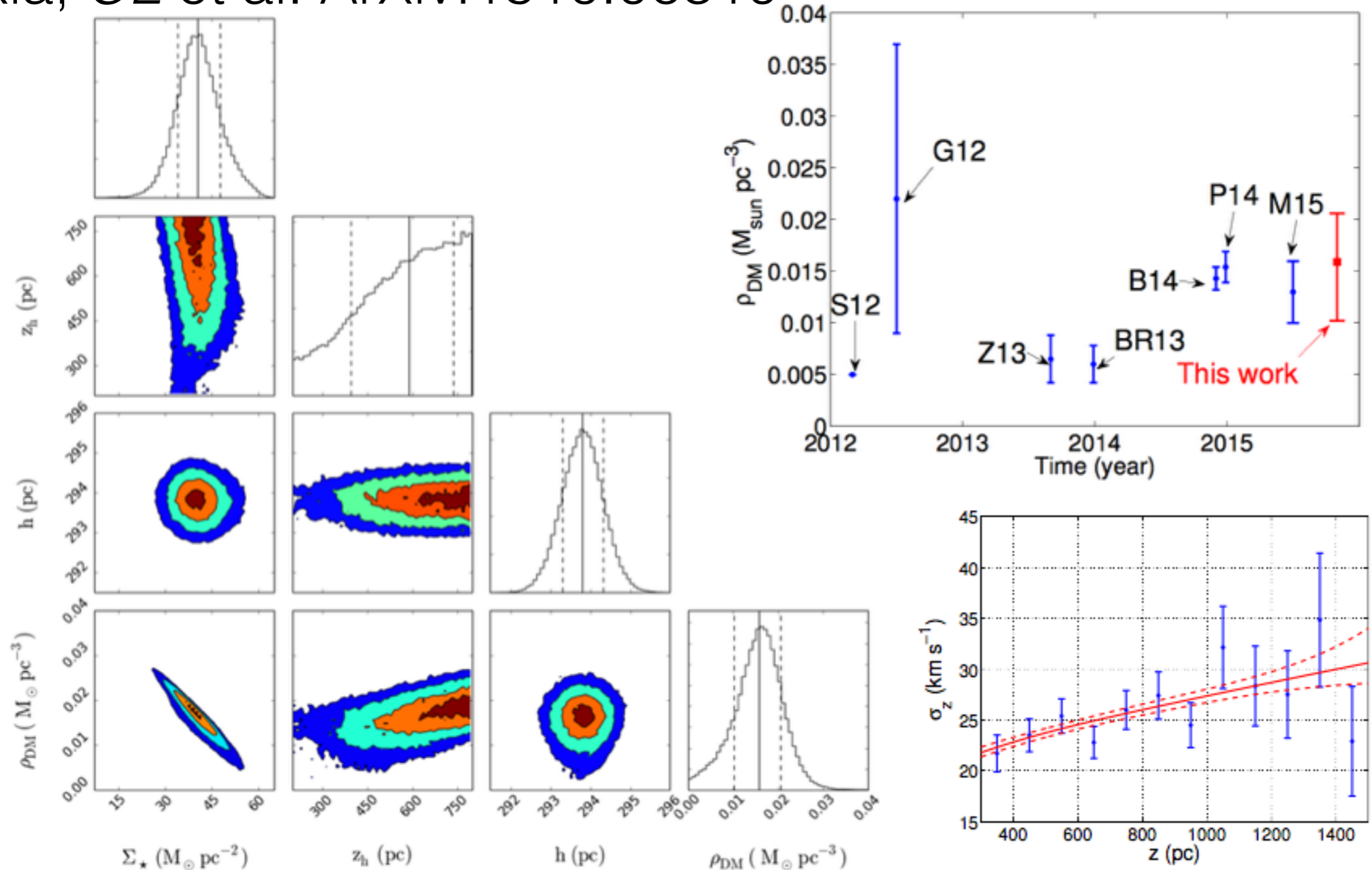


T_{eff} as the age proxy

Tian, *CL* et al. 2015, ApJ

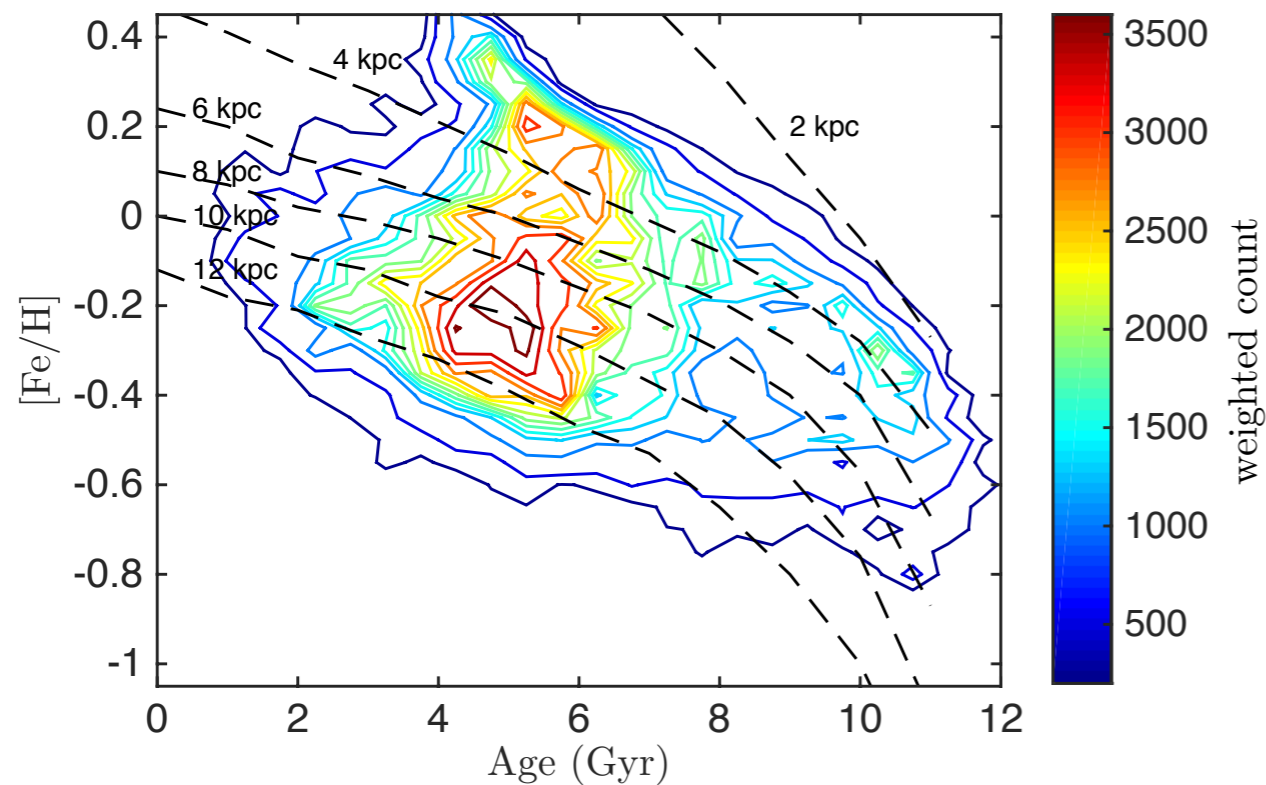
Local dark matter density

Xia, *CL* et al. ArXiv:1510.06810



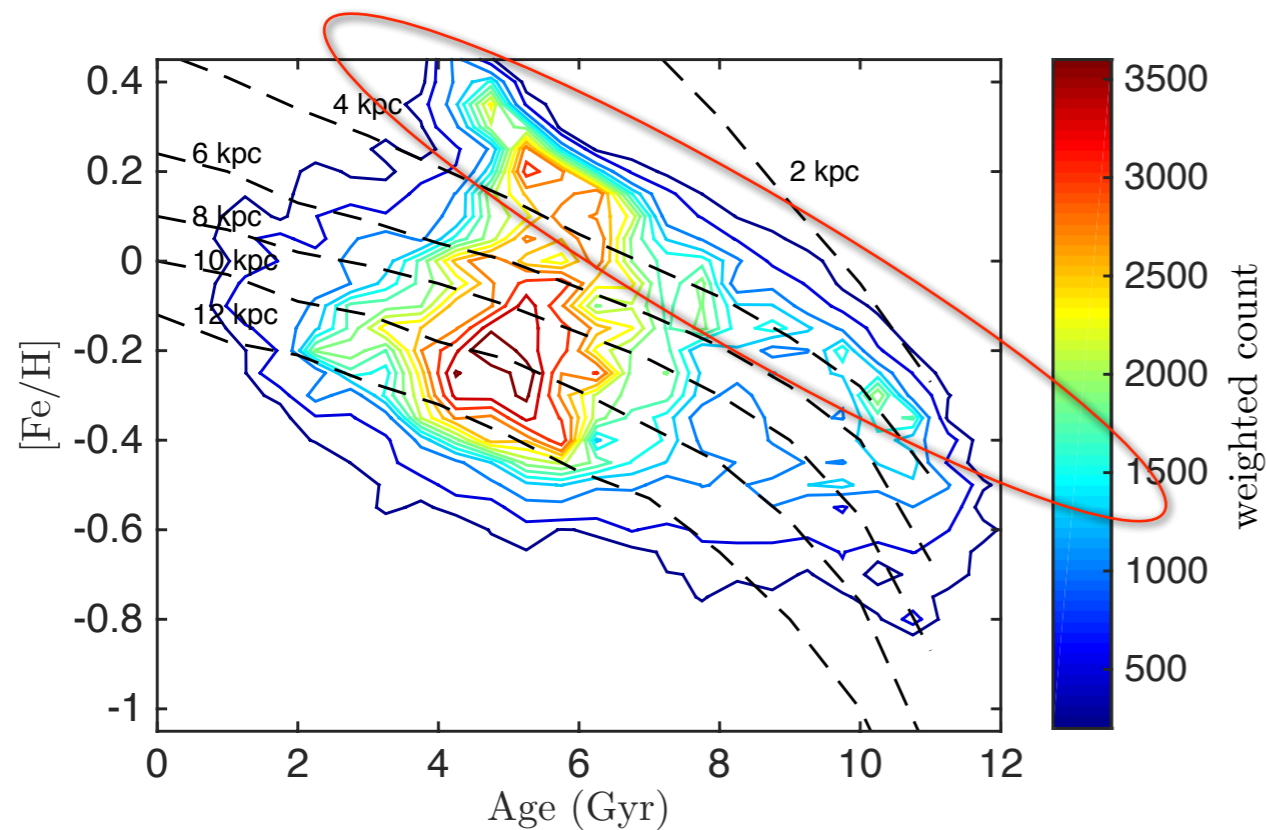
New evidence for radial migration

CL et al. ArXiv:1510.06123



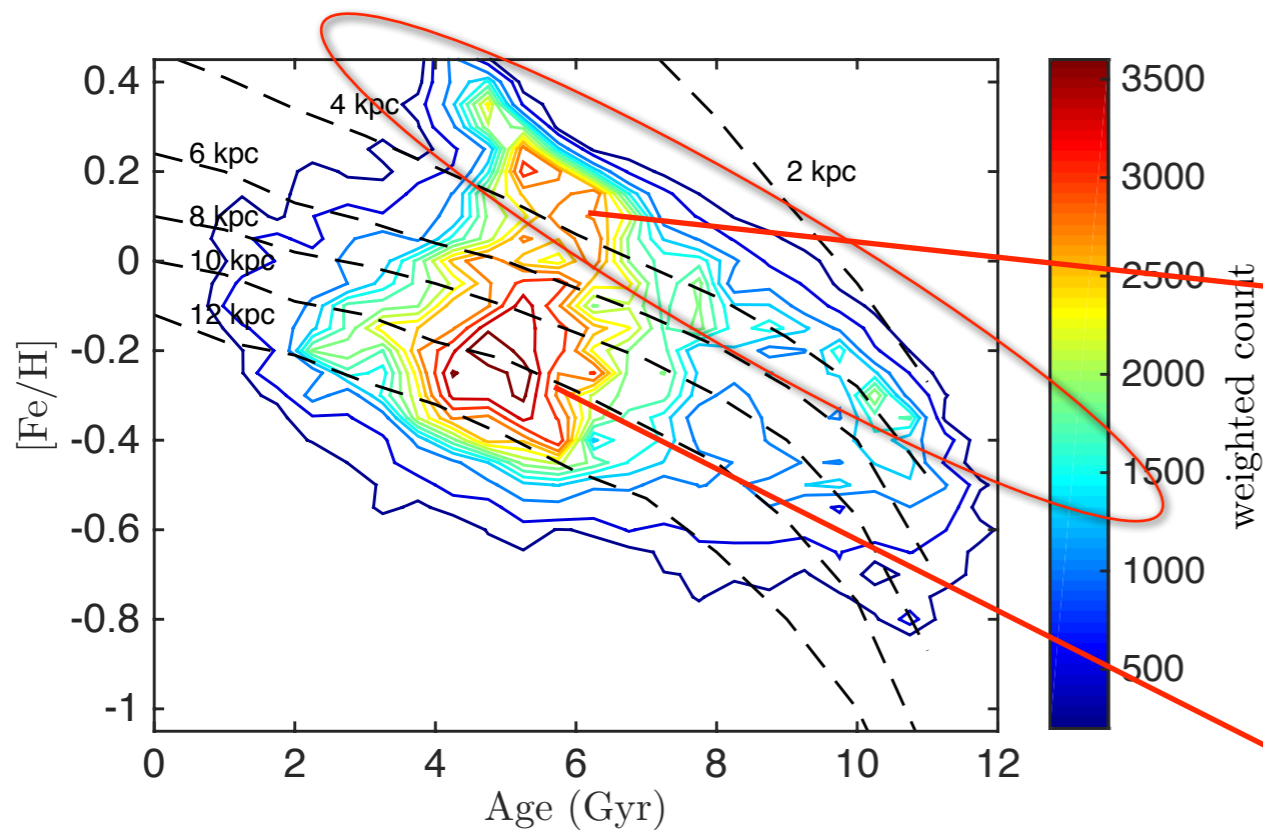
New evidence for radial migration

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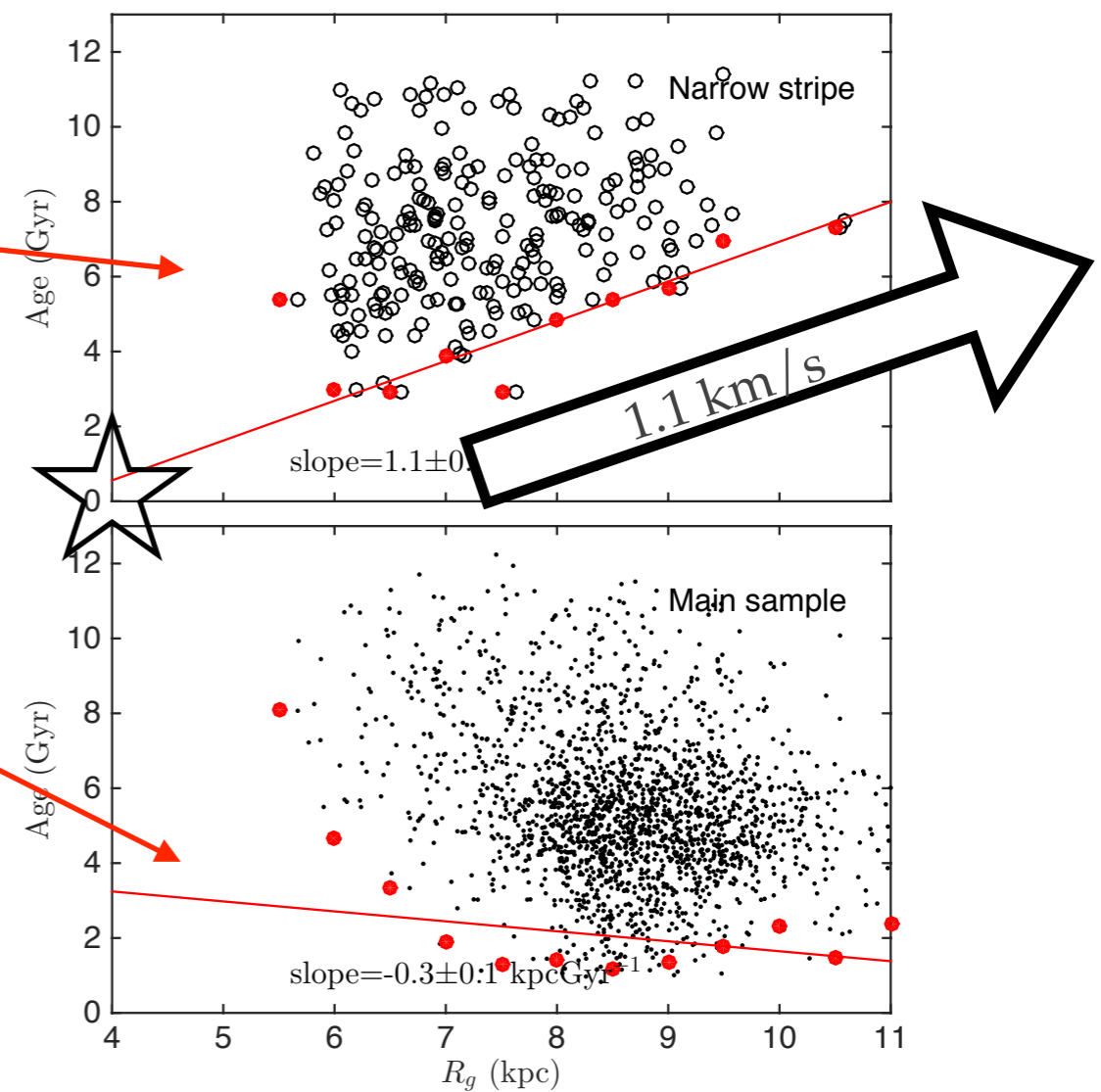


New evidence for radial migration

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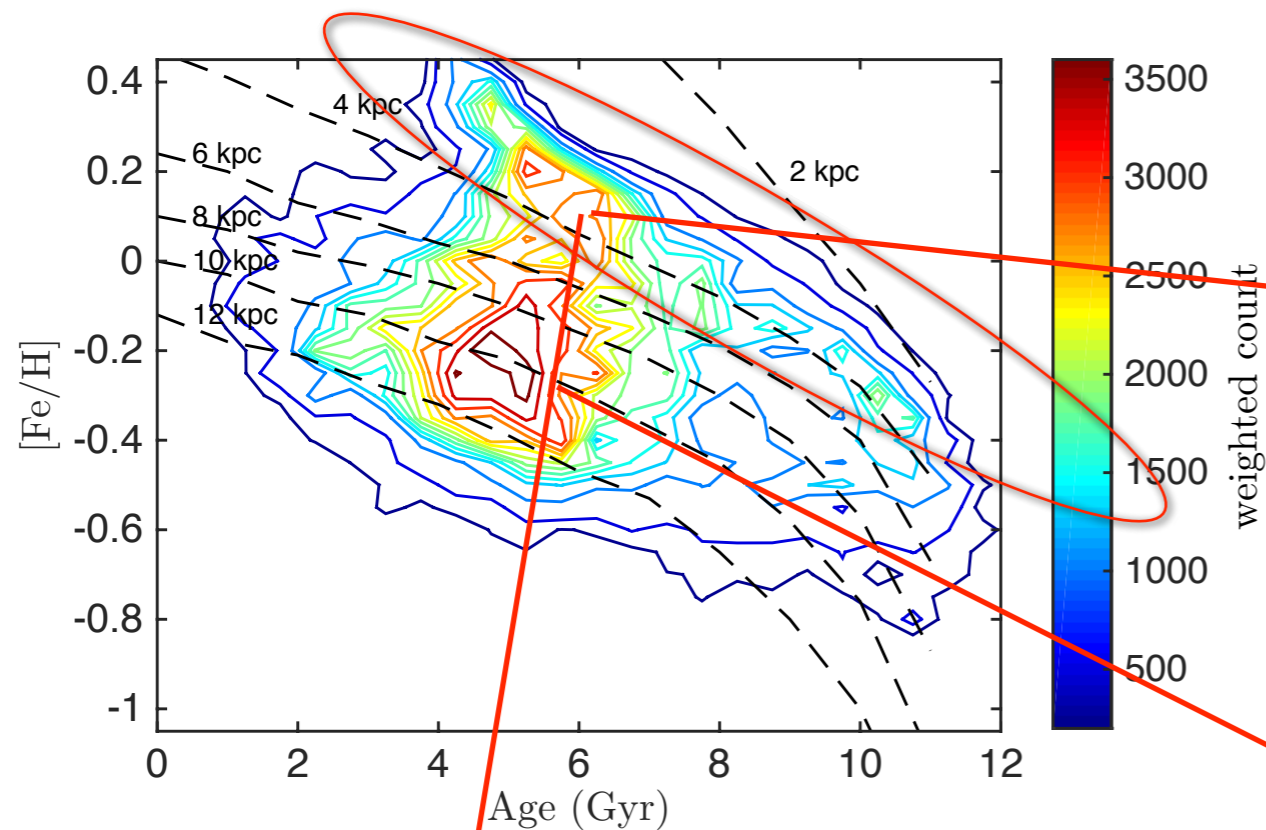


Time machine!

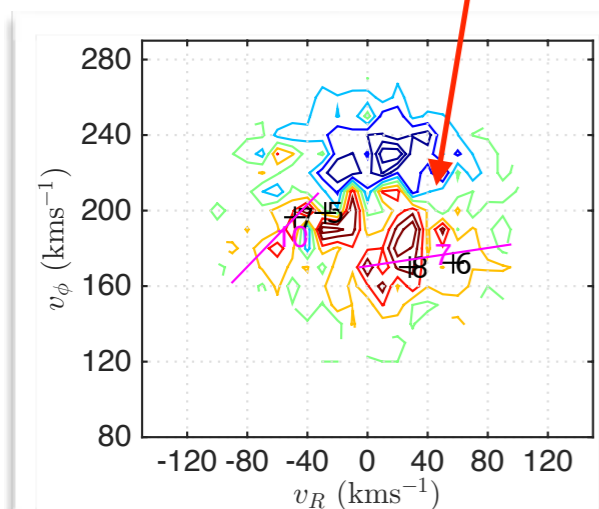
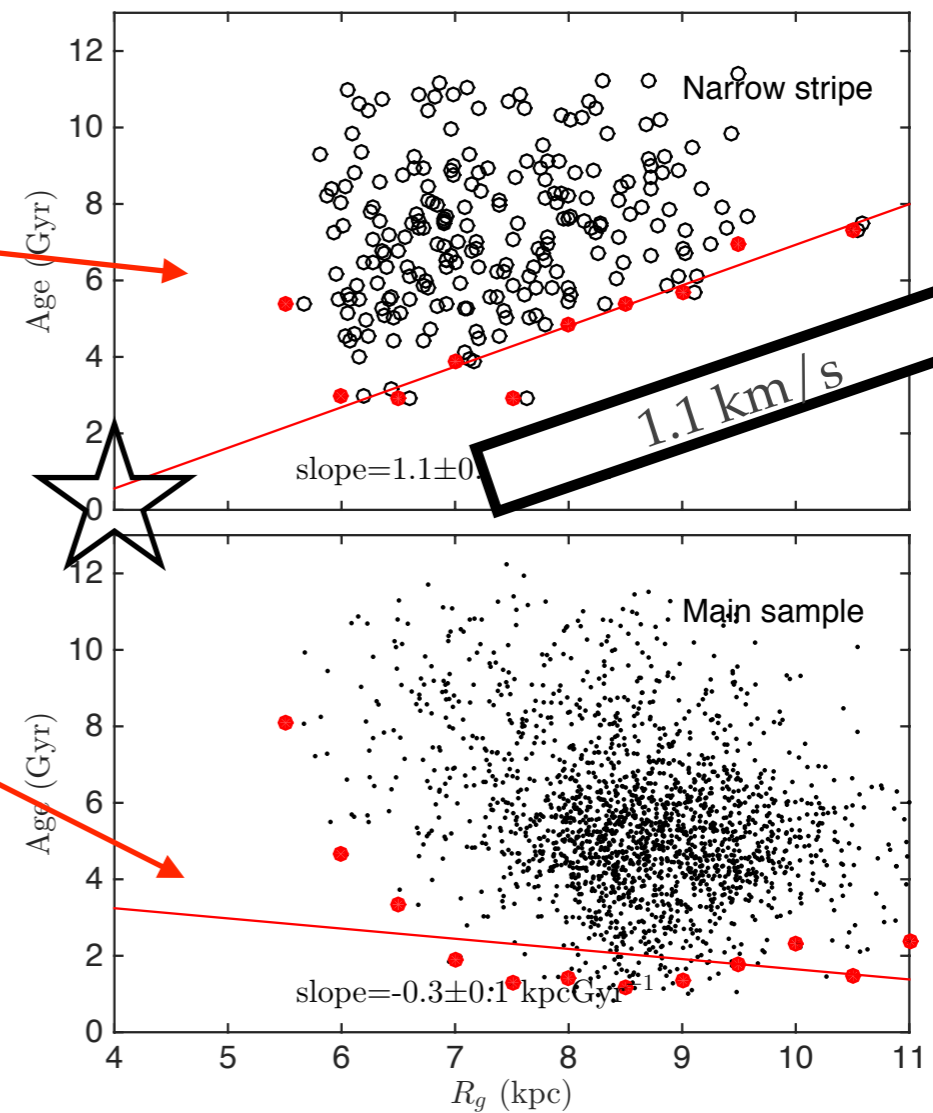


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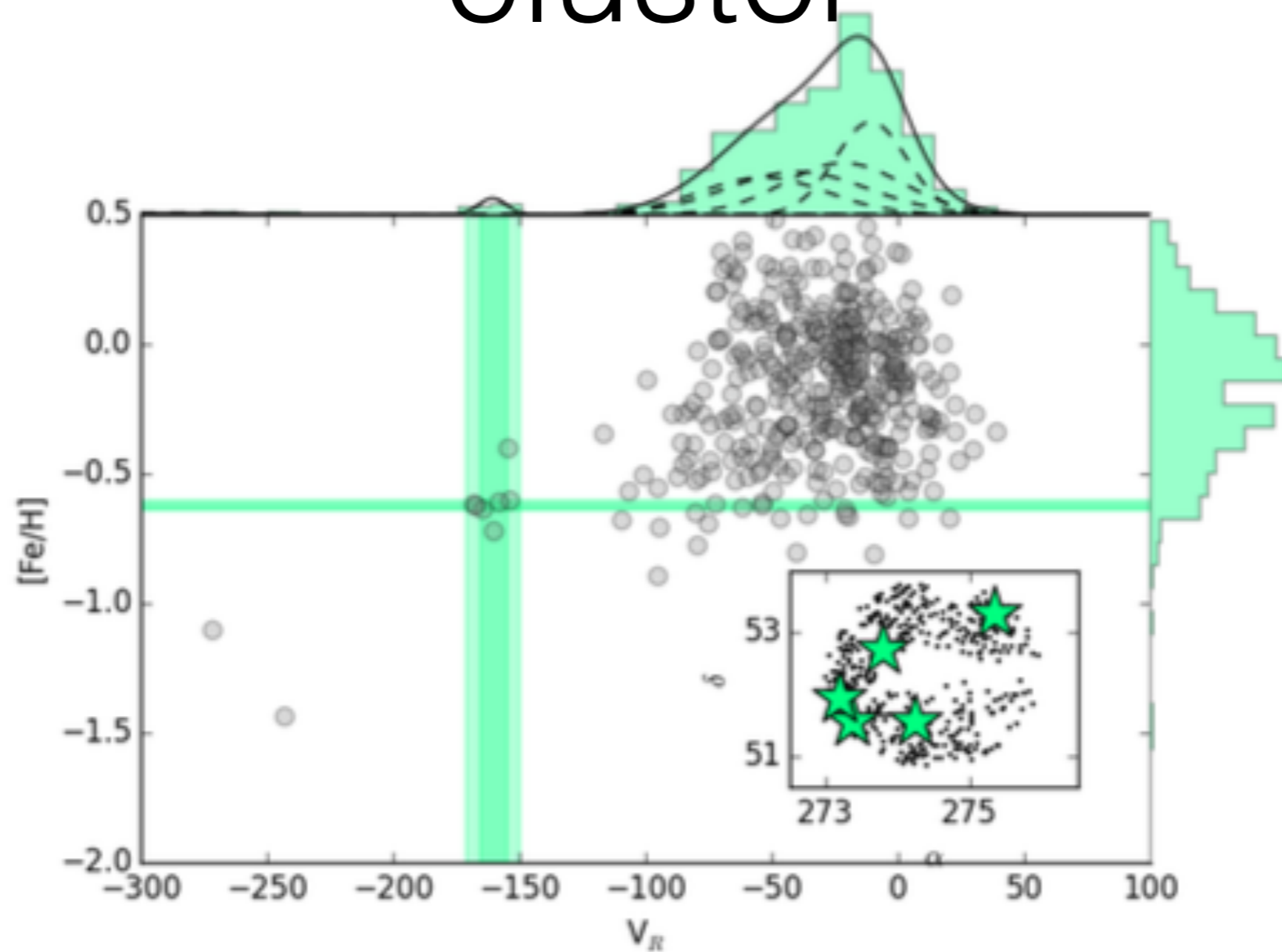


Time machine!



Median
VR=2.6+/-1.8 km/s

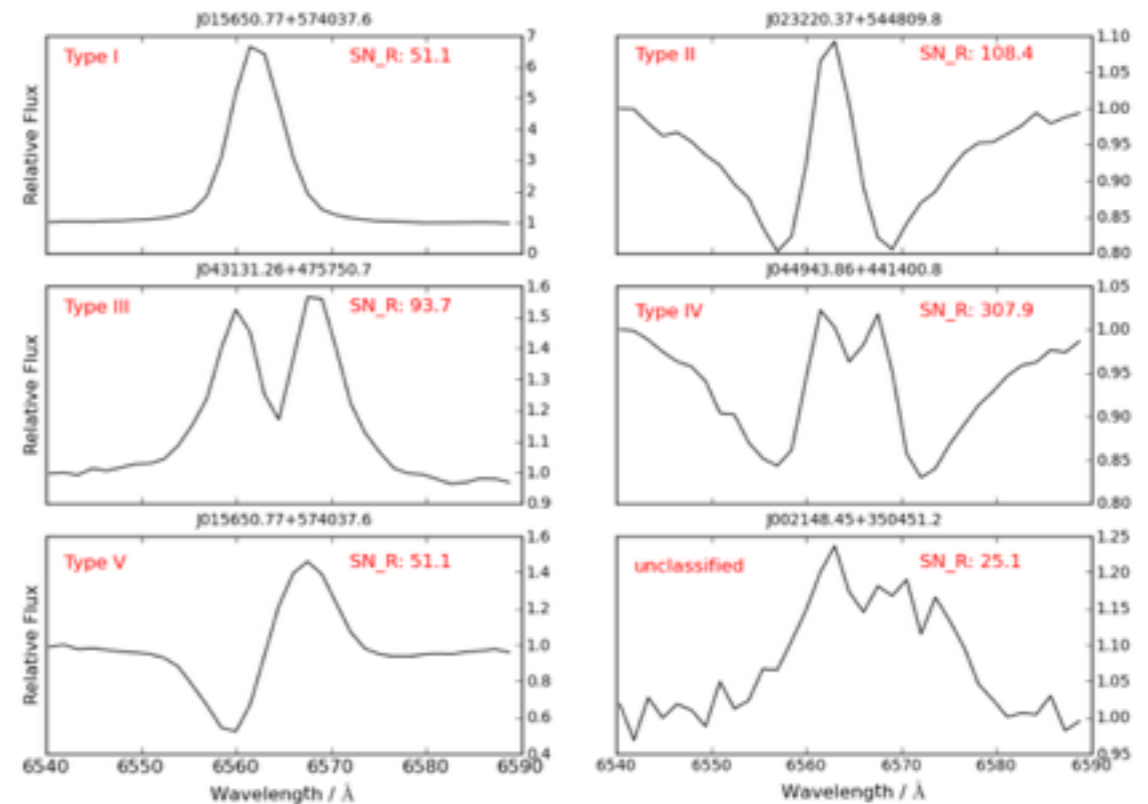
A new disrupted globular cluster



Vickers & Smith submitted to ApJL

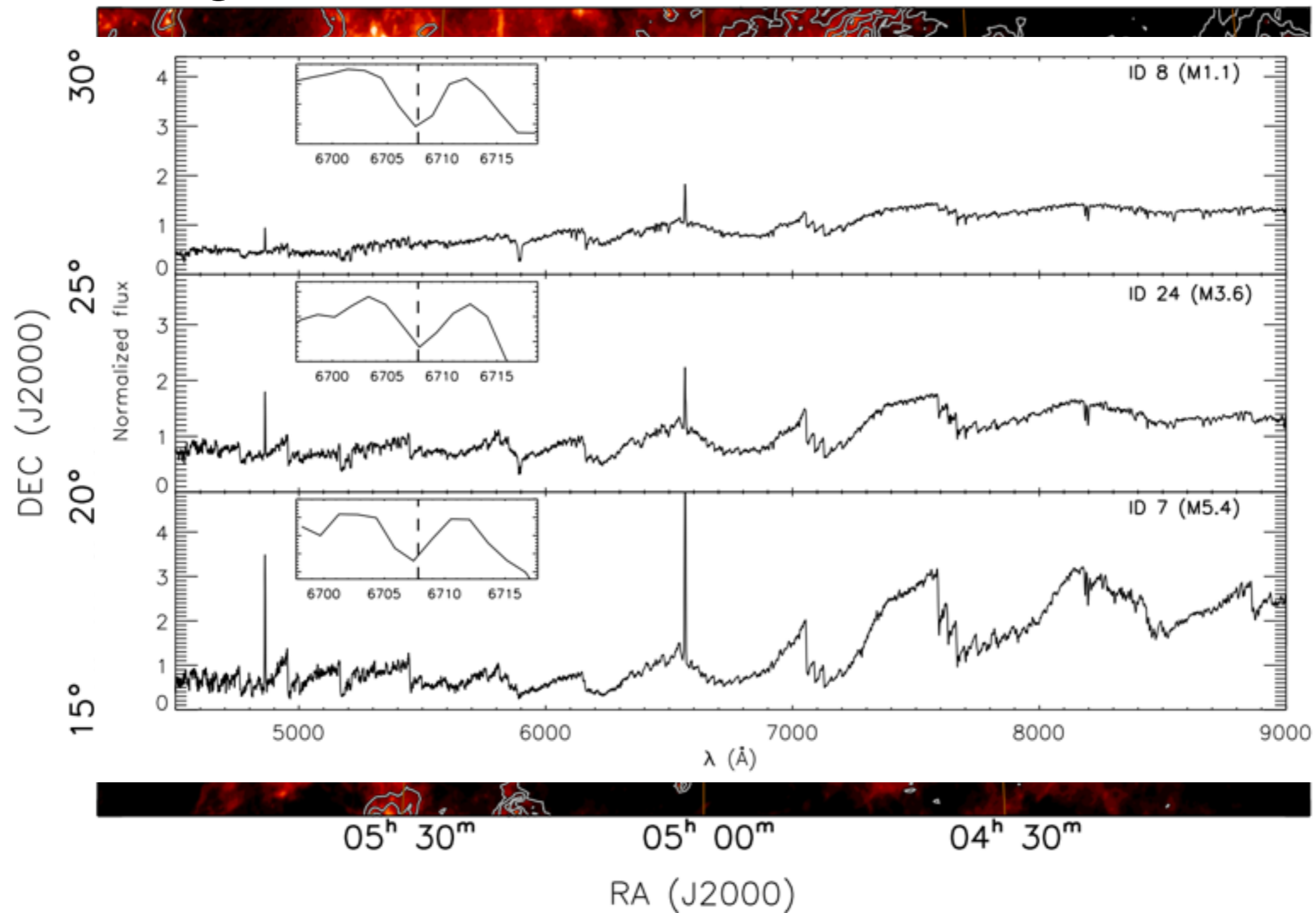
Early-type emission line stars

- Hou et al. submitted to RAA
- 10395 early-type Ha emission stars from LAMOST DR2
 - single-peak emission
 - single-peak emission in absorption line
 - double-peak emission
 - double-peak emission in absorption line
 - P-Cygni profile
- Classical Be, Herbig Ae/Be and binary systems



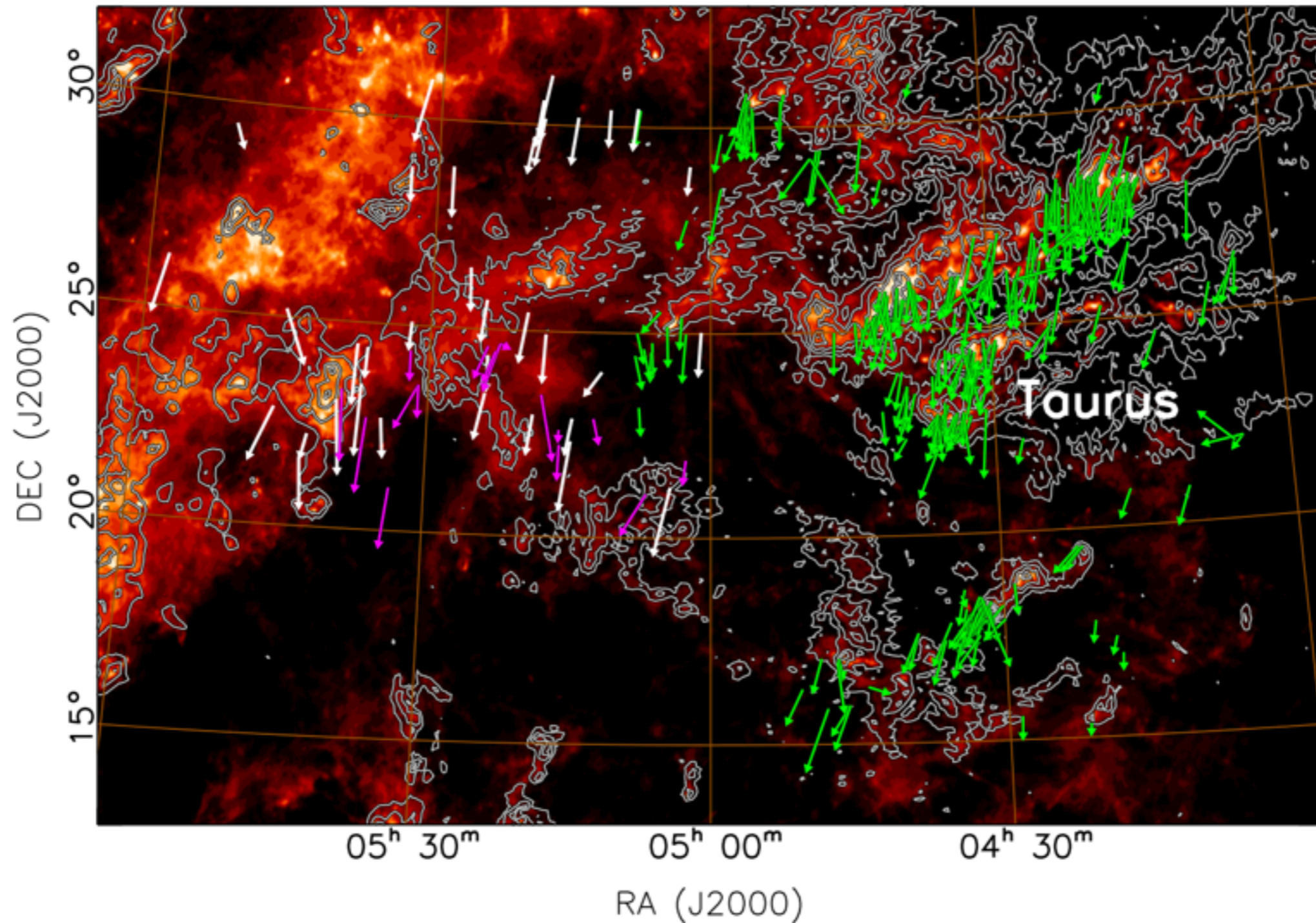
pre-main sequence group

Fang, *CL* et al. to be submitted

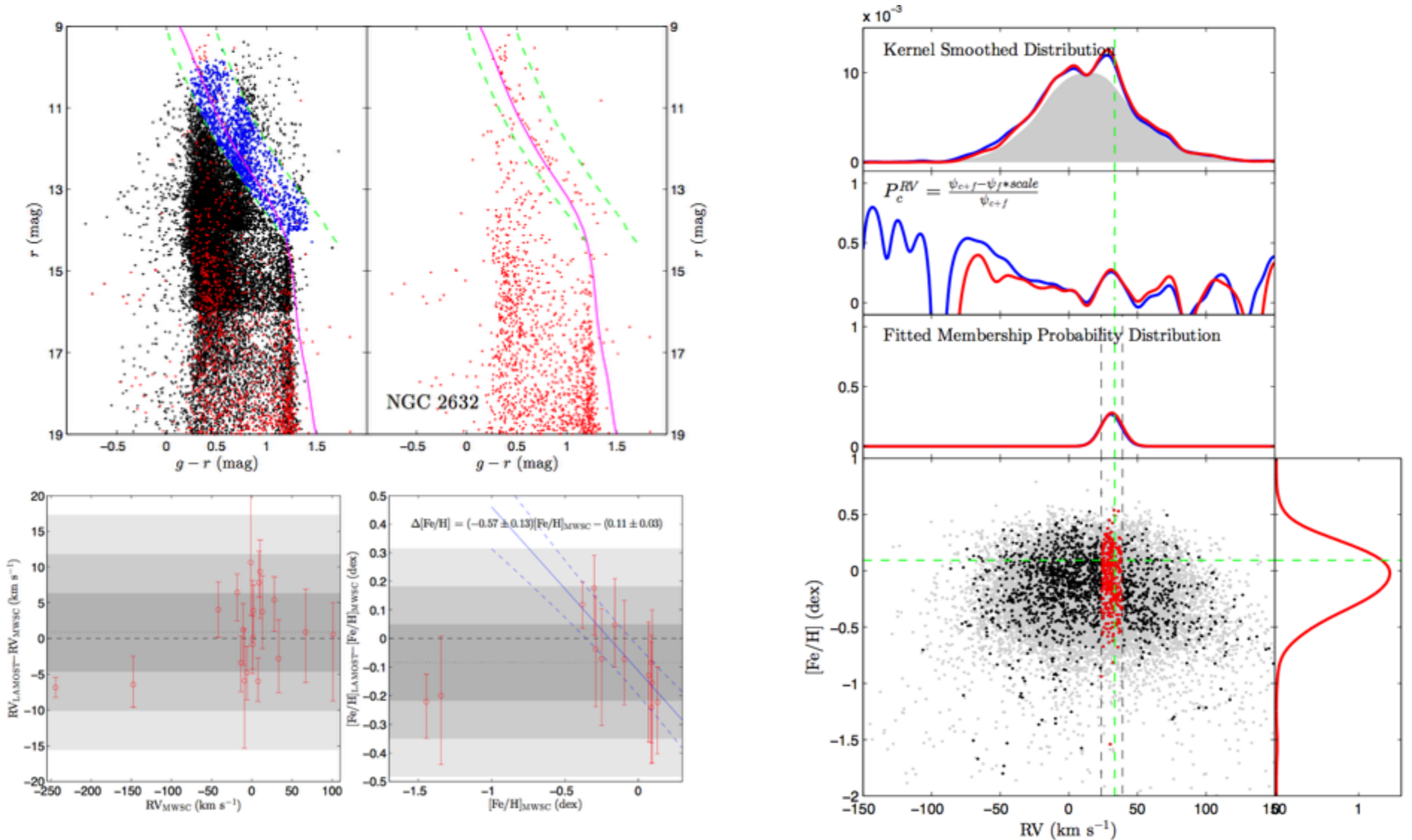


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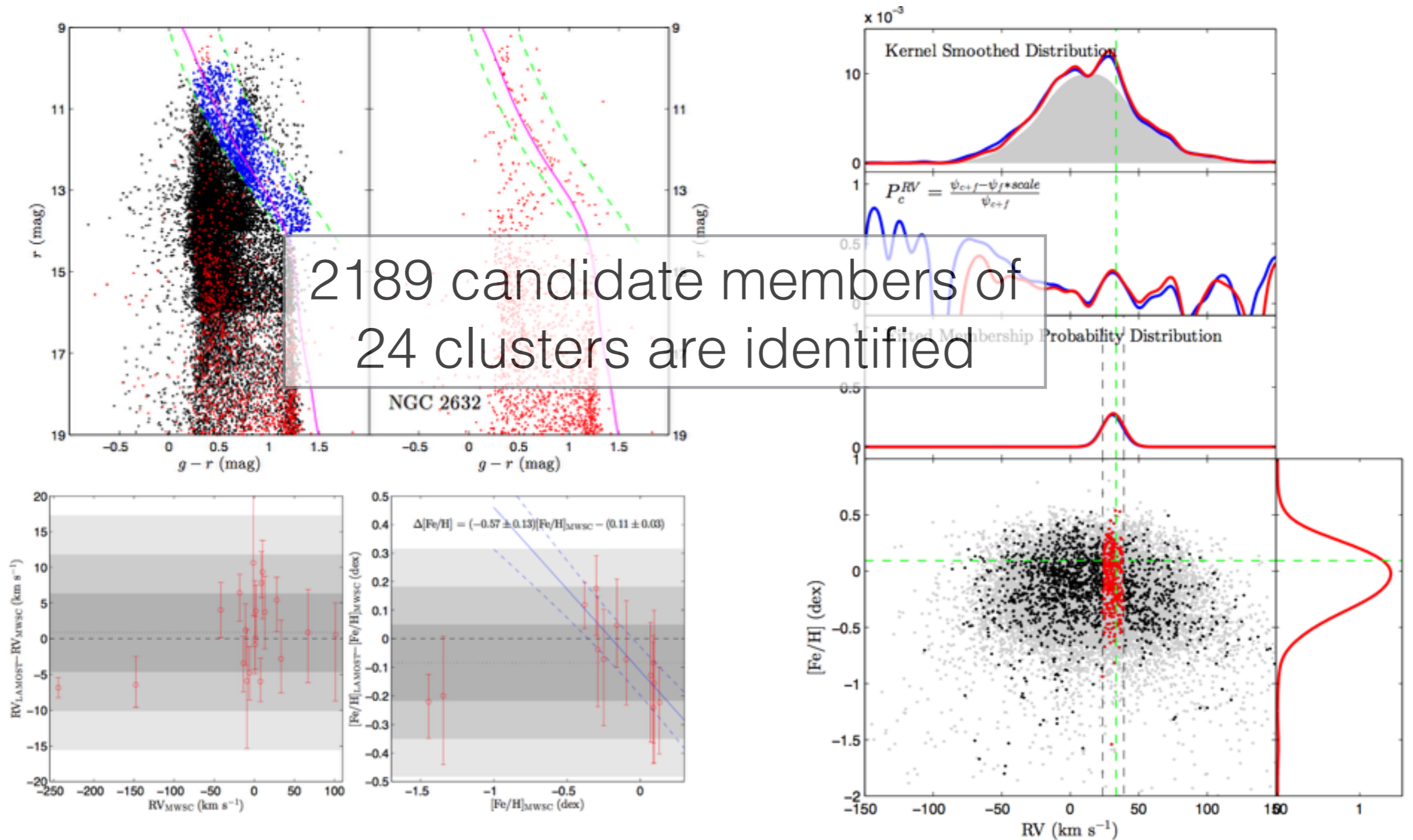
Fang, *CL* et al. to be submitted



Cluster membership



Cluster membership



Summary

- LAMOST science is blooming from this year
- It is never late to actively get involved in the LAMOST survey in such ways:
 - Use the data to do science
 - Propose add-on targets
 - Collaborate with LAMOST people