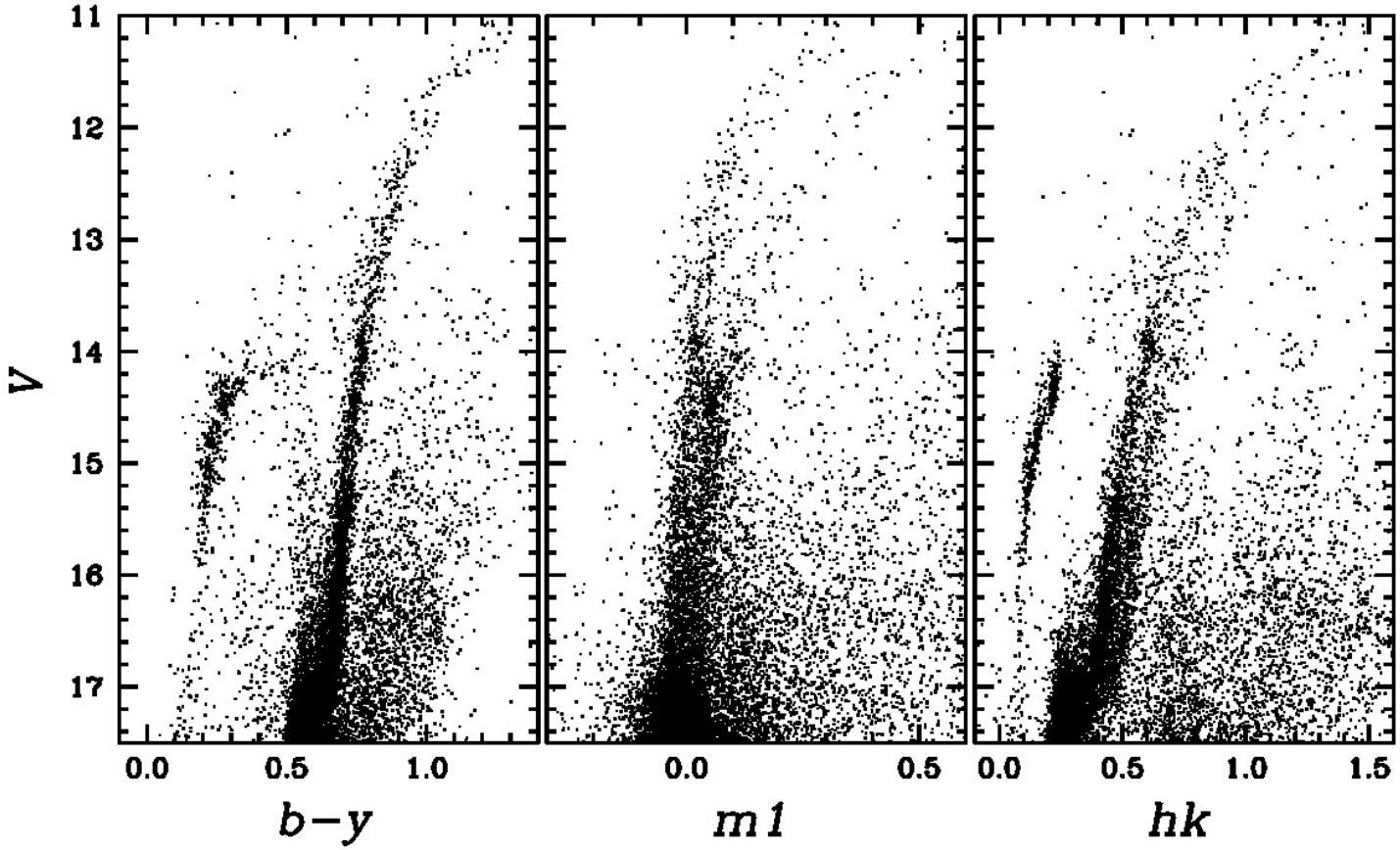
MULTIPLE STELLAR POPULATIONS OF GLOBULAR CLUSTERS FROM HOMOGENEOUS Ca *by* PHOTOMETRY. I. M22 (NGC 6656)*†

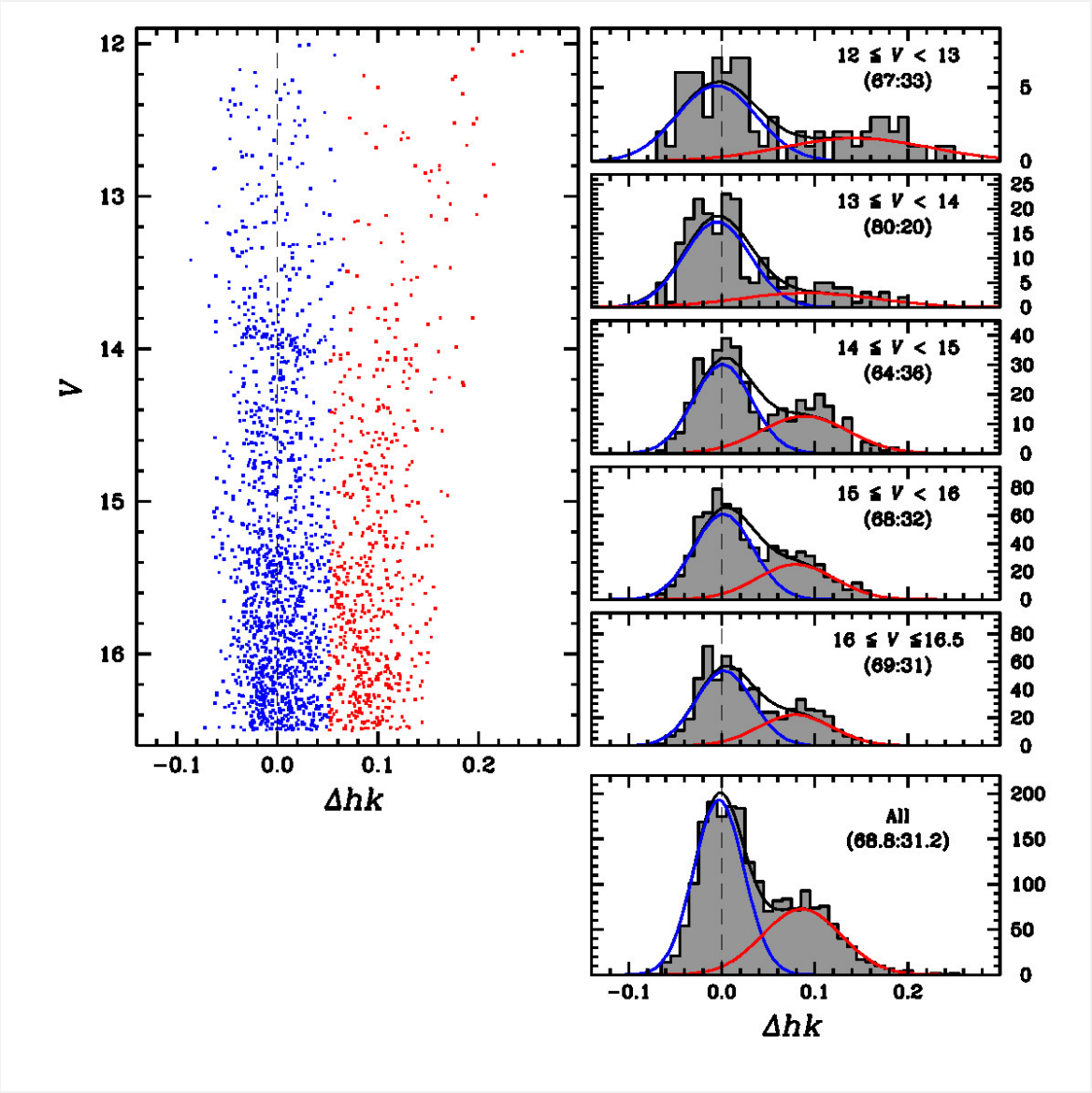
JAE-WOO LEE[1]

2015, ApJS, 219:7

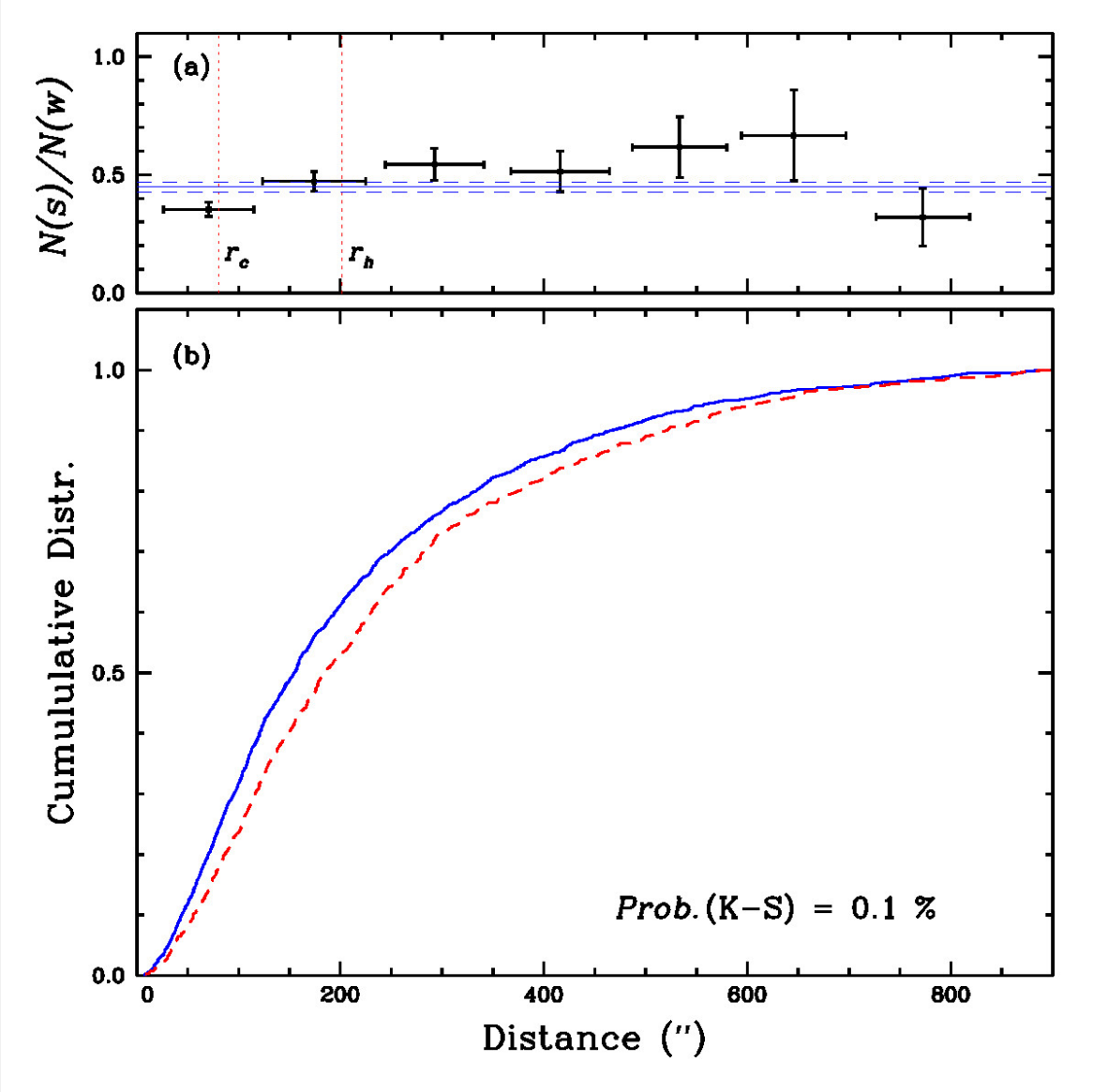
Wide-field ground based Ca uvby + HST WFC3 + RV measurements (Lane et al. 2009)



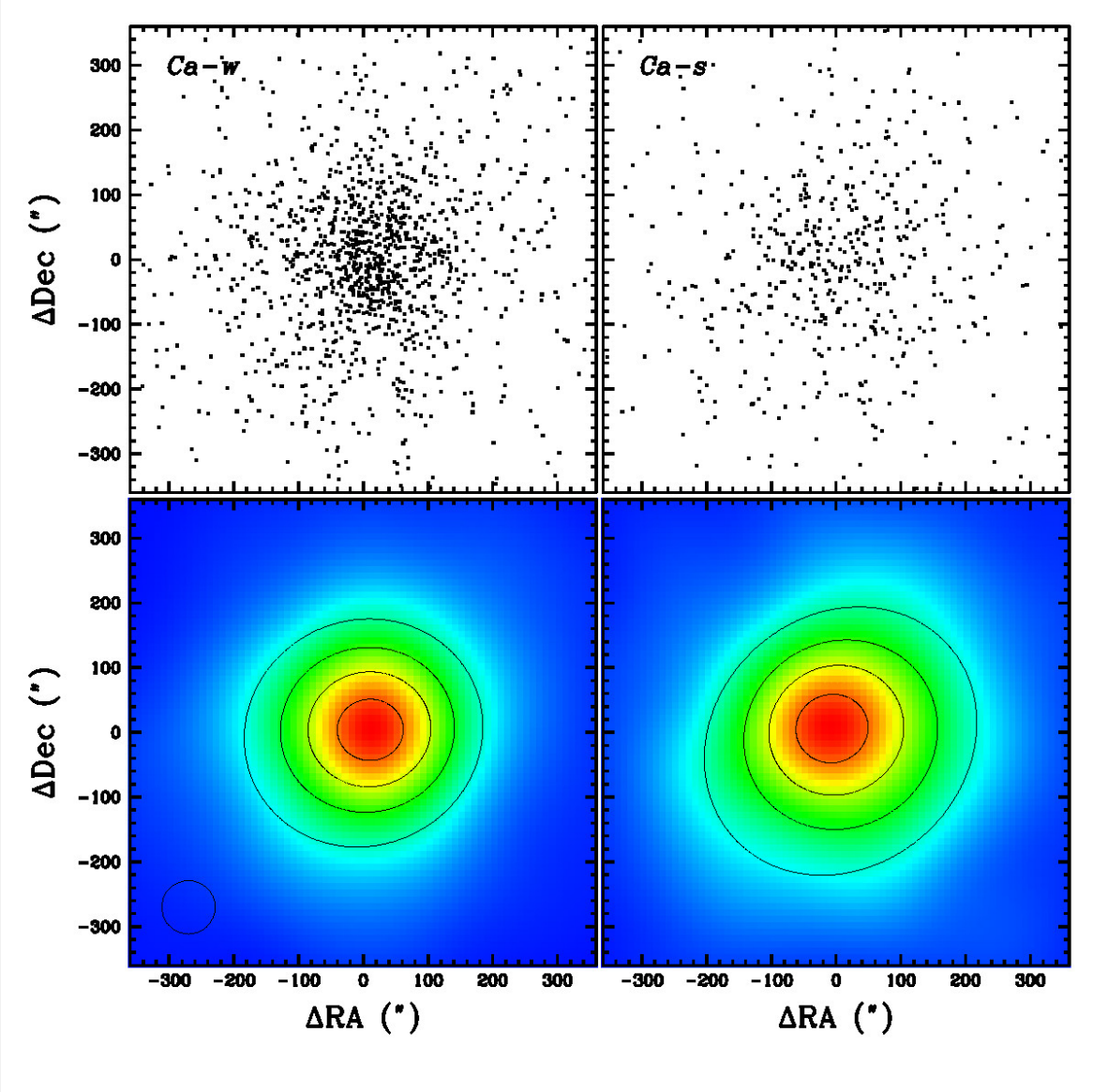
Two RGB populations in M22



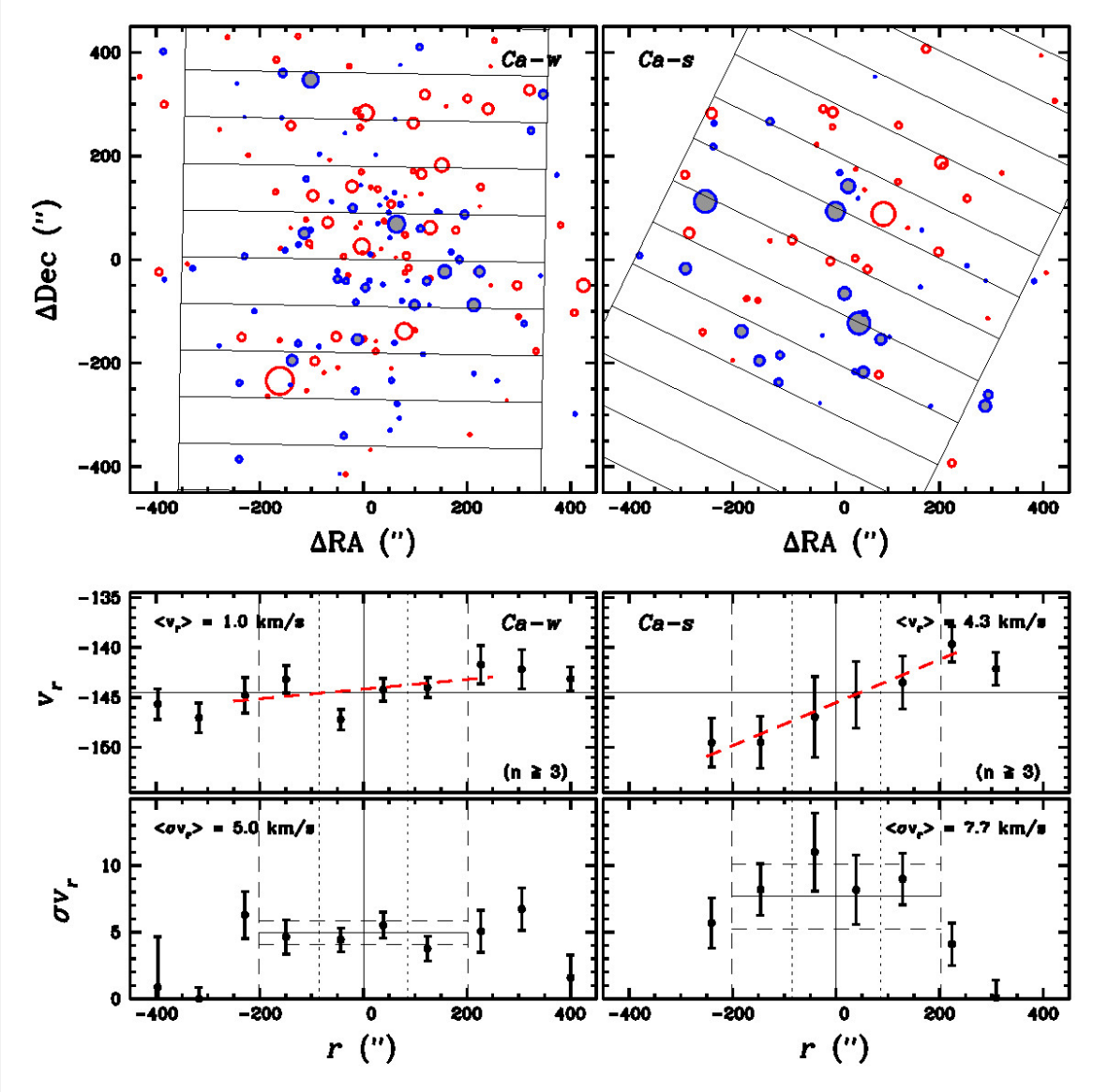
The Ca-w population is more centrally concentrated



The Ca-s population has a more elongated distribution

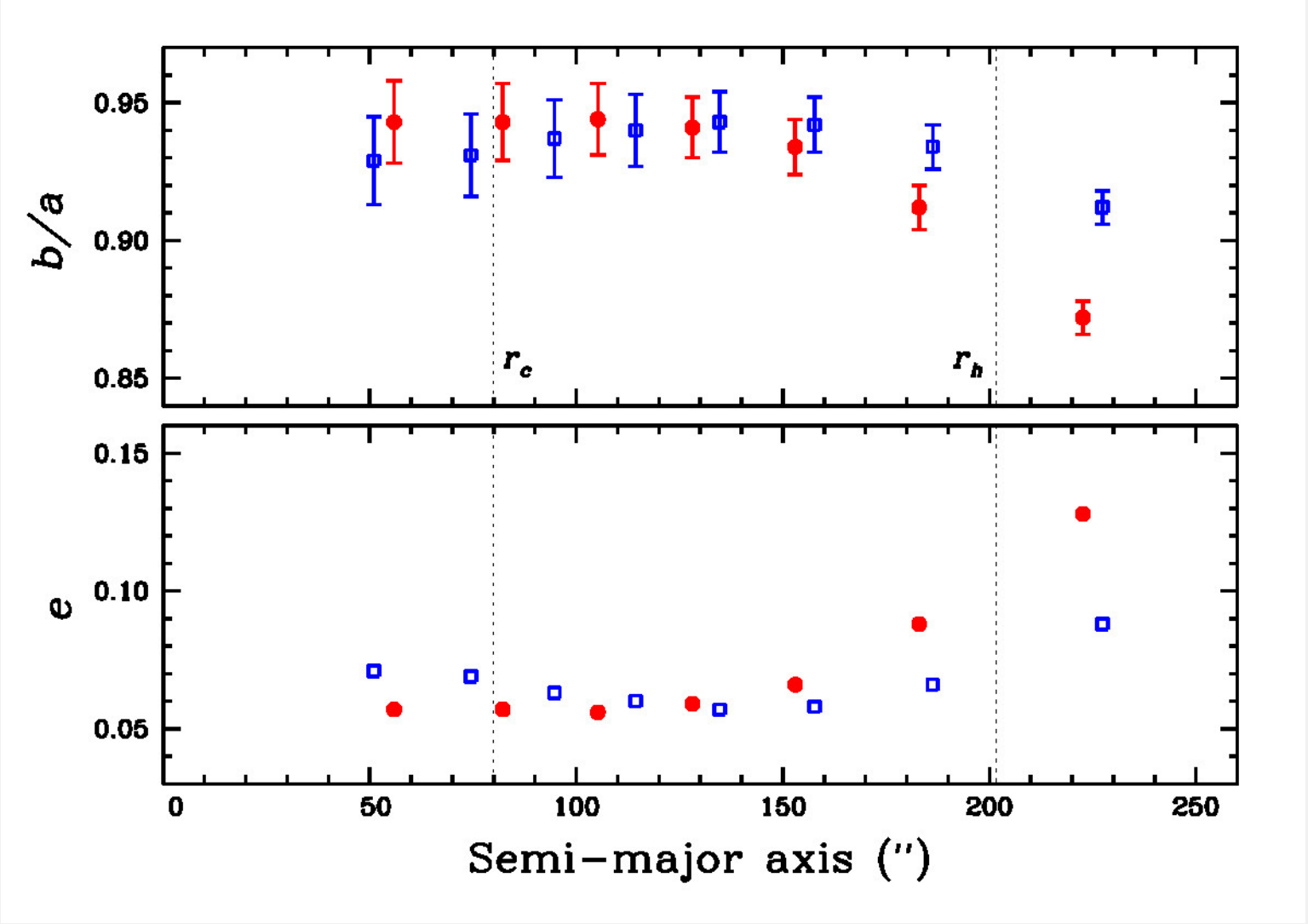


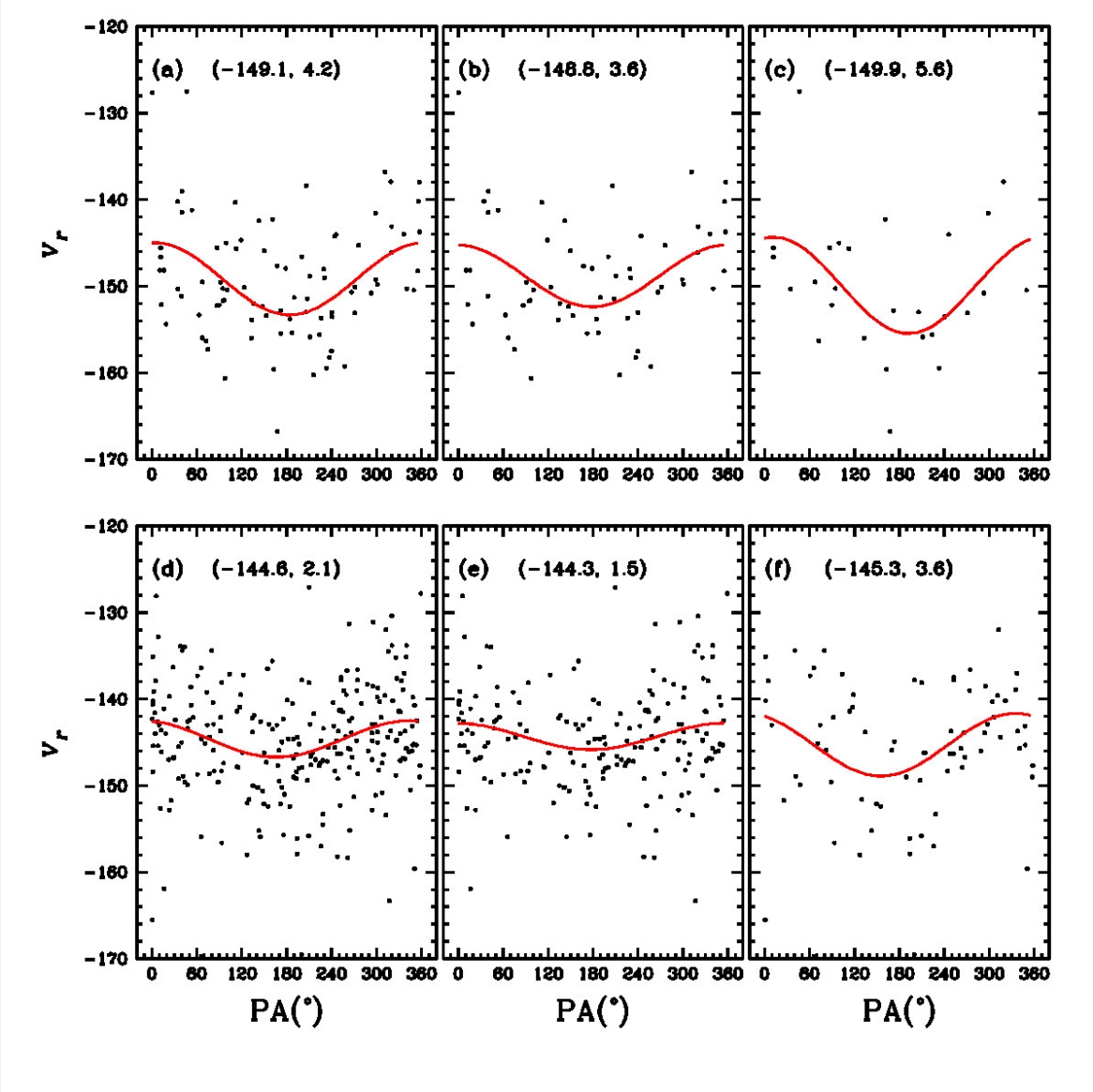
The Ca-s population has larger projected rotational velocity and larger velocity dispersion

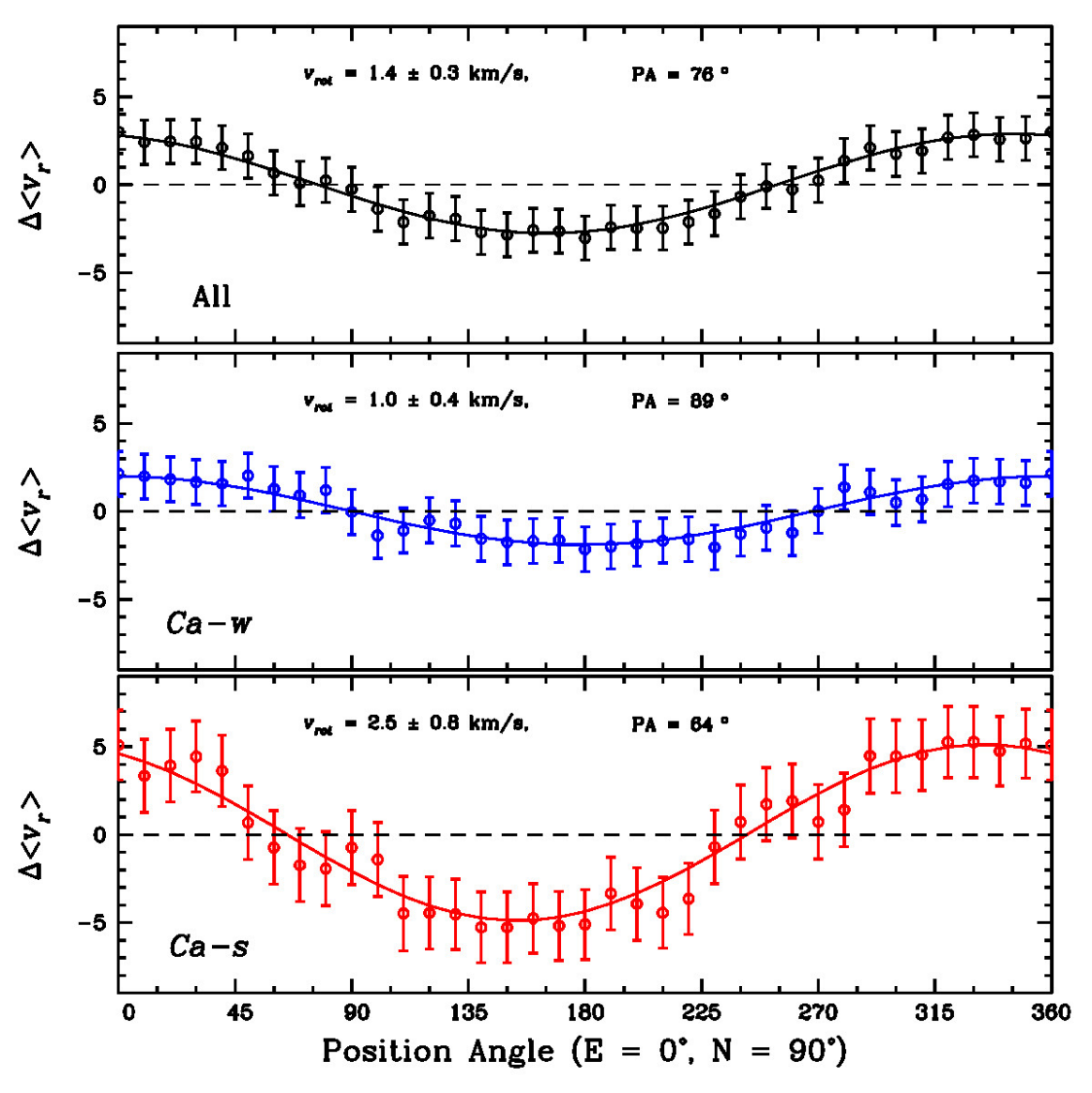


Summary

- The hk index provides a powerful method to distinguish multiple populations in GCs.
- The double RGB population in M22 have different spatial distributions and kinematic properties.
- The most plausible explanation for the formation of M22 is the merger of a GC pair (in a dwarf galaxy environment).


b/a
0.95
0.90
0.85
r_c
r_h
e
0.15
0.10
0.05
0
50
100
150
200
250
Semi−major axis (")


(a) (−149.1, 4.2)
(b) (−146.8, 3.6)
(c) (−149.9, 5.6)
(d) (−144.6, 2.1)
(e) (−144.3, 1.5)
(f) (−145.3, 3.6)
V_r
PA(°)
−120
−130
−140
−150
−160
−170
0 60 120 180 240 300 360


v_{rot} = 1.4 ± 0.3 km/s, PA = 76 °
All
v_{rot} = 1.0 ± 0.4 km/s, PA = 89 °
Ca−w
v_{rot} = 2.5 ± 0.8 km/s, PA = 64 °
Ca−s
Δ<v_r>
5
0
−5
0
45
90
135
180
225
270
315
360
Position Angle (E = 0°, N = 90°)