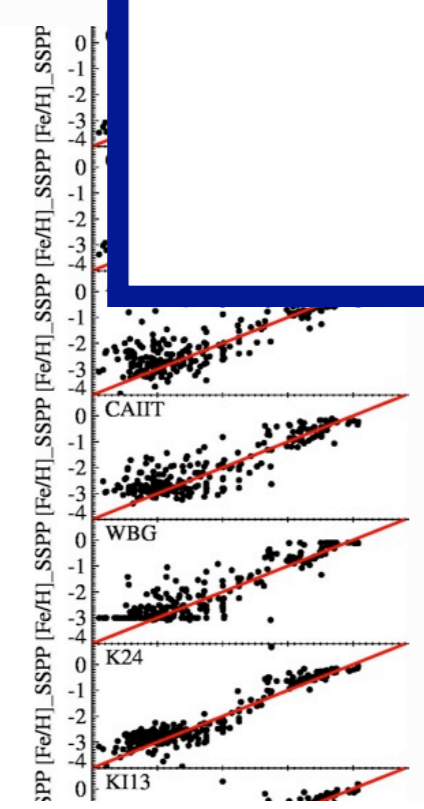
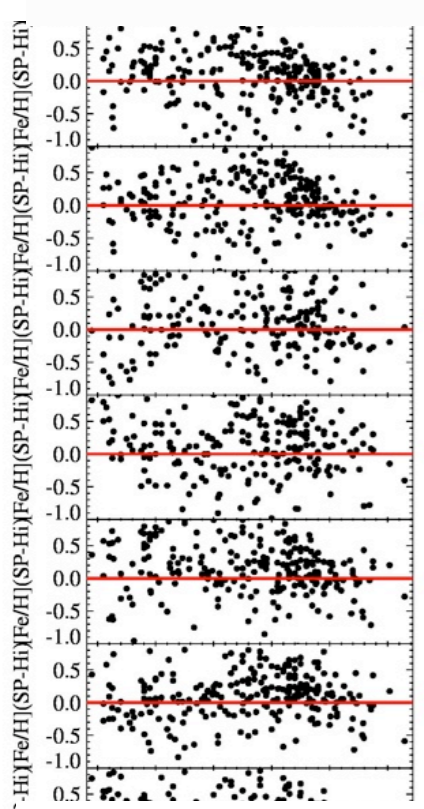


SEGUE-2*

SDSS-III Collaboration Meeting

Paris

July, 2010



*Sloan Extension for Galactic Understanding and Exploration

Survey Description

- Old Milky Way stellar populations, Galactic archaeology: see science talks this meeting
- Use wide field, high throughput of the SDSS survey telescope, fiber spectrographs
 - moderate resolution
 - many lines of sight
 - *in situ* old thin and thick disk, halo stars
- SEGUE-2 observations: all dark time 1st year of SDSS-III (shared w/ BOSS imaging)
 - will release with DR8, Jan 2011

Survey Data

- R=1800 spectra, 3800Å - 9000Å
- 7 sq. deg lines of sight
 - non-contiguous
- targets selected from SDSS *ugriz* imaging, USNOB proper motions (Munn et al. 2004)
 - $14 < g < 20$
 - more distant than RAVE
- Builds on the SEGUE-1 survey (Yanny et al. 2009)
 - done in parallel with finishing the original SDSS galaxy survey, part of DR7
 - data from both survey processed, released and documented together for DR8

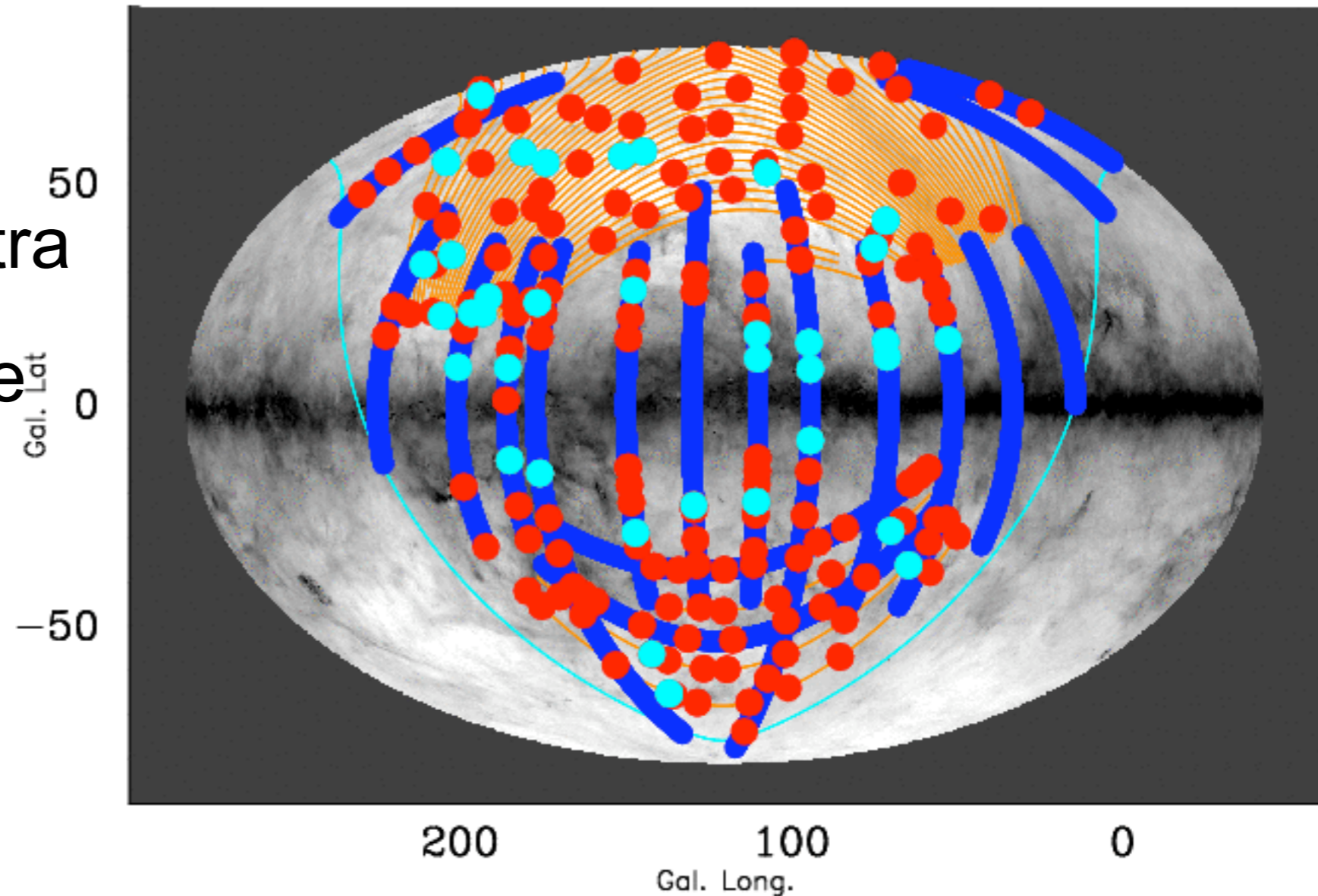
SEGUE -2

SEGUE imaging blue, SDSS orange

202 Lines of Sight

124,000 science spectra

Observations complete

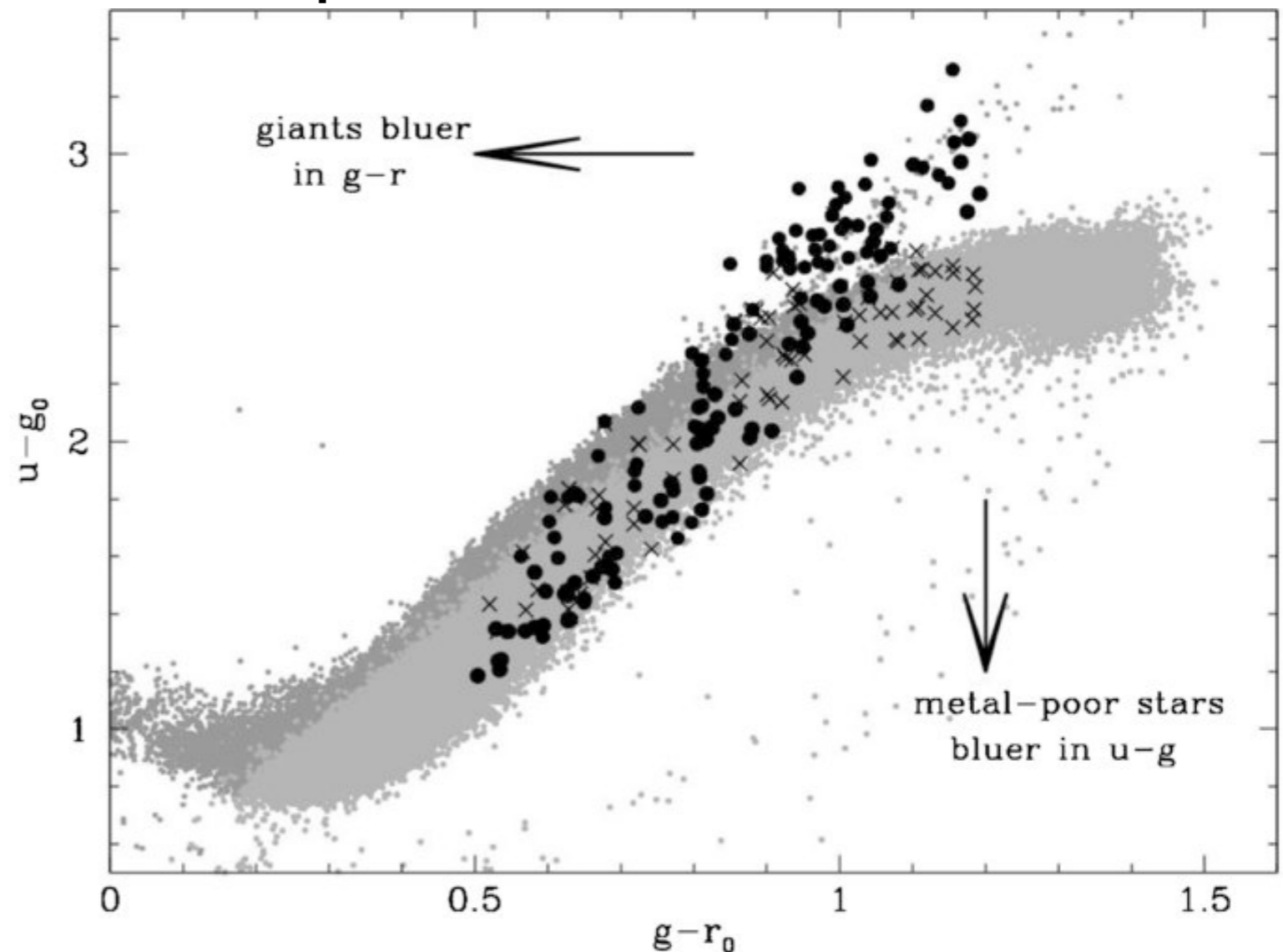


Focus on faint/distant targets

Improved selection of metal-poor stars, halo giants and BHBs based on SEGUE-1 experience

Spectroscopic Targets

- *in-situ* tracers of substructure, mass profile in the outer halo: K-giants, BHBs, M-giants
- all candidates get fibers: sample limitation is survey area
- Galactocentric distances to 80 kpc
- old stellar populations: low-metallicity, ultra-cool white dwarfs, high proper motion dwarfs, high velocity, old MS turnoff
- one “deep” plate per line of sight



SEGUE-1

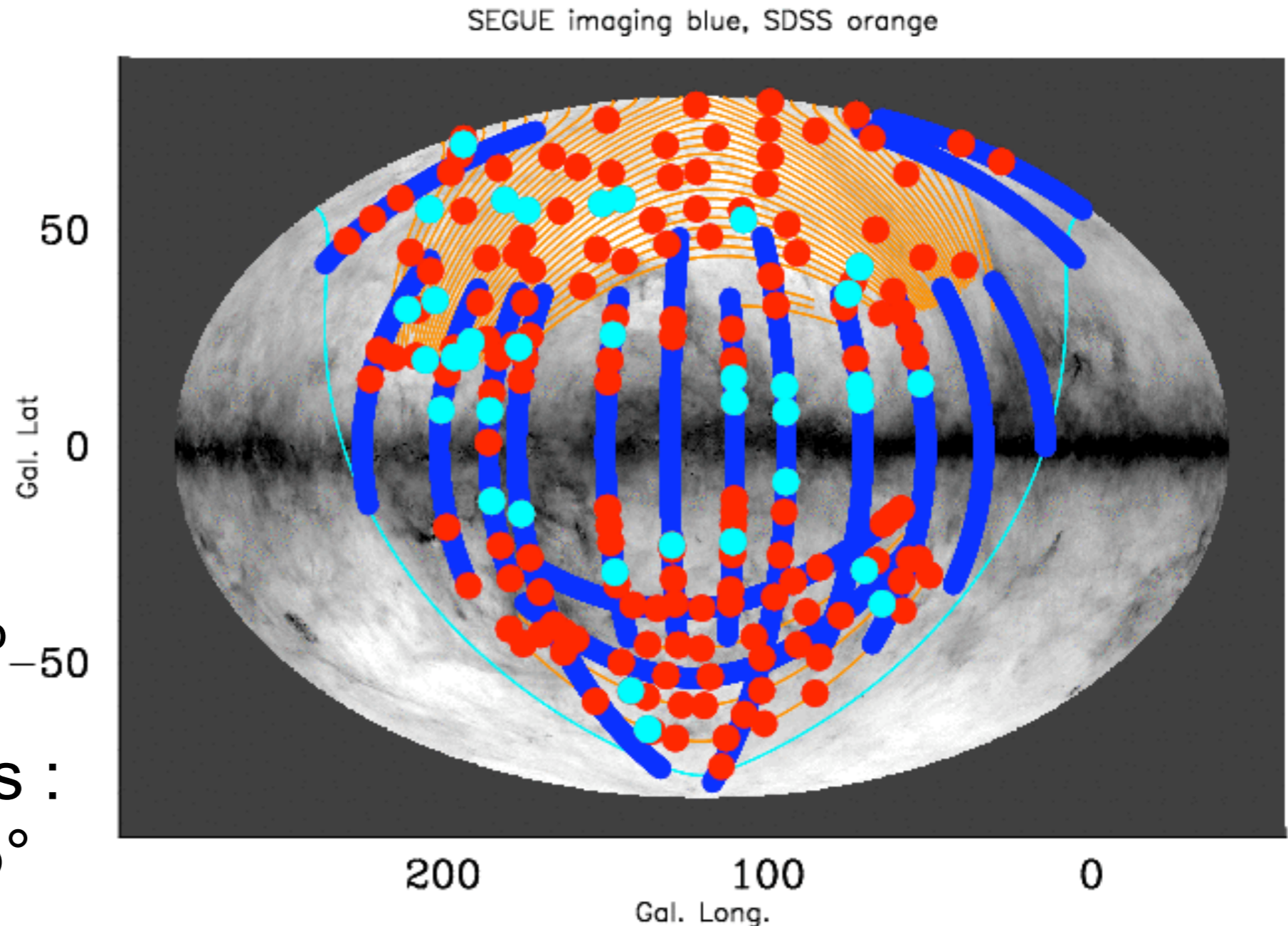
260,500 science spectra

157 field pointings

16 pointings on known substructure

11 “low latitude” pointings $8^\circ < |b| < 20^\circ$

ugriz imaging stripes :
3500 deg² @ $|b| < 35^\circ$
and through the Galactic plane

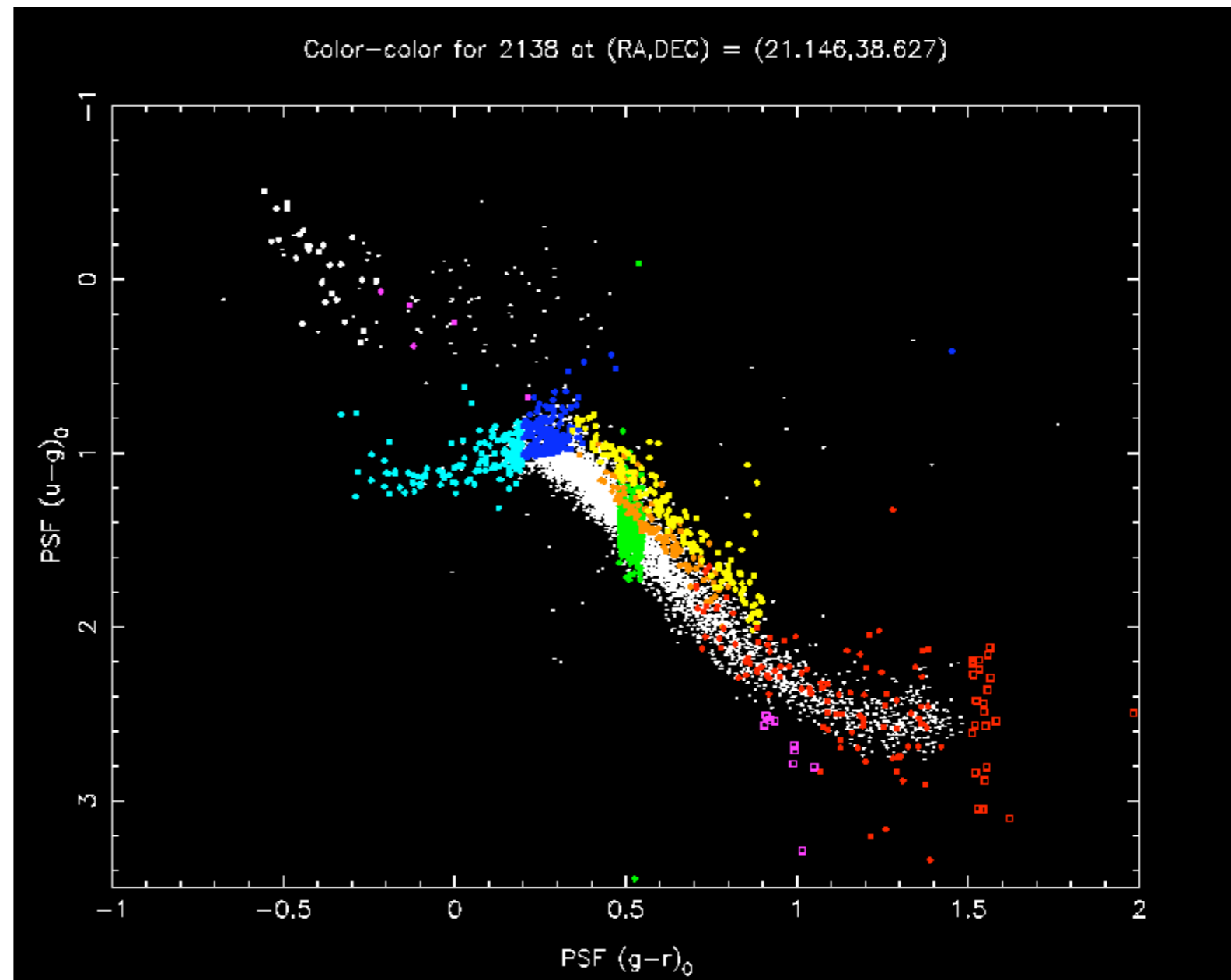


SEGUE @DR7, July 2008
<http://www.sdss.org/dr7>

Yanny et al. 2009

SEGUE-1 Targets

- two plates per pointing, bright and faint
- larger fraction of fibers given to targets selected in slices of $g-r$ to spread fibers over the old MS warmer than 4000K
- stars in the coolest slice are to $d \sim 2$ kpc, w/ good USNOB +SDSS proper motion data
- the MSTO UV-excess selection reaches 15-20 kpc



SEGUE Stellar Parameters Pipeline

Multiple methods, valid in specific ranges of S/N, g-r

Applied to all stellar data taken with SDSS spectrographs

For $5000\text{K} < T_{\text{eff}} < 7500\text{K}$,
S/N > 10 / 1Å pix:

$\sigma(T_{\text{eff}})$ 157K

$\sigma([\text{Fe}/\text{H}])$ 0.29

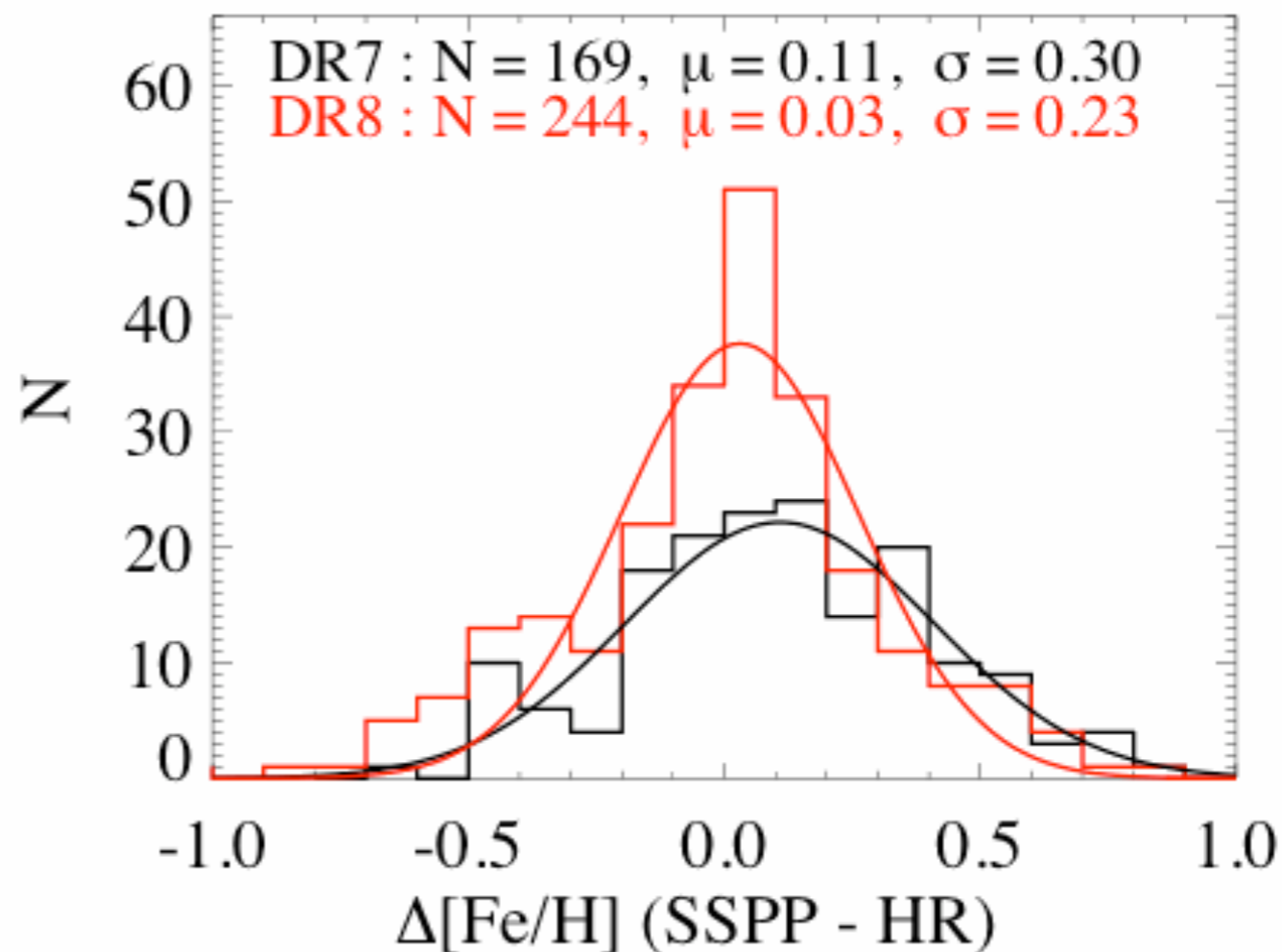
$\sigma(\log g)$ 0.24

$\sigma(\text{RV}) < 4 \text{ km/s}$ for $g < 18$

SSPP: Lee et al (2008) a,b

Allende Prieto et al. 2008

RVs from Schlegel/Loomis/
Gunn spectro pipeline

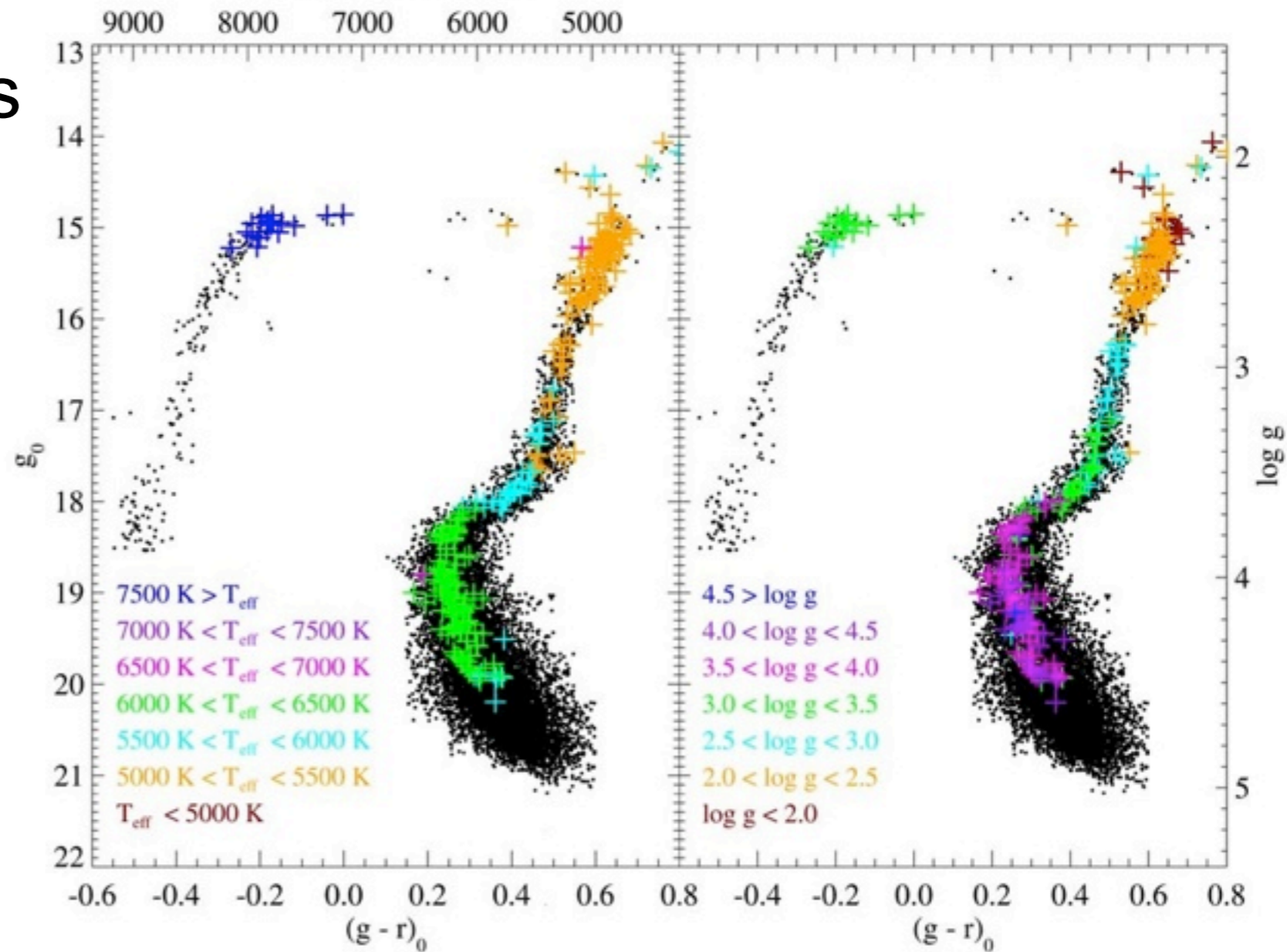


Main DR8 improvements: robust combination of estimators, accuracy @ $[\text{Fe}/\text{H}] > -0.5$

Spectroscopic Calibration Sample

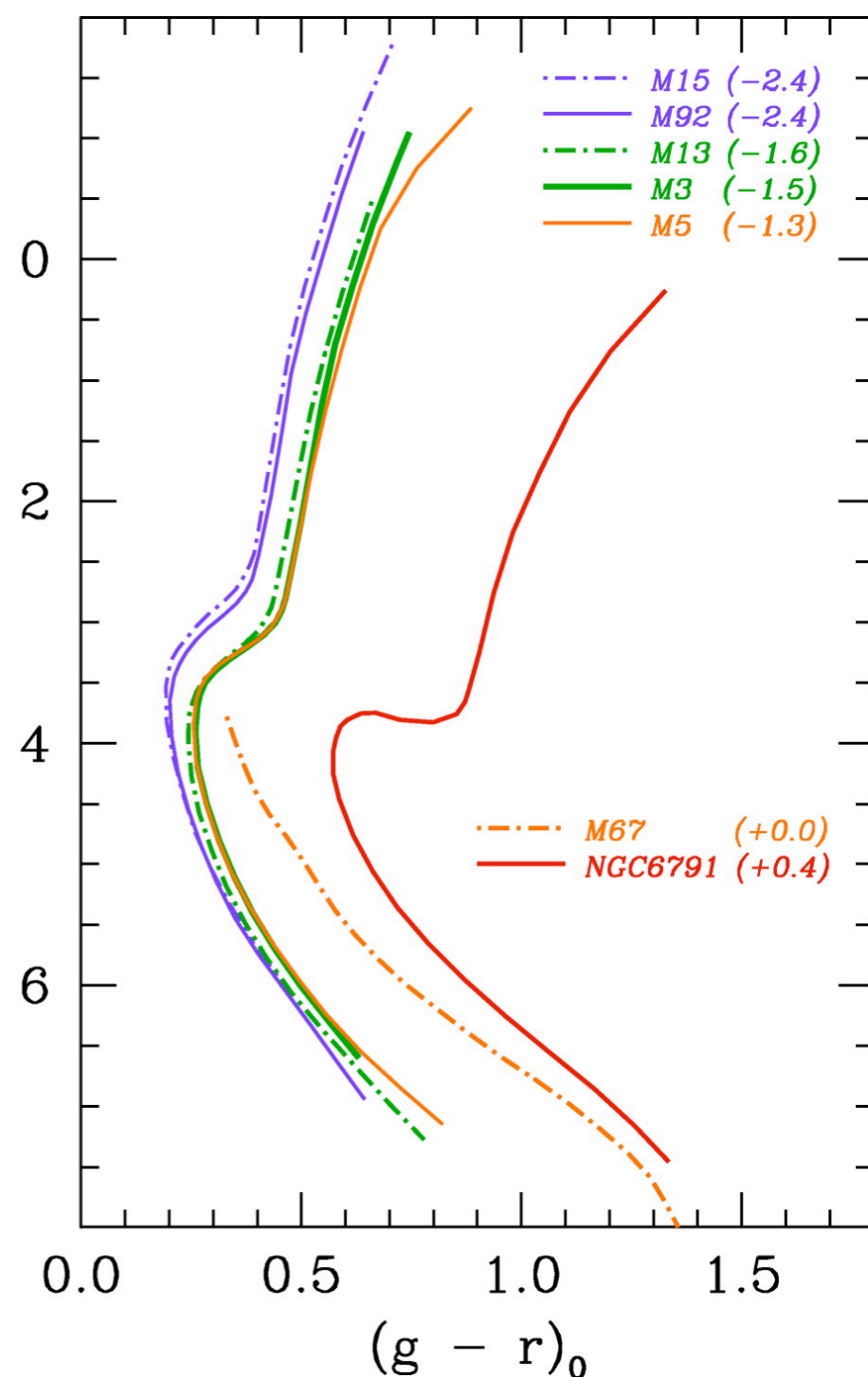
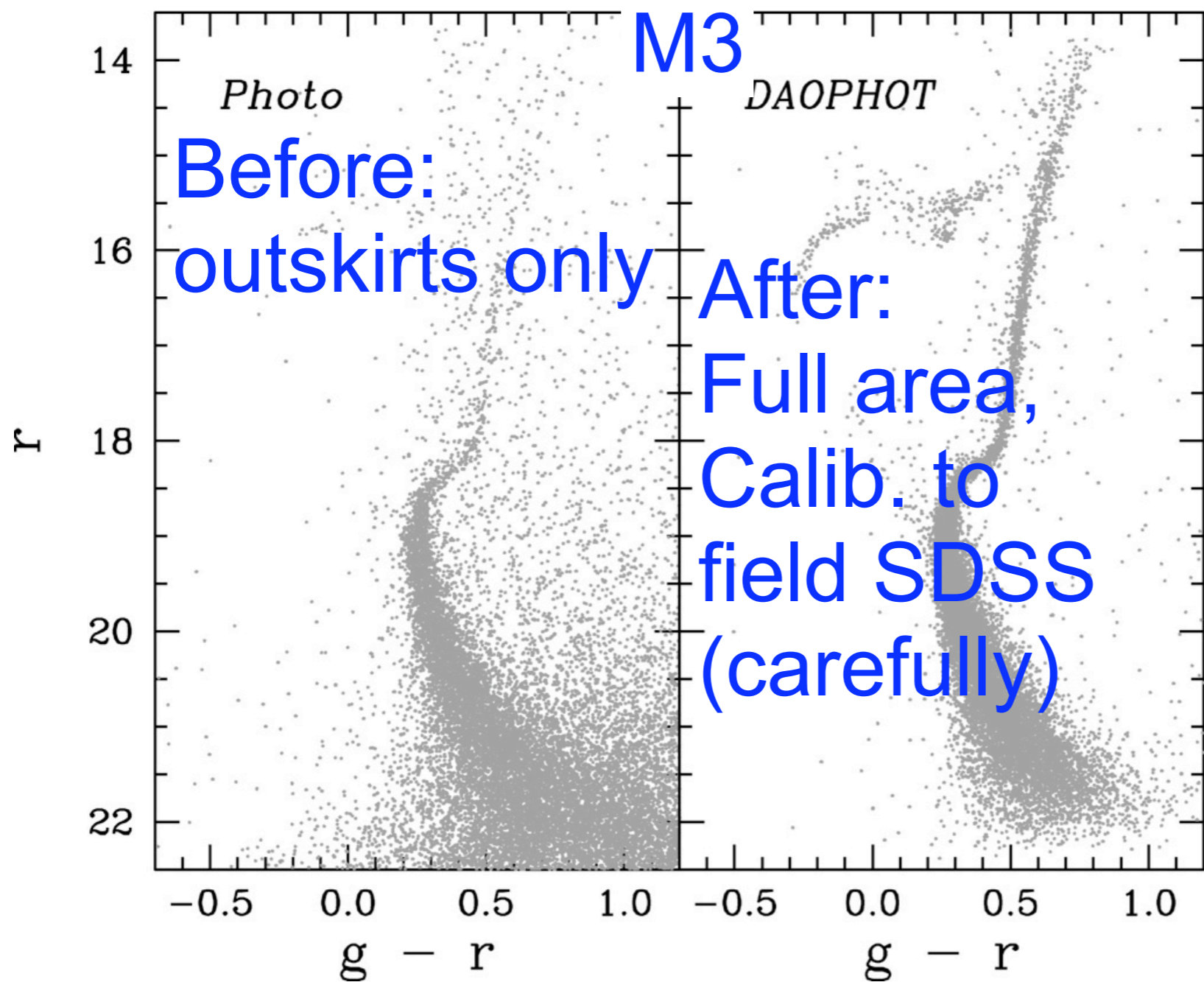
SEGUE-1 + SEGUE-2
special calibration plates
on cluster stars:

M92
M13
M15
M2
NGC 2420
M67
M71
NGC 6791
Be 29



Field stars: 100+ stars observed with SEGUE
and high resolution spectrographs on HET, Keck,
VLT, Subaru, ... (Allende Prieto et al. 2008)

Globular Cluster Photometry and Fiducial Sequences



An et al. 2008

Status

- Observations, data processing complete
 - no substantive changes to the extraction, flux calibration, RV pipelines
 - new, improved version of the SSPP
- Spectra, RVs, SSPP outputs available to the collaboration as fits binary tables
- Spectra, RVs, SSPP outputs loaded into a “pre-DR8 CAS” sql database, available to the collaboration
 - matched to a copy of DR7 imaging data
 - improvements vs. DR8 to make queries easier
 - documentation is the next big task, including the SEGUE-2 paper