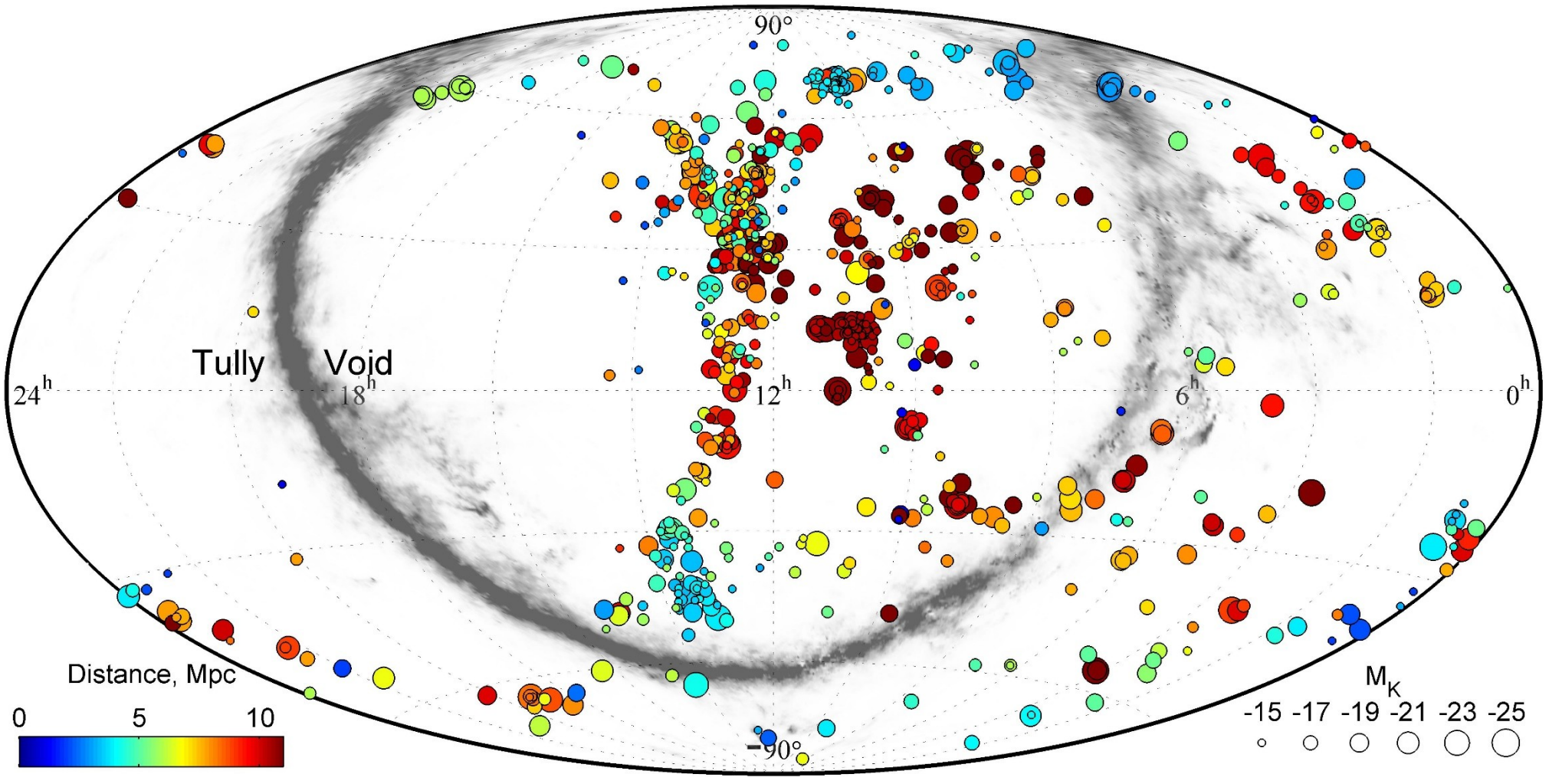
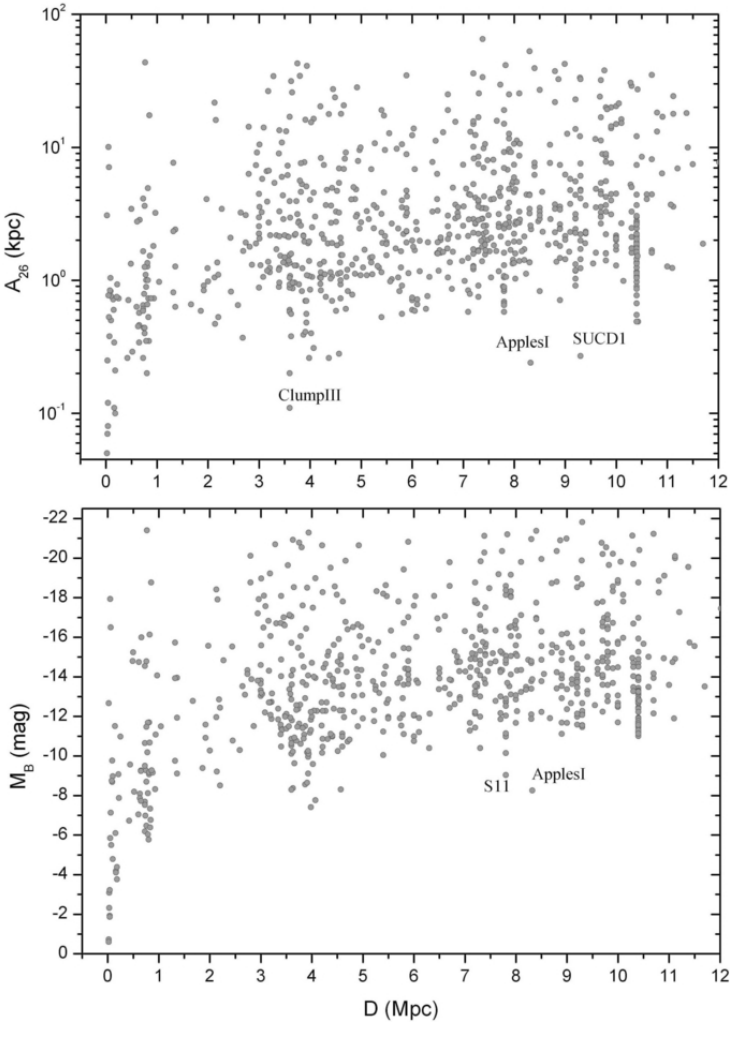
Dmitry Makarov
Special Astrophysical Observatory of the Russian Academy of Sciences

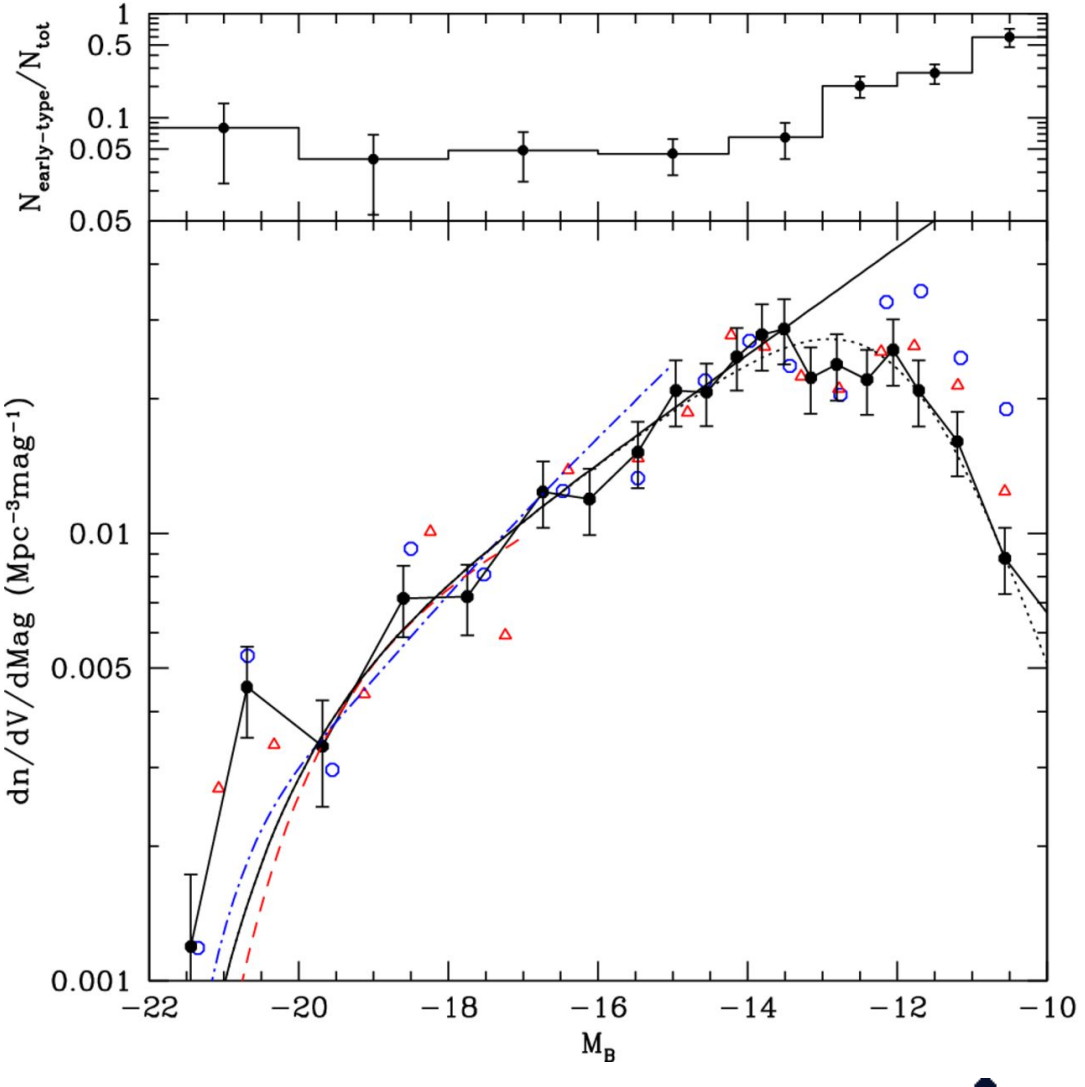
Mean density of matter in the Local Universe

Distribution of LV galaxies on the sky



Luminosity function of LV galaxies

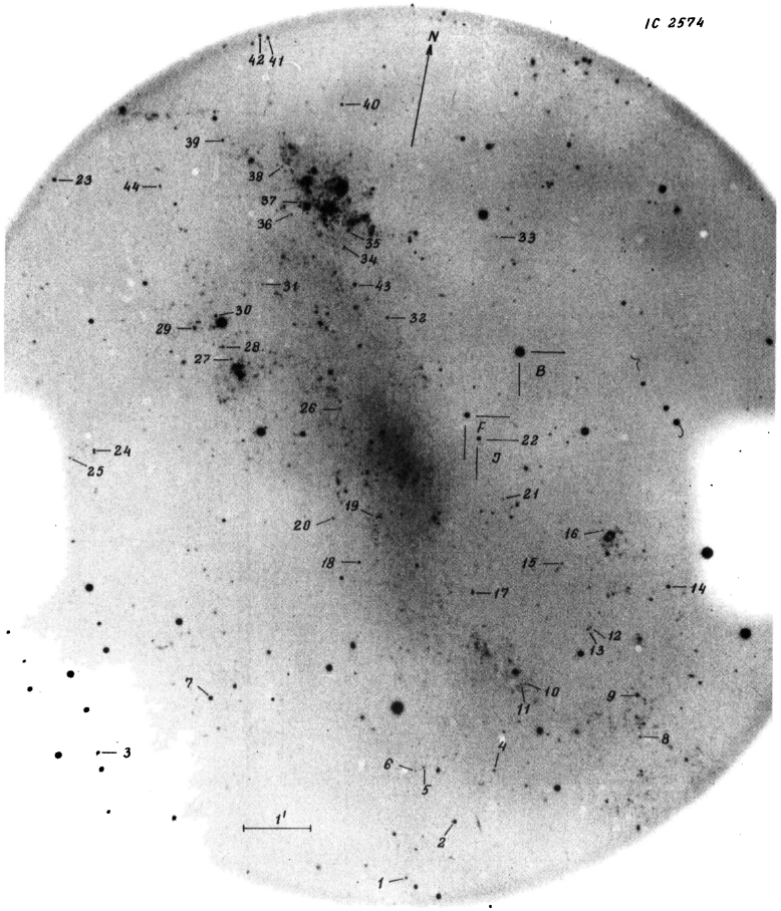


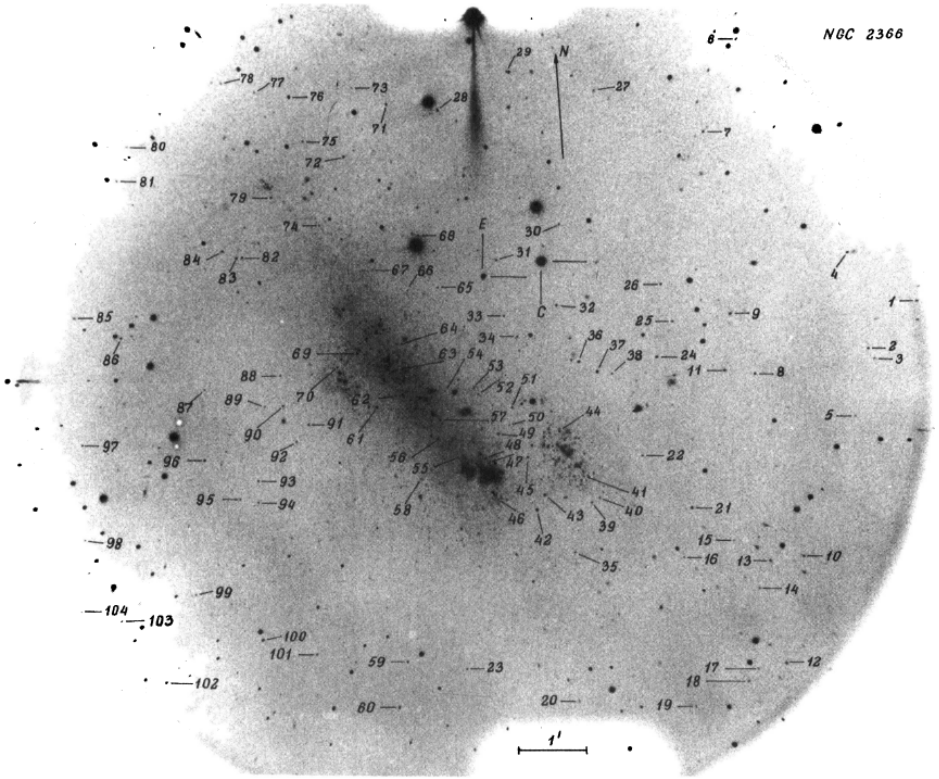


Distance of nearby galaxies NGC 2366, IC 2574 and NGC 4236 from photographic photometry of their brightest stars

N.A. Tikhonov[1], B.I. Bilkina[2], I.D. Karachentsev[1] and Ts.B. Georgiev[2]*

[1] Special Astrophysical Observatory of the USSR Academy of Sciences, Stavropol Territory, 357147, U.S.S.R.
[2] Department of Astronomy and National Astronomical Observatory of the Bulgarian Academy of Sciences, Sofia 1784, Bulgaria

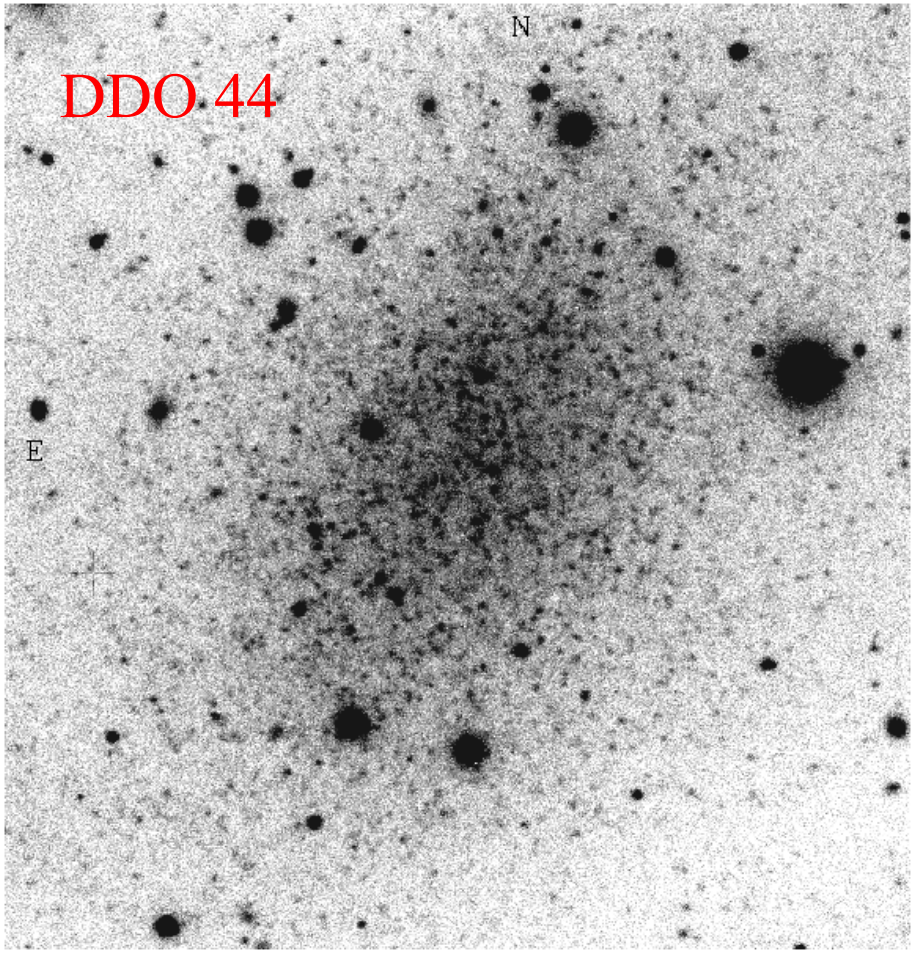




ASTRONOMY & ASTROPHYSICS
SUPPLEMENT SERIES

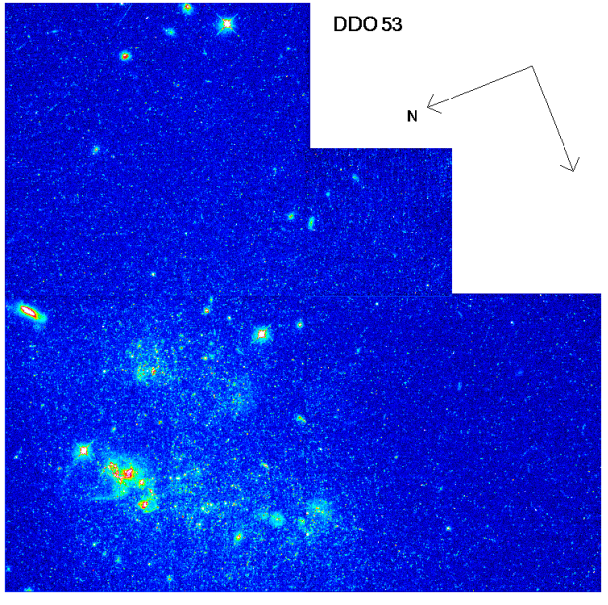
Astron. Astrophys. Suppl. Ser. **89**, 1-13 (1991)

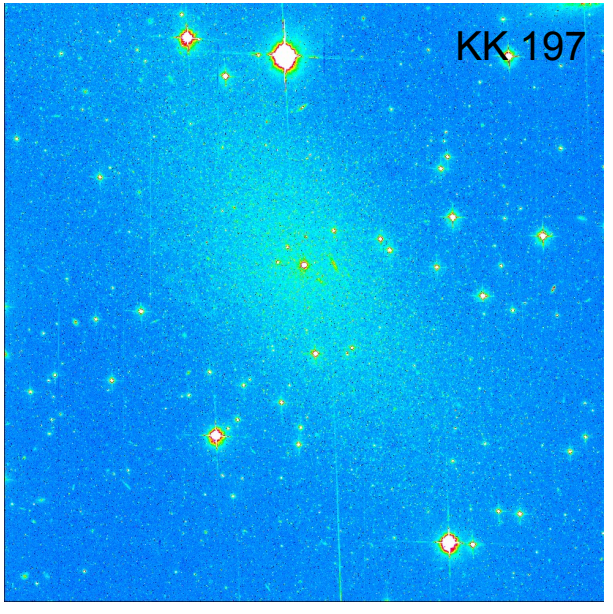
Nearby galaxies resolved on stars

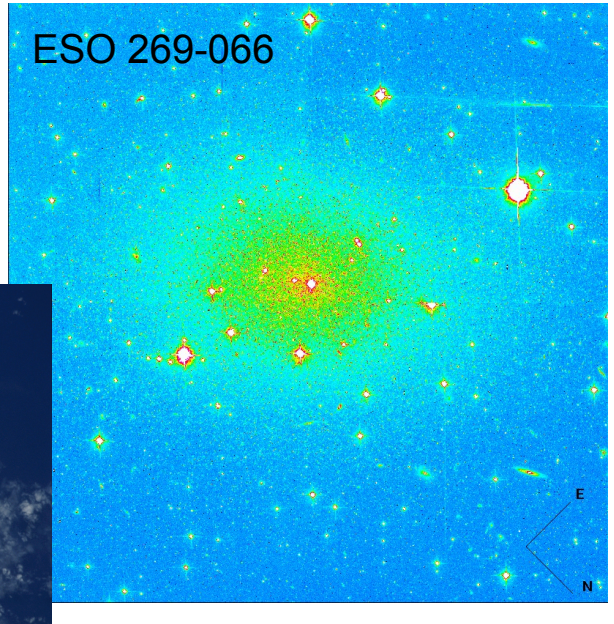


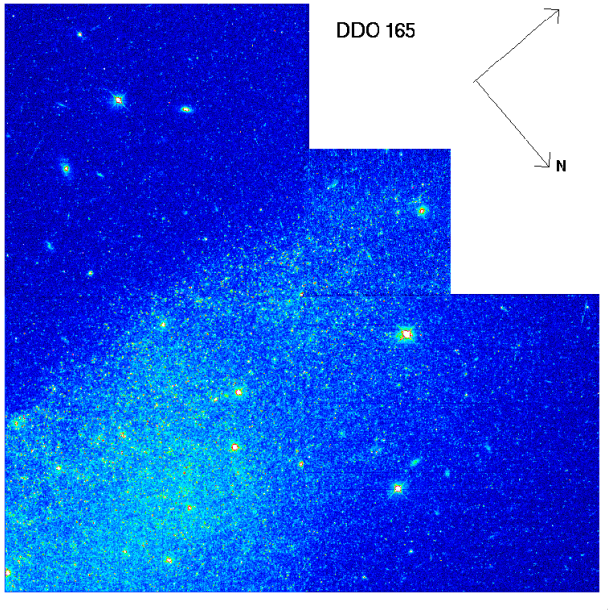
N.A. Tikhonov, M.E. Sharina

Определение расстояний до галактик на телескопе им. Хаббла









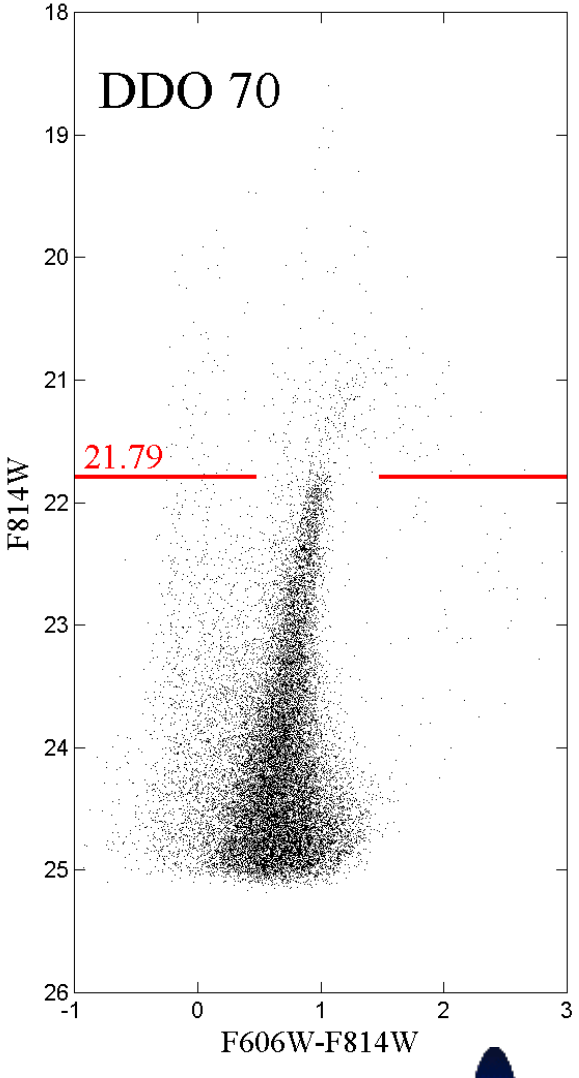
The tip of the ted giant branch

Advantage:

- Bright stars M_I~-4
- Efficient observations:
  2x images in V & I bands
- Old stellar population.
  - The method can be applied to galaxies of any morphology
  - Small inner extinction
- Physics is clear

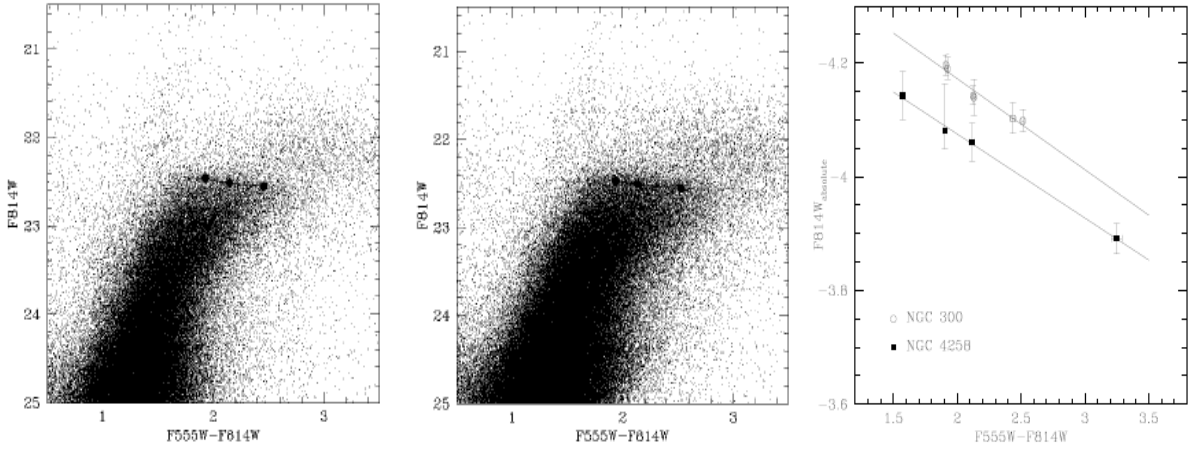
Disadvantages:

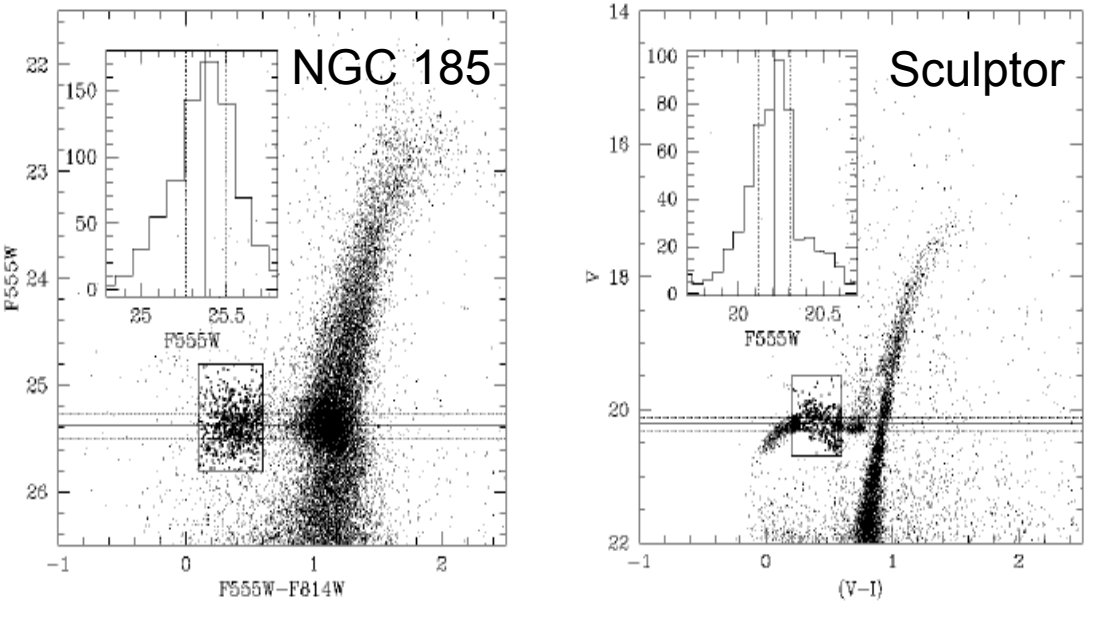
- Bolometric magnitude depends on metallicity and age
- Applicable only to nearby galaxies D<10 Mpc



The tip of the red giant branch

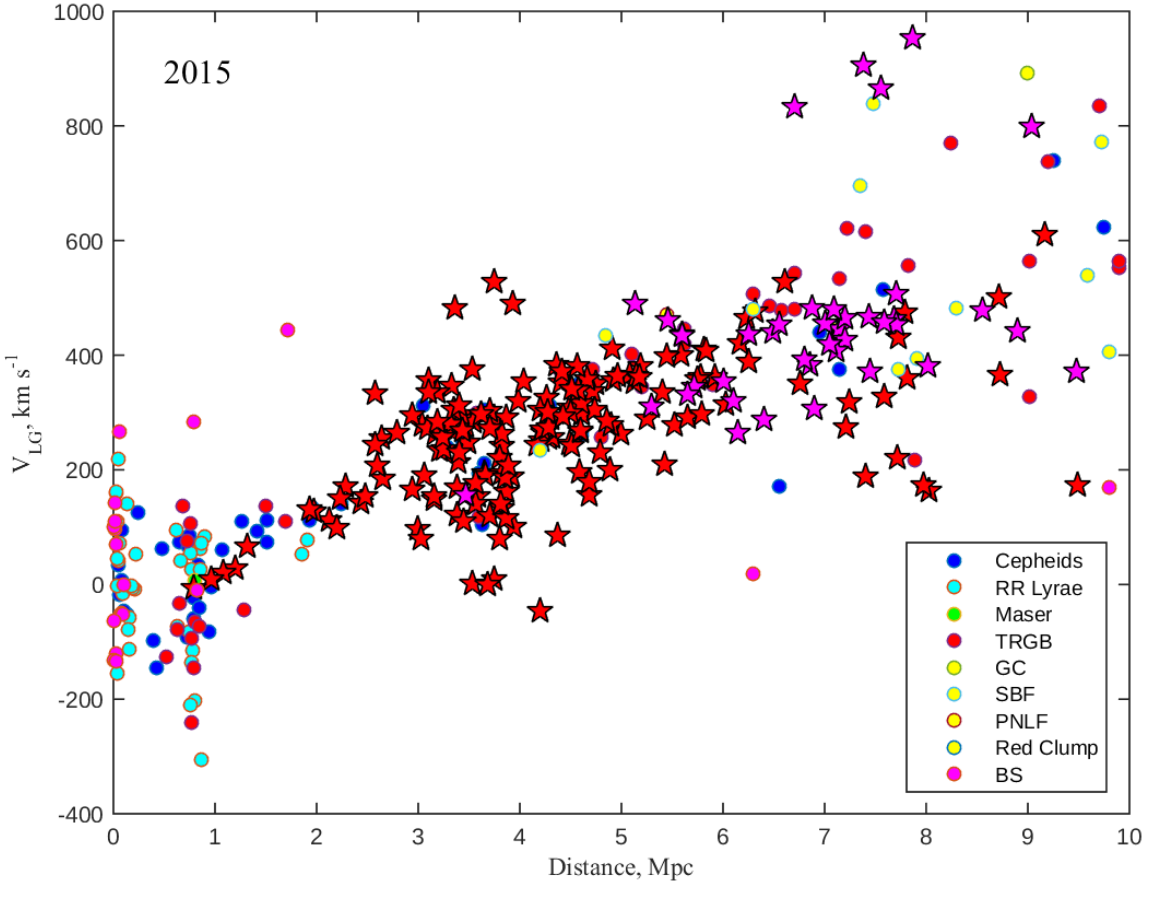
- The calibration of TRGB was established via luminosity of Horizontal Branch independently from Cepheids.
- TRGB error ~ 0.02
- TRGB zero-point is in fine agreement with Cepheids scale
  $\mu_{Ceph} - \mu_{TRGB} = -0.01 \pm 0.03$

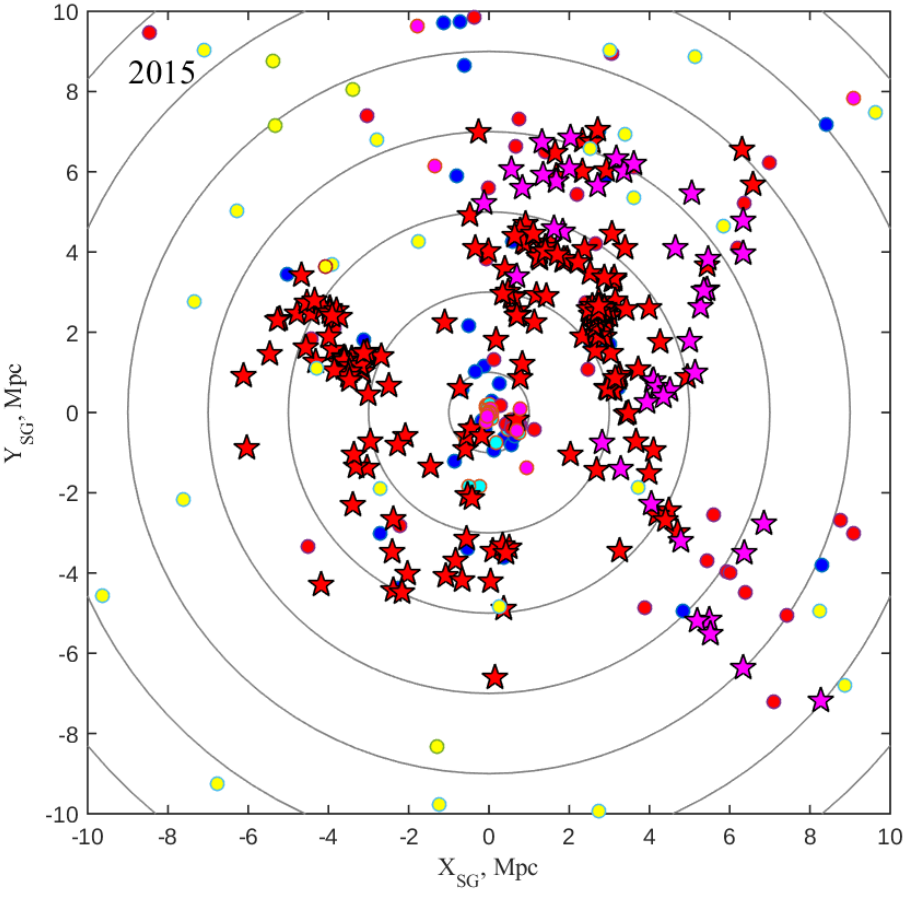




$$M_I^{TRGB} = -4.05(\pm 0.02) + 0.217(\pm 0.01)[(V-I)-1.6]$$

Distance determination progress

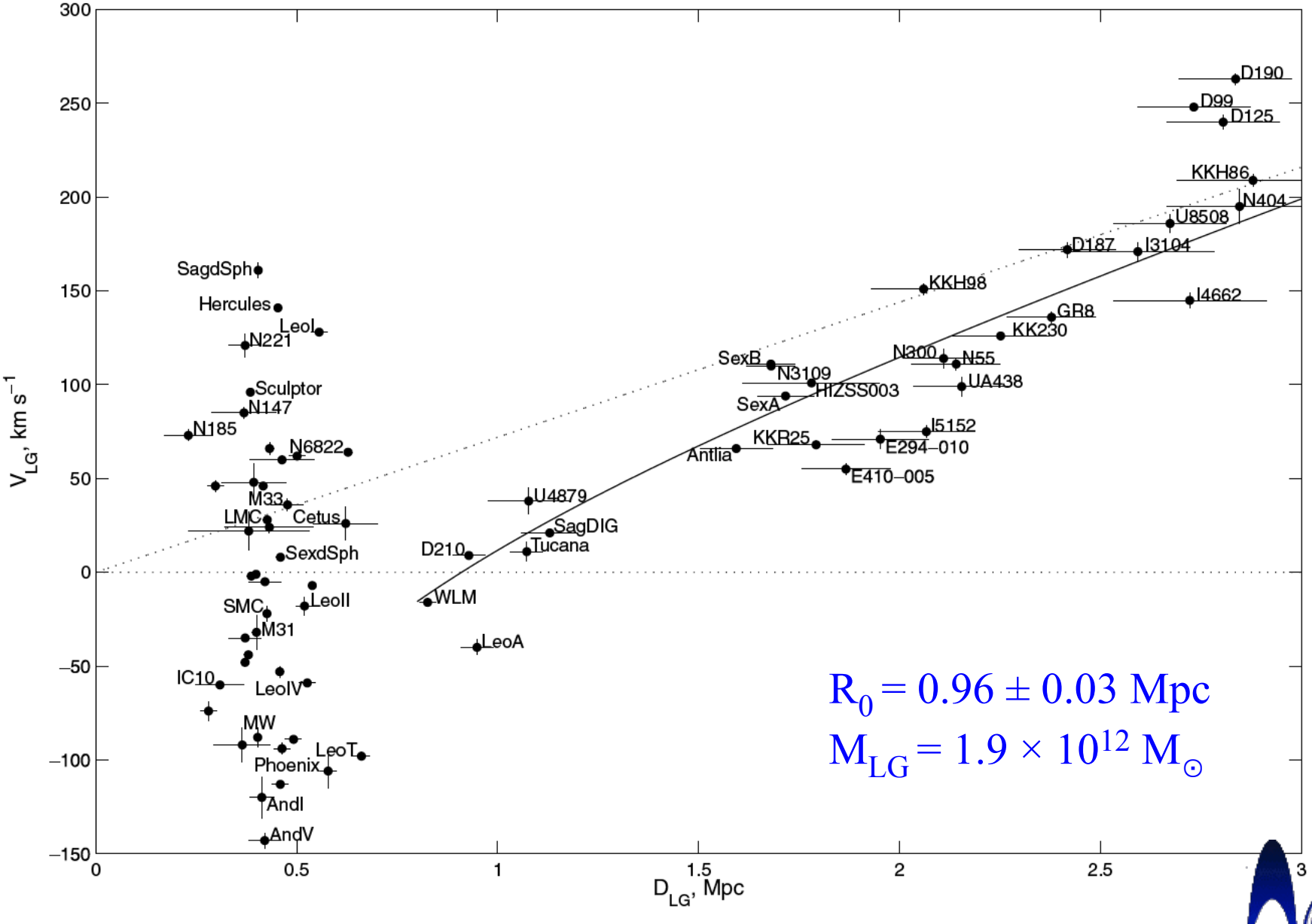




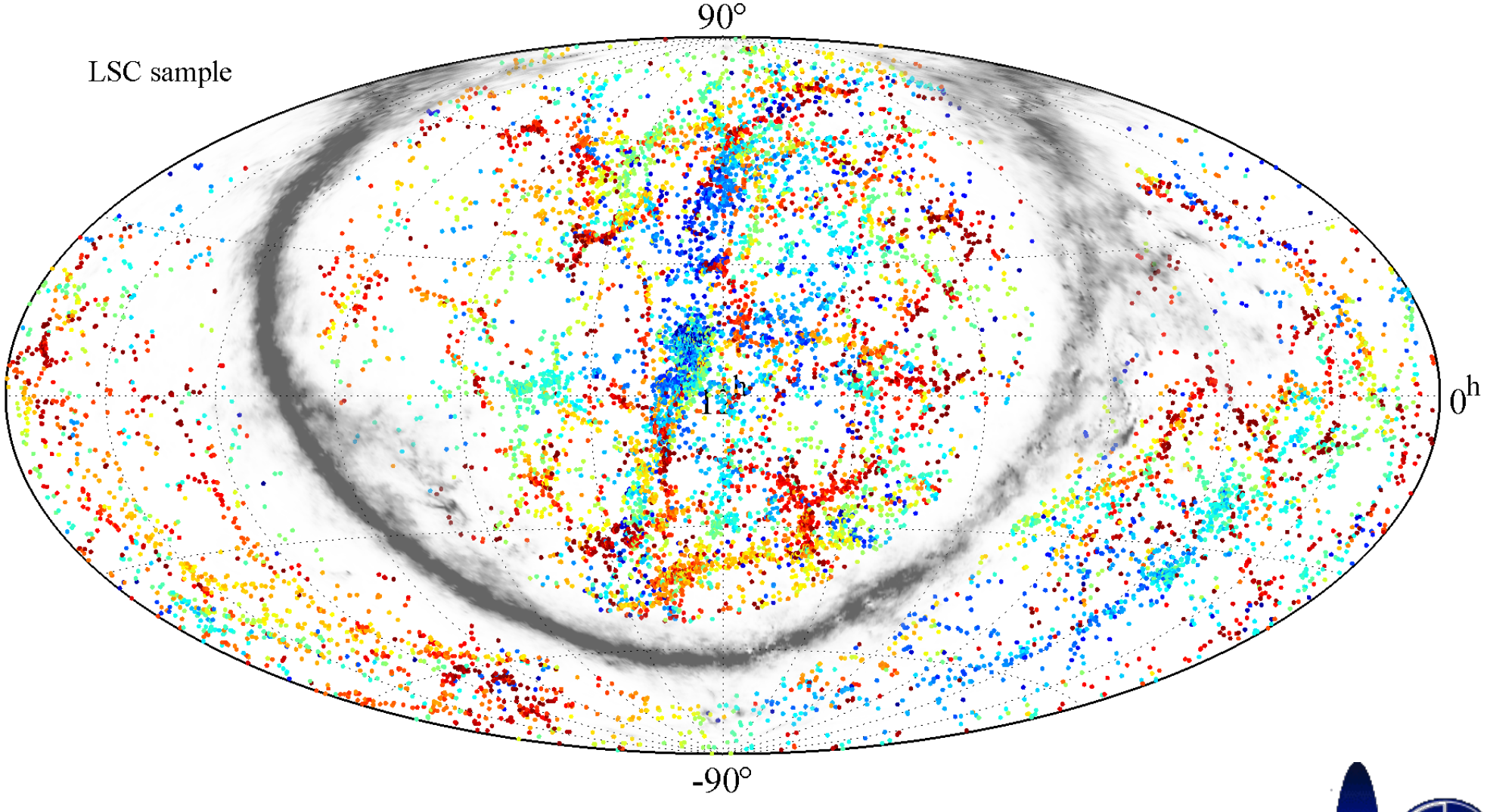
Mon. Not. R. Astron. Soc. **393,** 1265–1274 (2009) doi:10.1111/j.1365-2966.2008.14300.x

The Hubble flow around the Local Group

I. D. Karachentsev,[1⋆] O. G. Kashibadze,[1] D. I. Makarov[1] and R. B. Tully[2]



Groups of Galaxies in the Local Universe

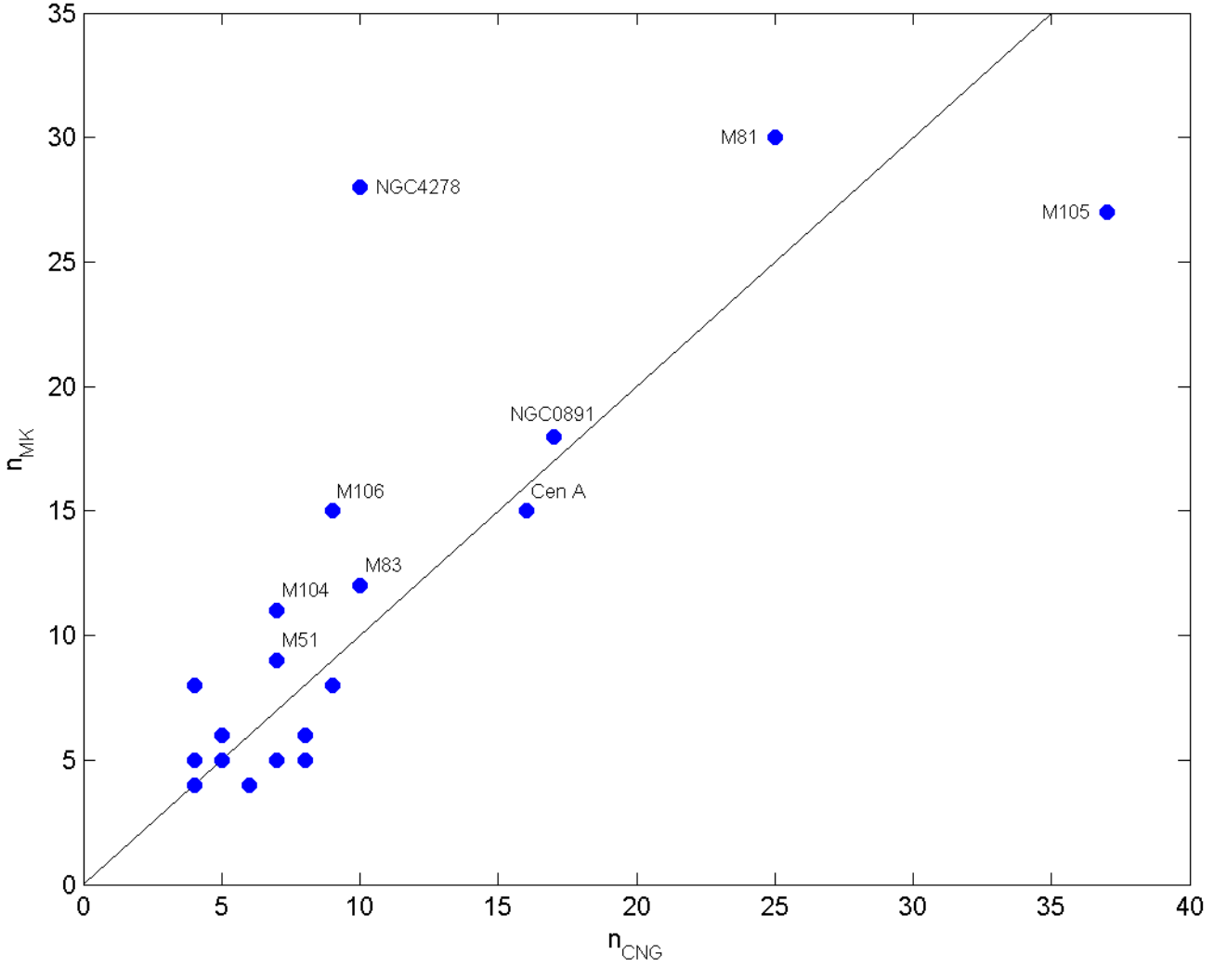


Clusterization criteria

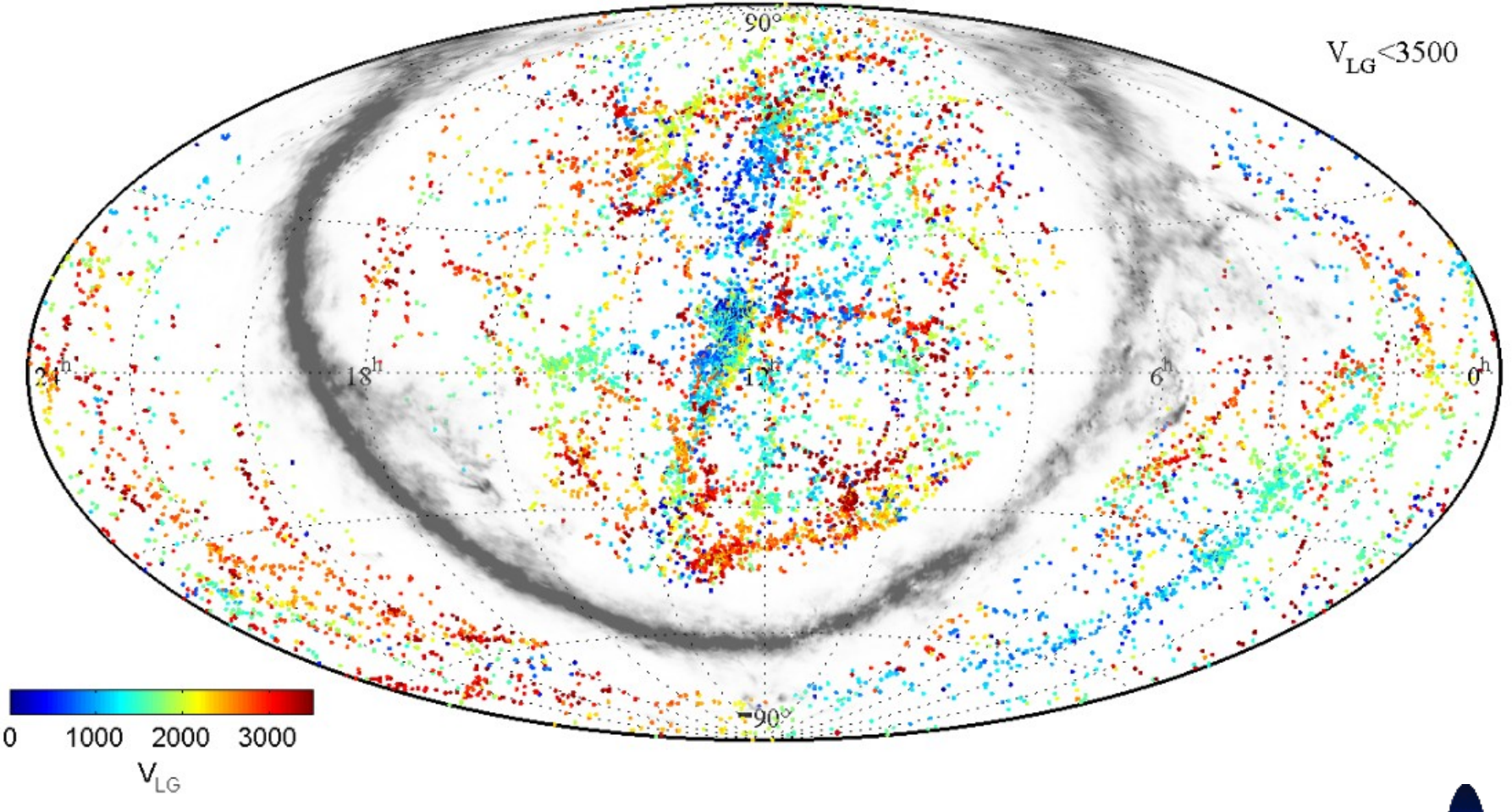
$$\frac{\mathrm{T}}{\Omega} = \frac{V^2 R}{2G\sum \mathcal{M}} < 1$$

$$\frac{\pi^2 R^3 H^2}{8G\sum \mathcal{M}} < 1$$

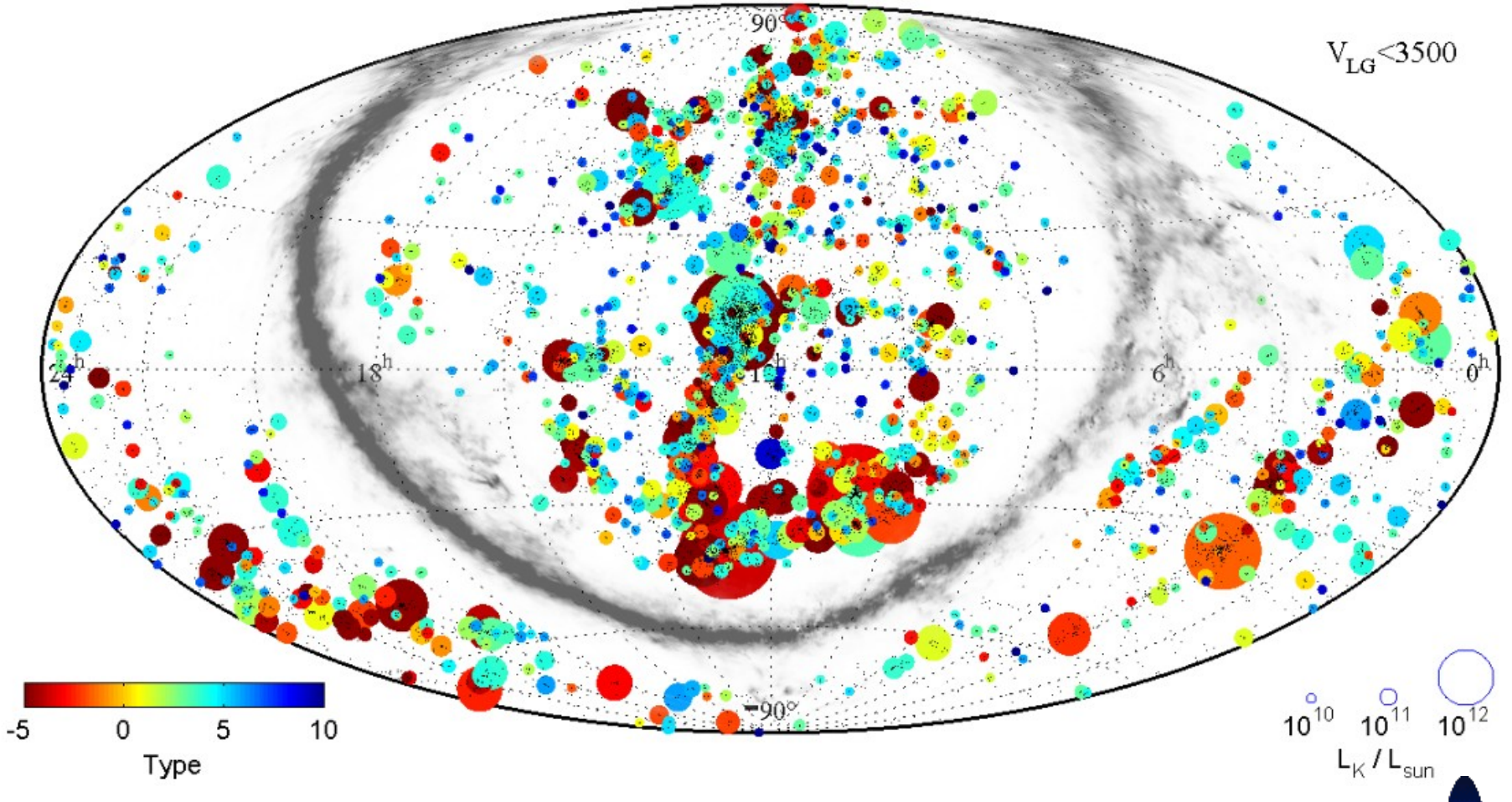
Algorithm tuning



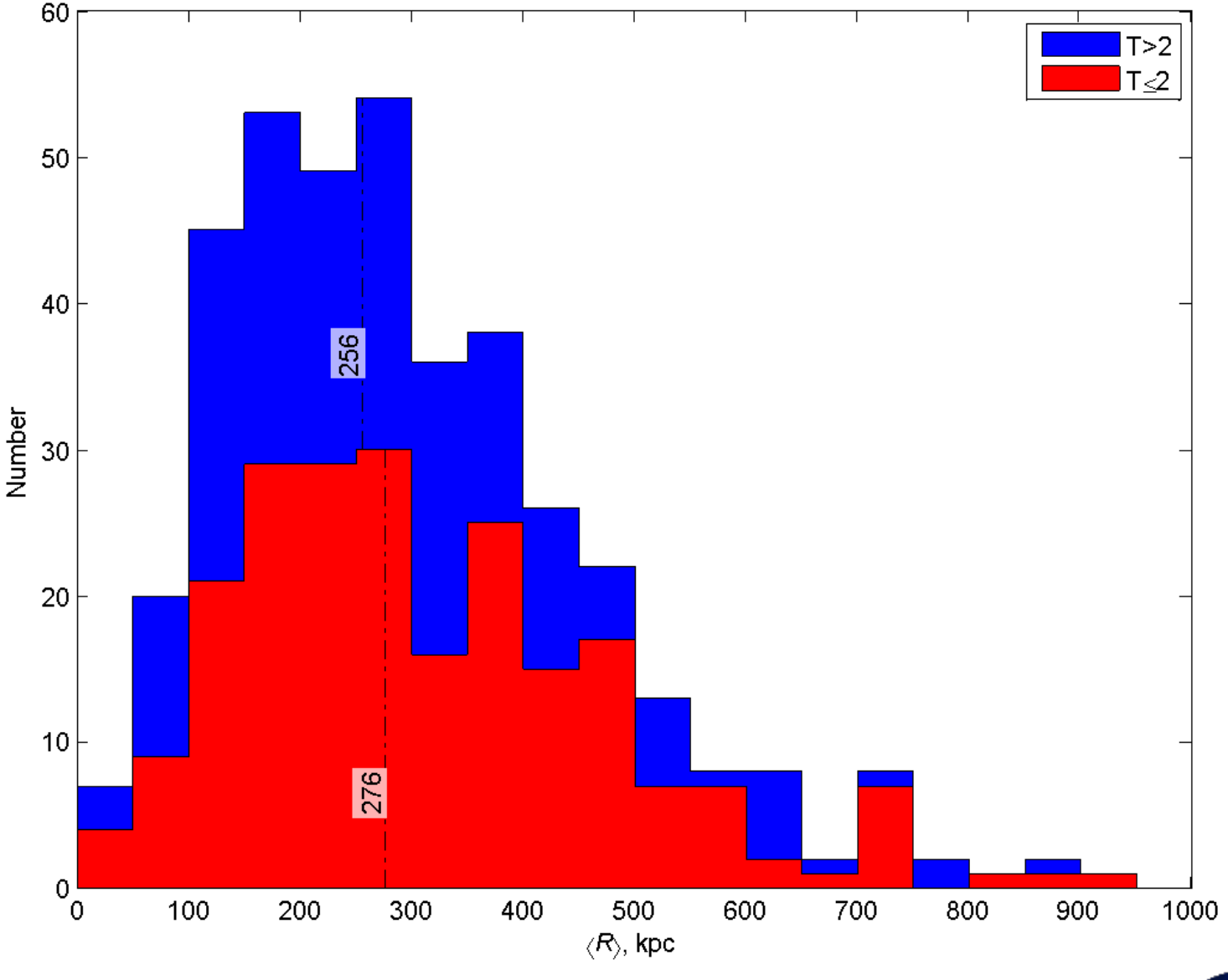
Distribution of nearby galaxies



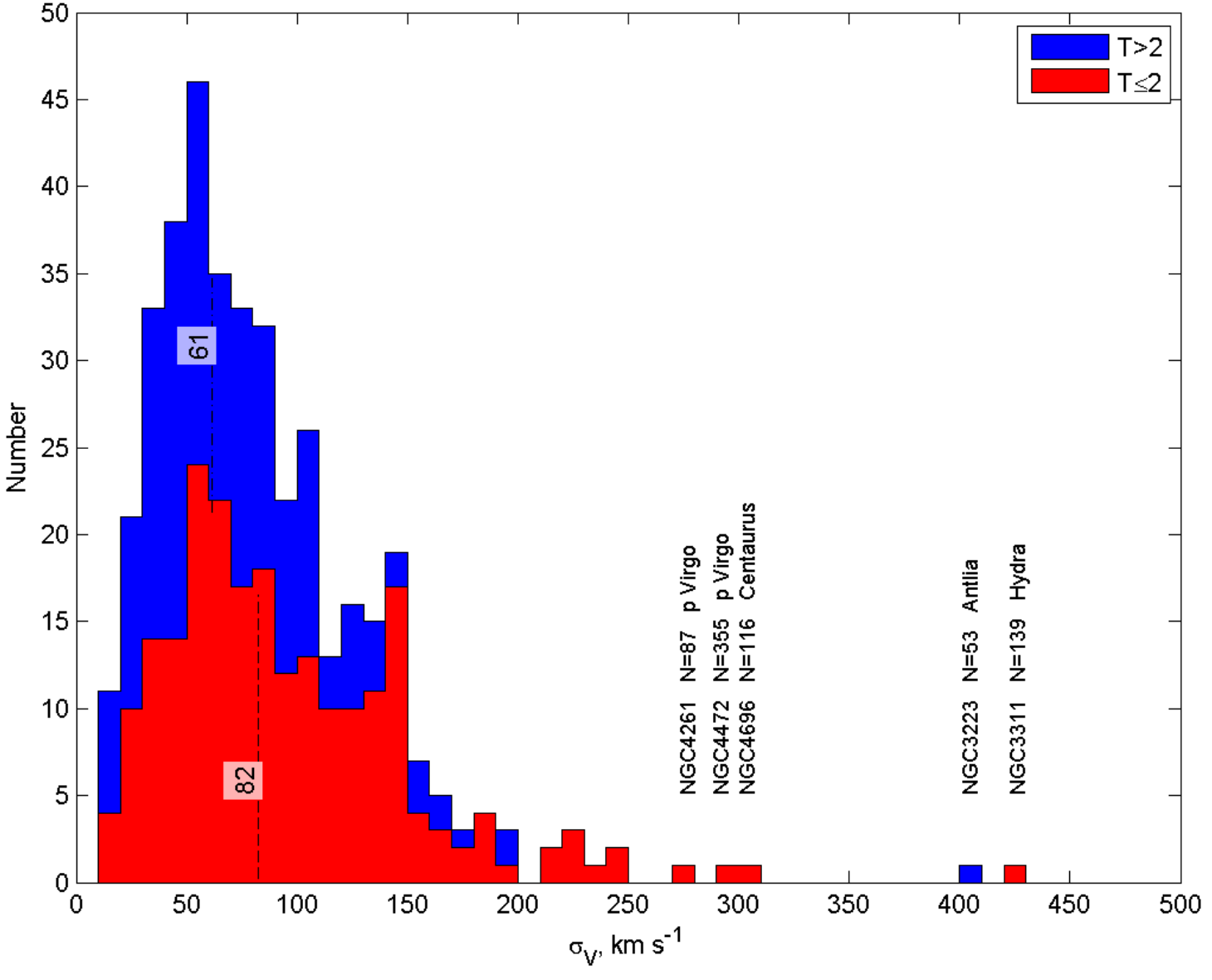
Distribution of groups by Luminosity and Morphology



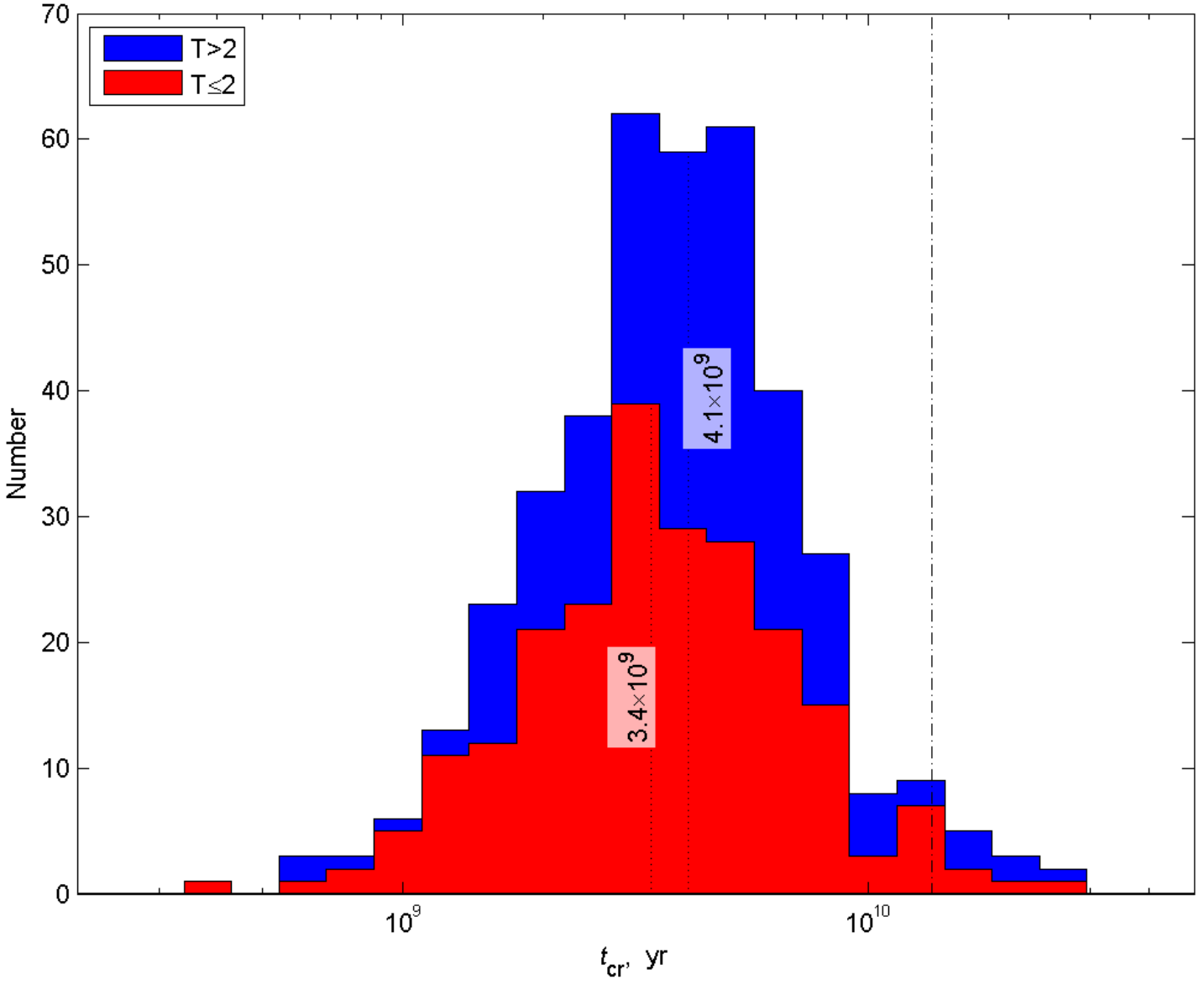
Distribution of groups by size



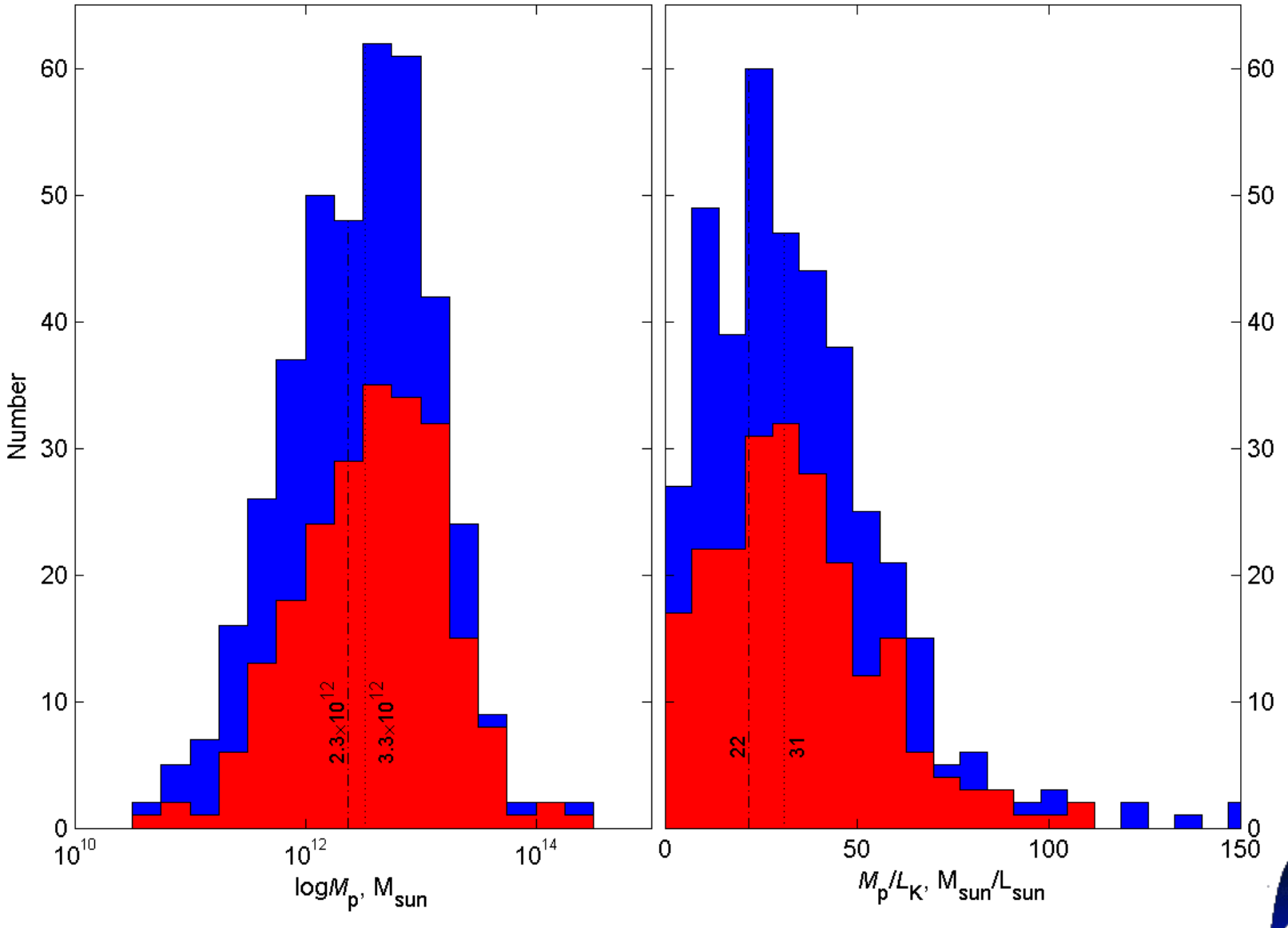
Distribution by virial motion



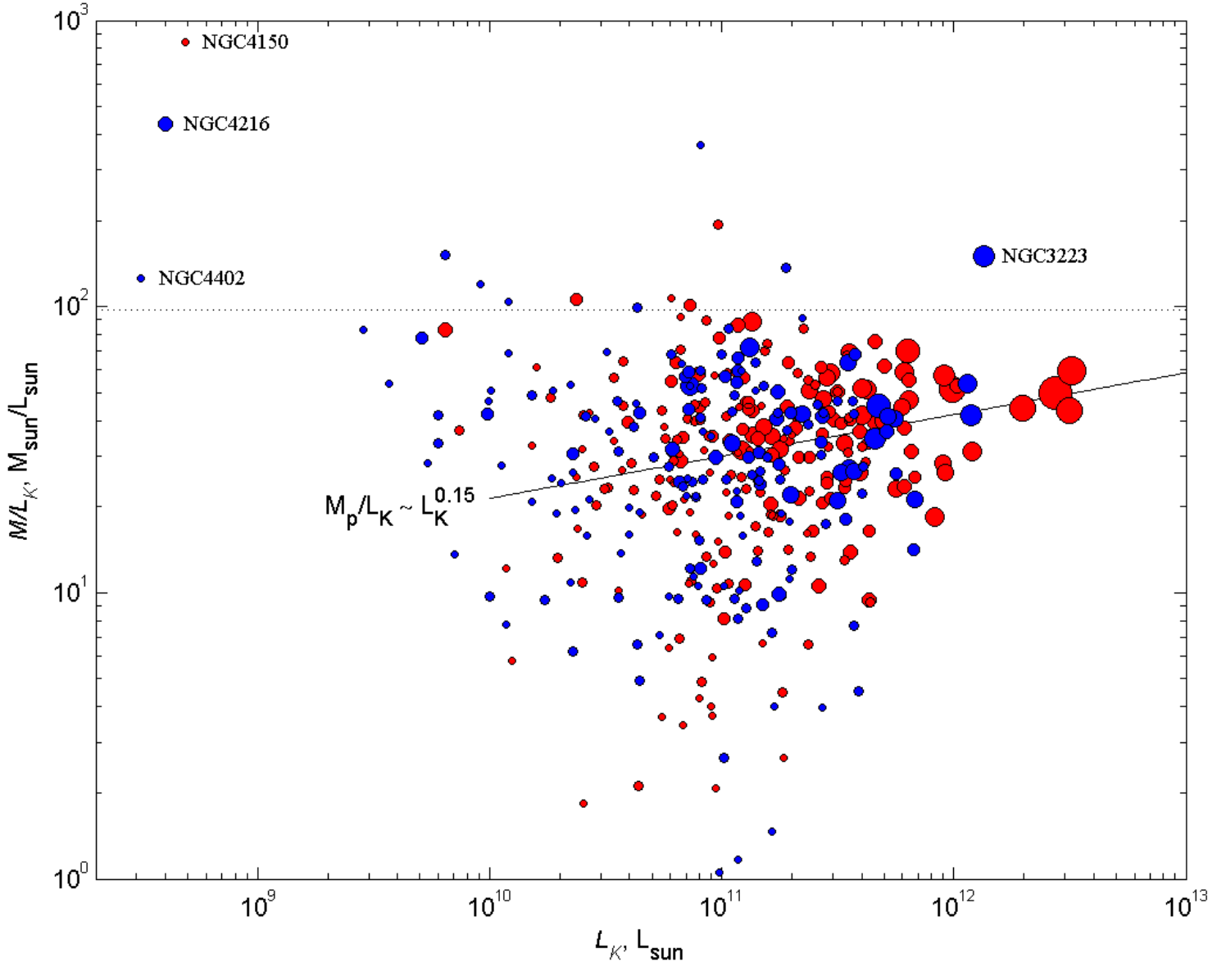
Crossing time



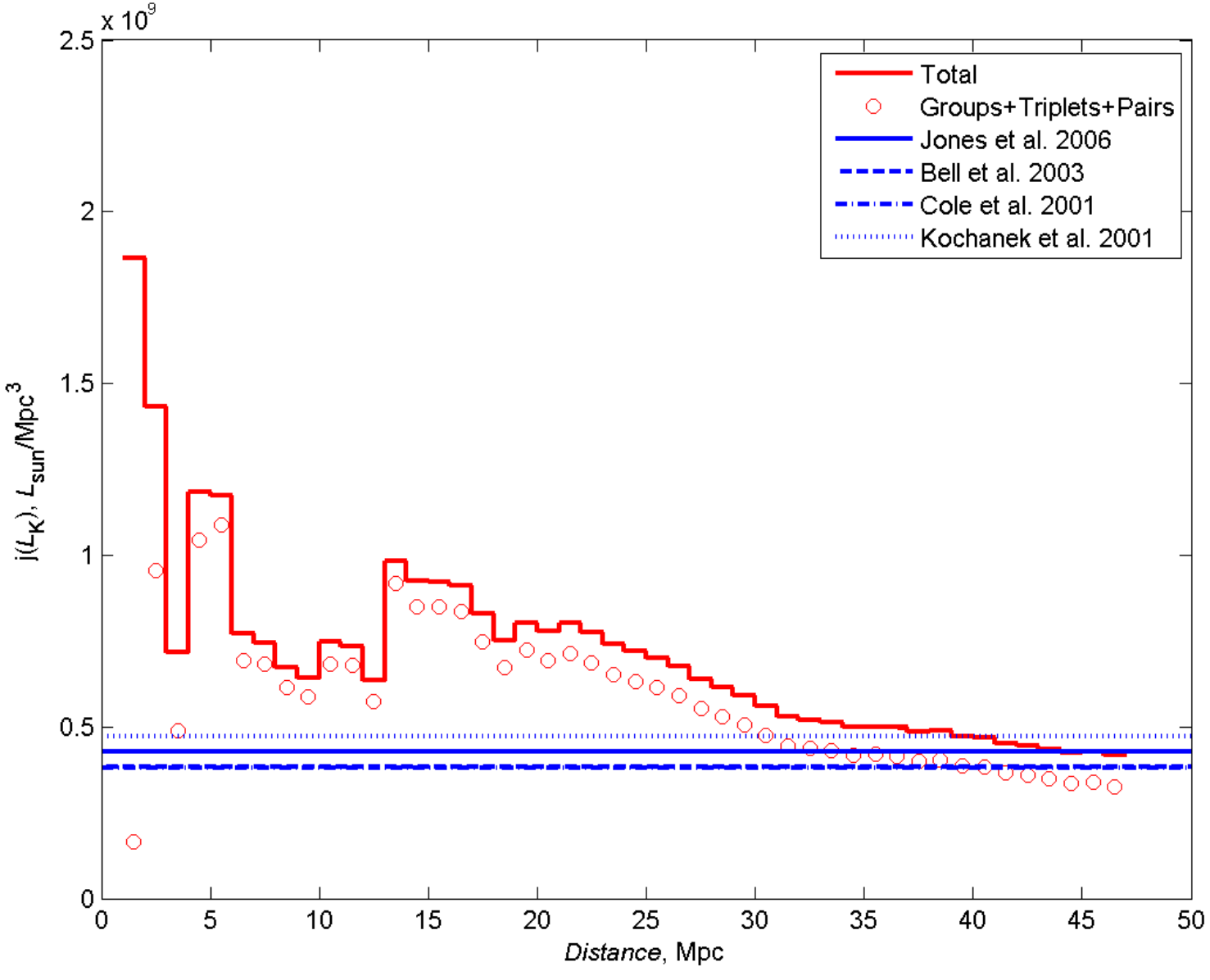
Mass and Mass-to-Light ratio



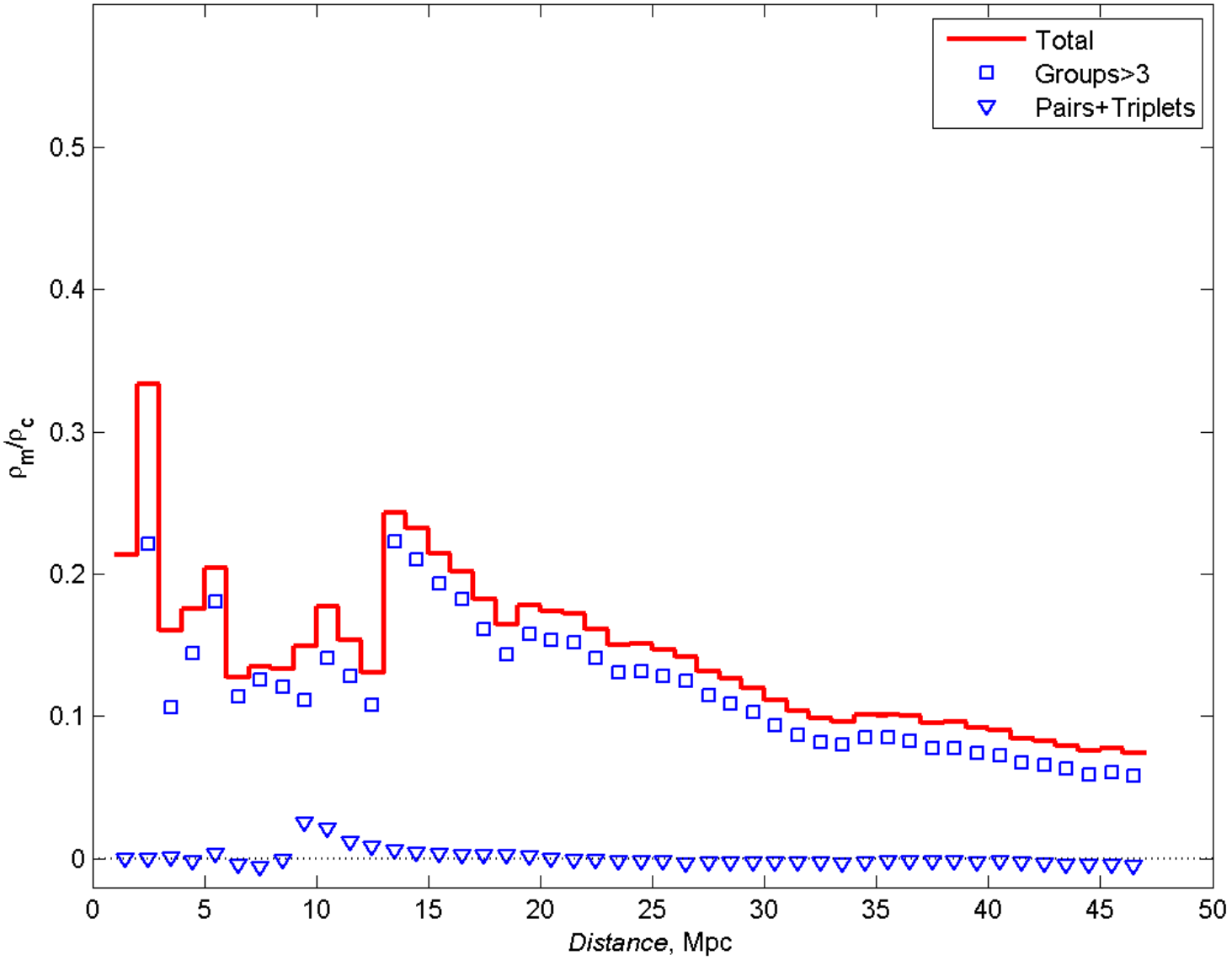
Mass-to-Light ratio versus Luminosity



Running luminosity density



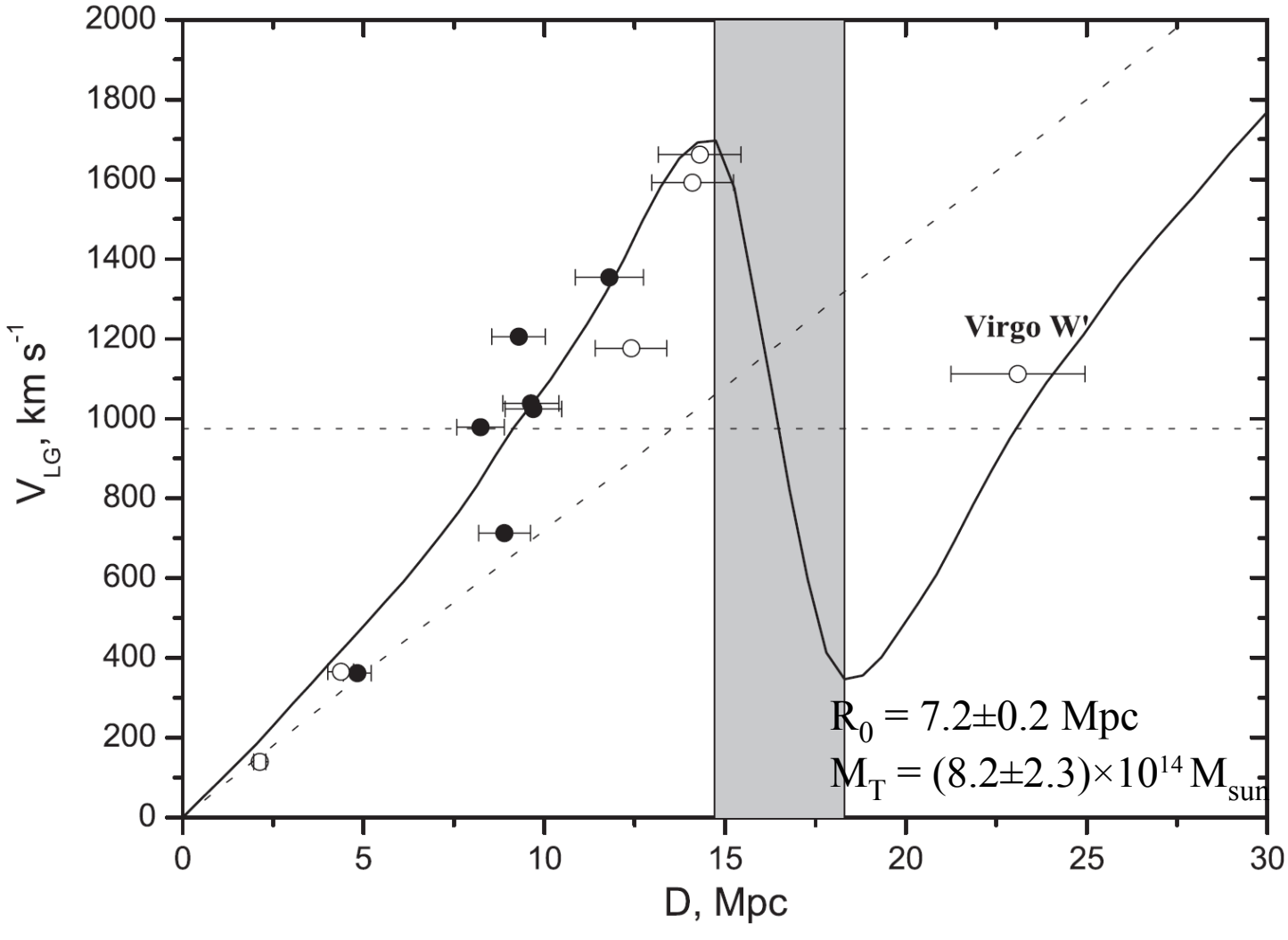
Running Mass Density

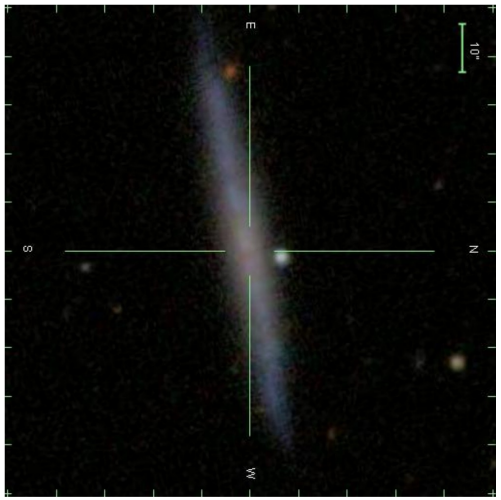


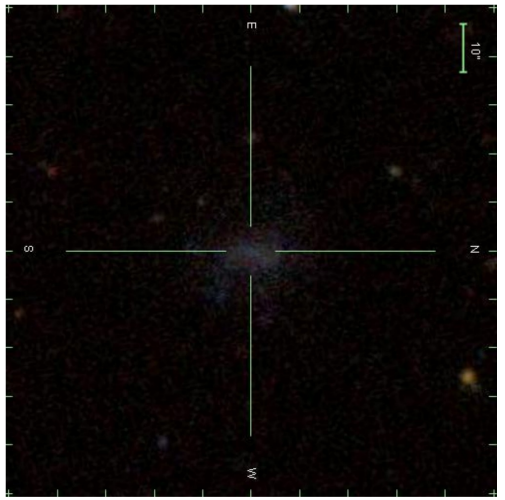
THE ASTROPHYSICAL JOURNAL, 782:4 (9pp), 2014 February 10 doi:10.1088/0004-637X/782/1/4

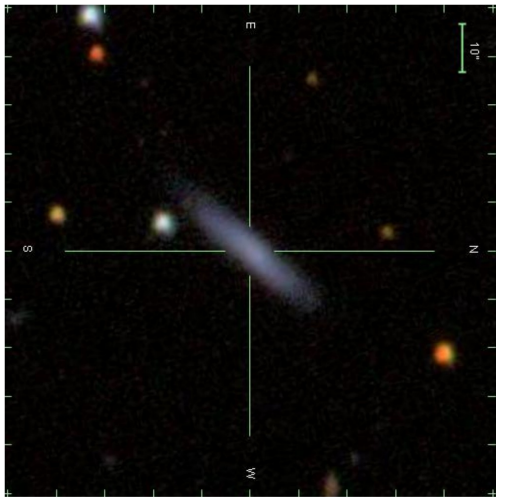
INFALL OF NEARBY GALAXIES INTO THE VIRGO CLUSTER AS TRACED WITH *HUBBLE SPACE TELESCOPE**

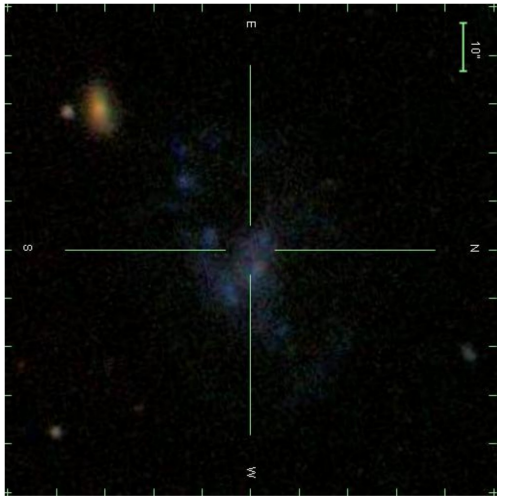
IGOR. D. KARACHENTSEV[1], R. BRENT TULLY[2], PO-FENG WU[2], EDWARD J. SHAYA[3], AND ANDREW E. DOLPHIN[4]



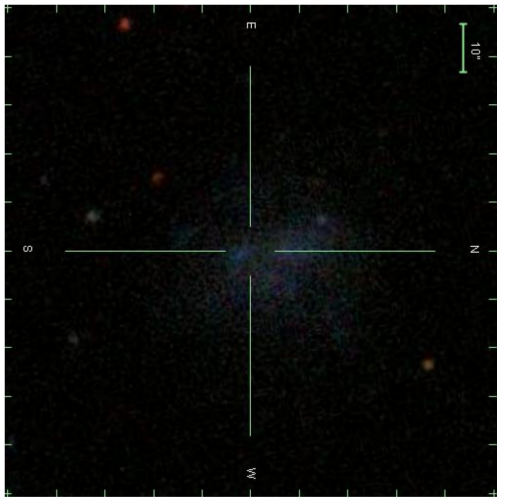

E
10"
S
N
W


E
10"
S
N
W


E
10"
S
N
W


E
10"
S
N
W


J1337+32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10"
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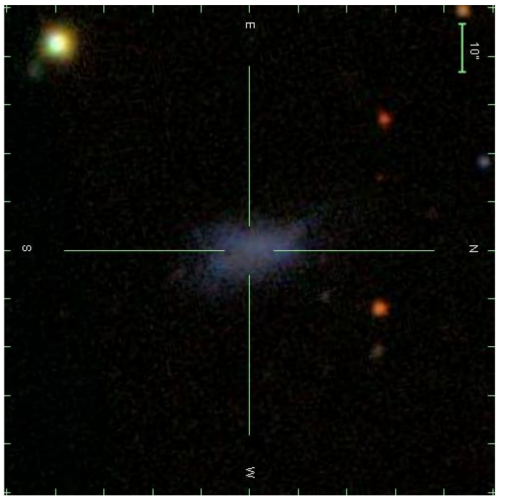
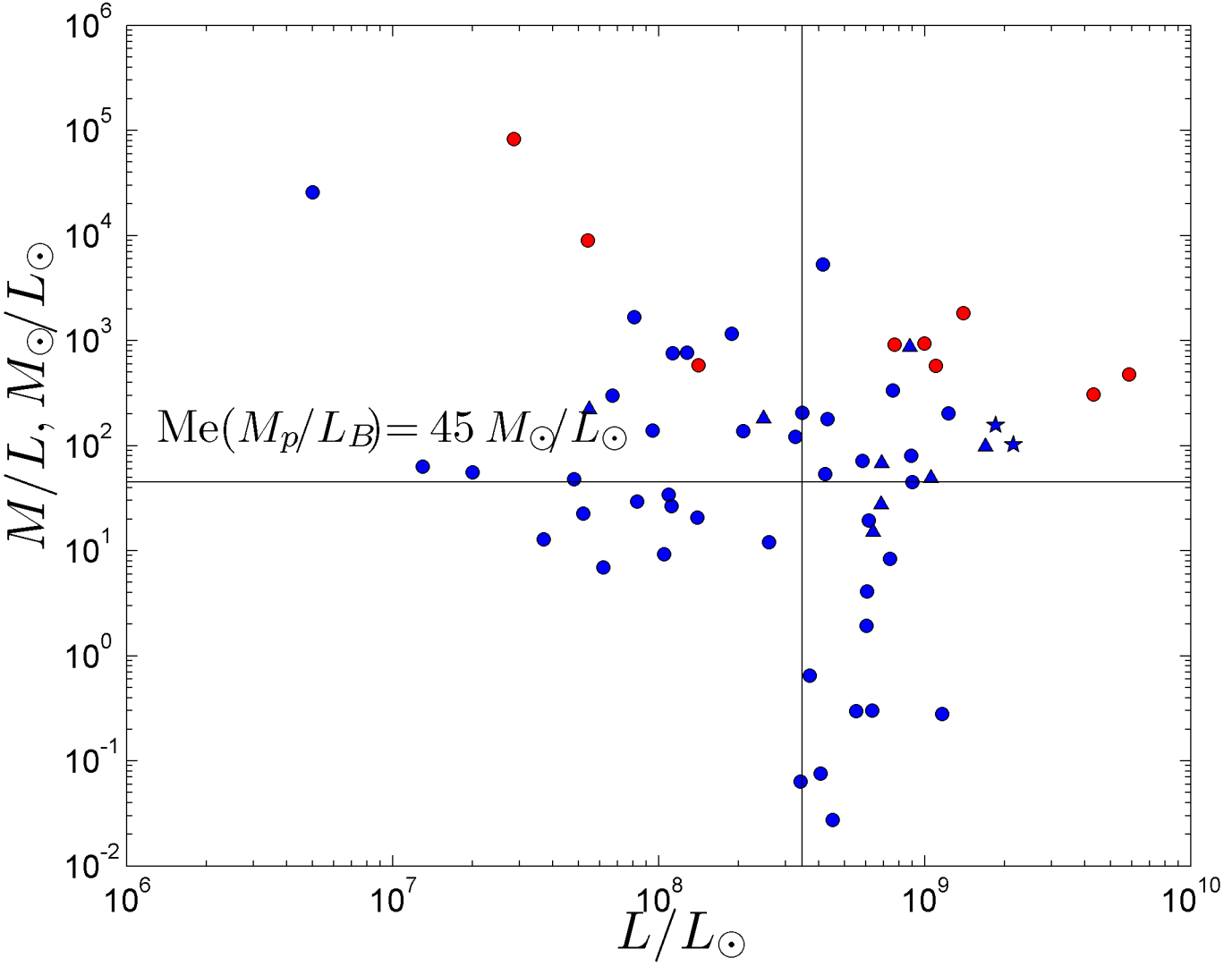
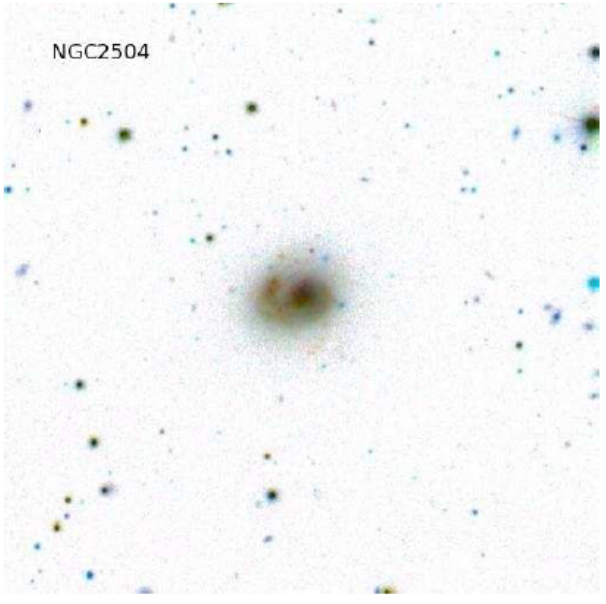
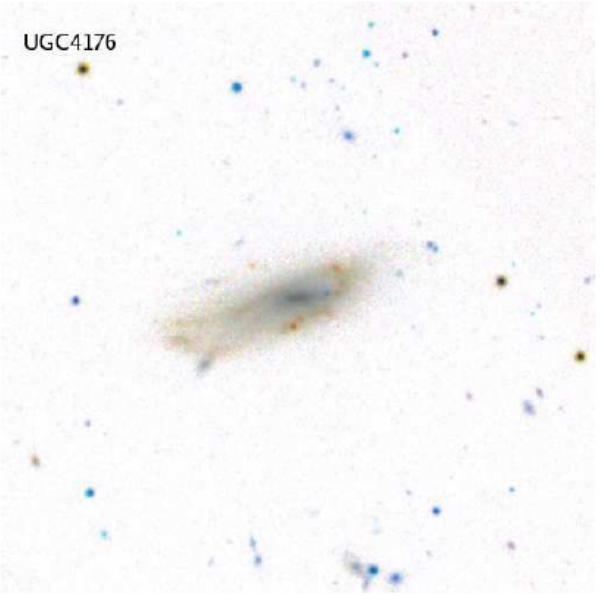

E
10"
S
N
W

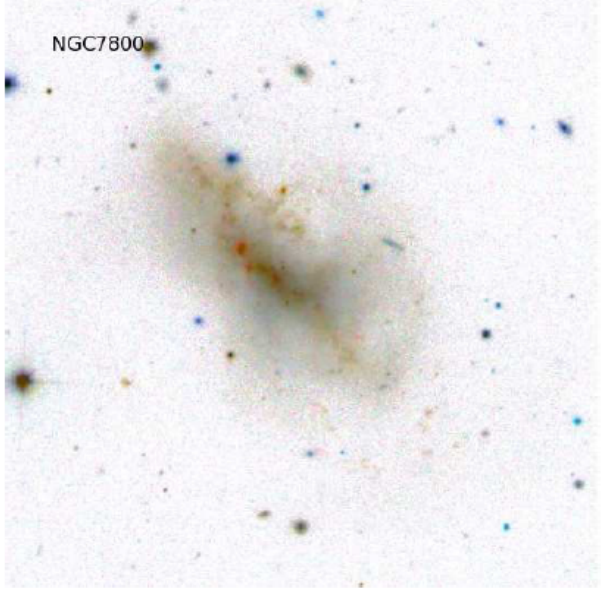
Main parameters of the groups of dwarfs

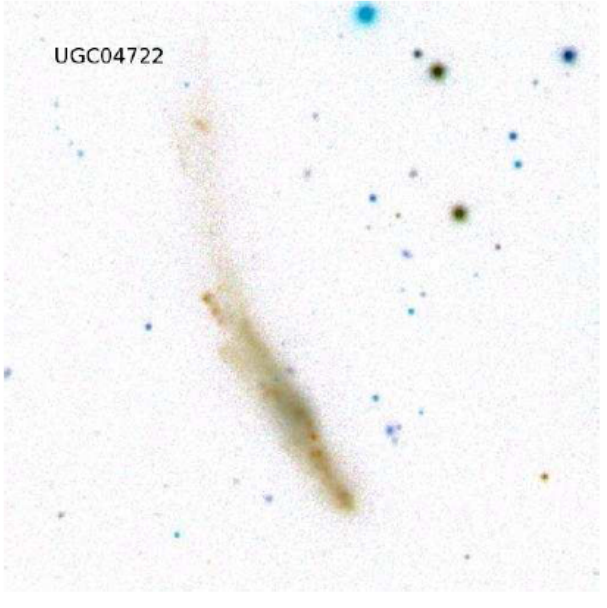


Examples of isolated galaxies with interaction

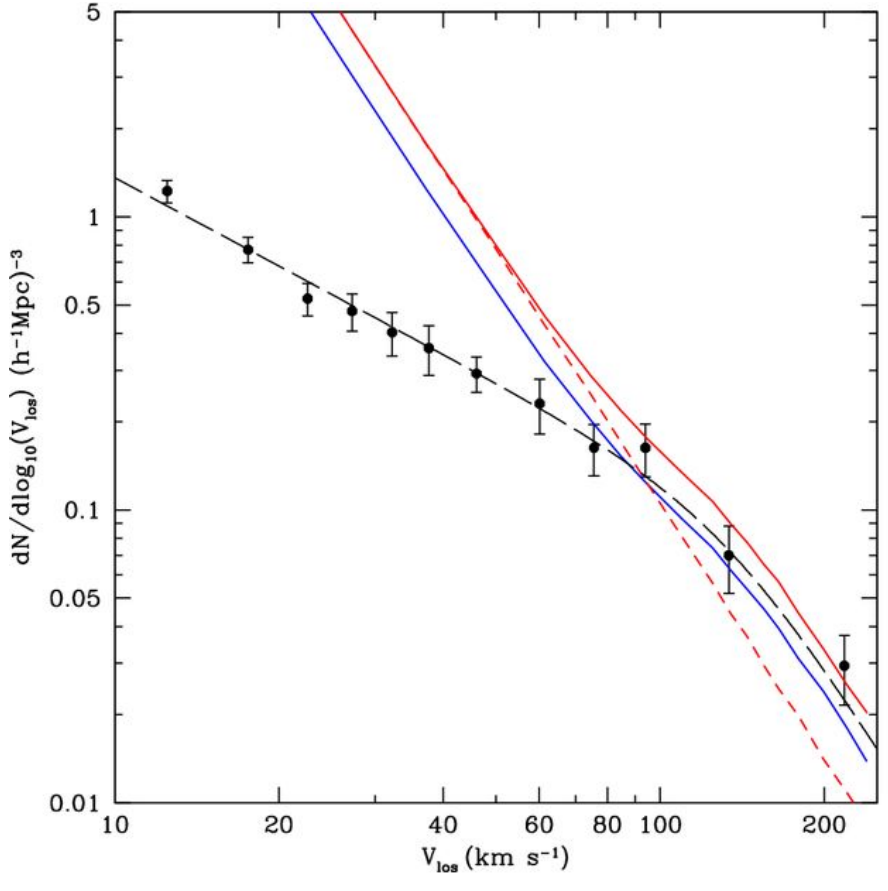


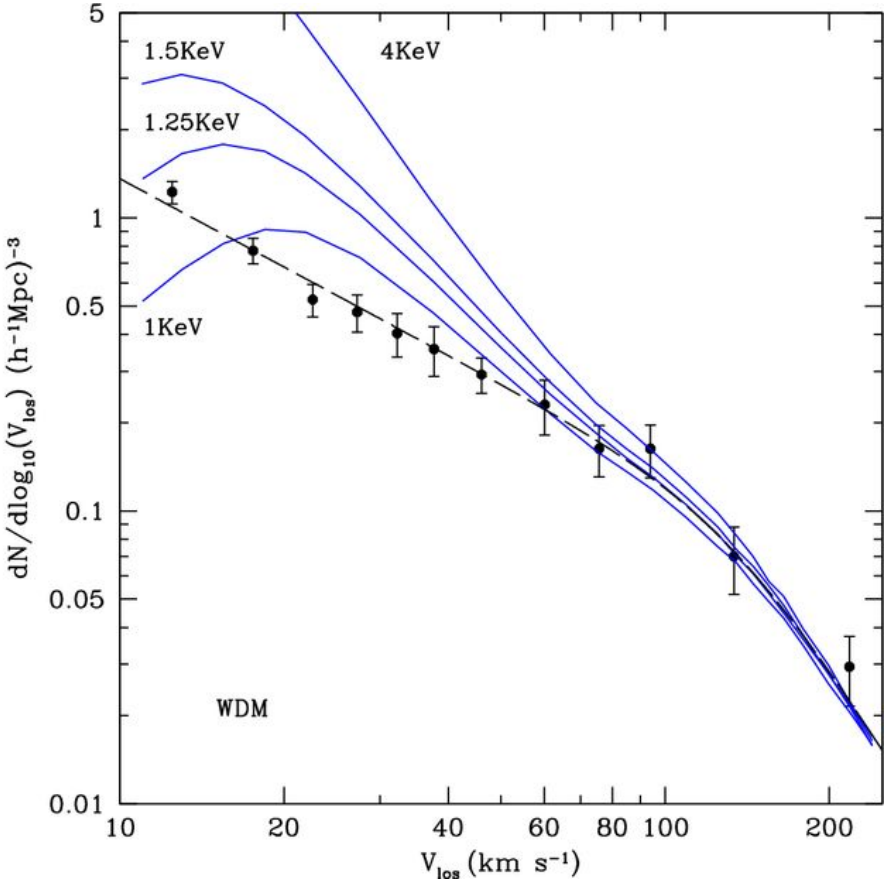


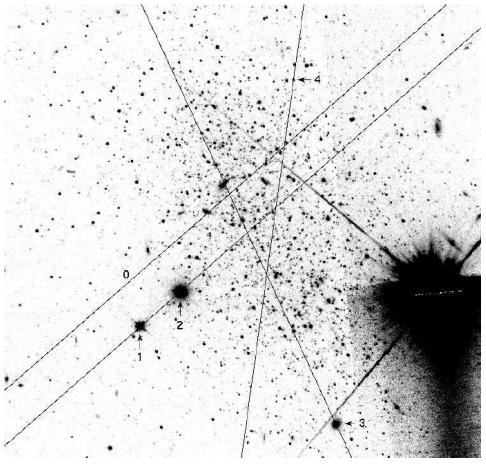




Abundance of field galaxies

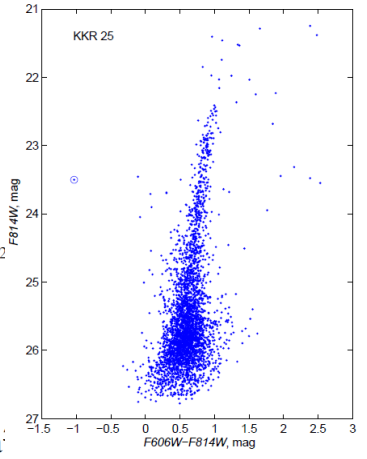






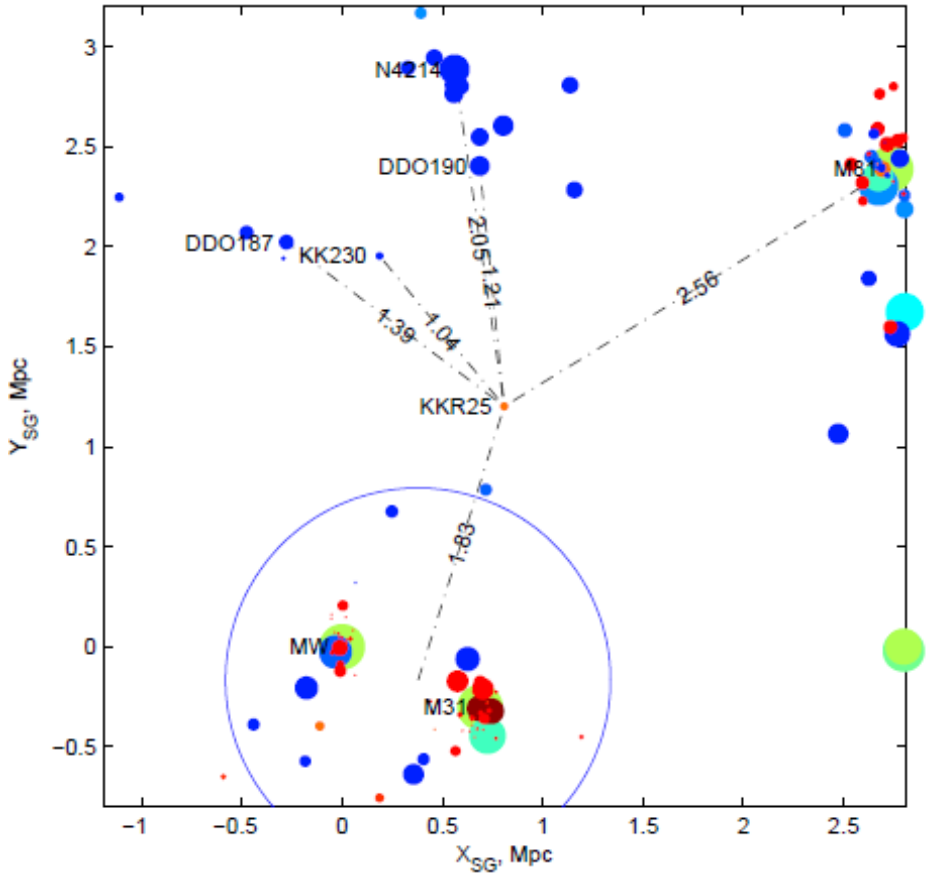
KKR 25

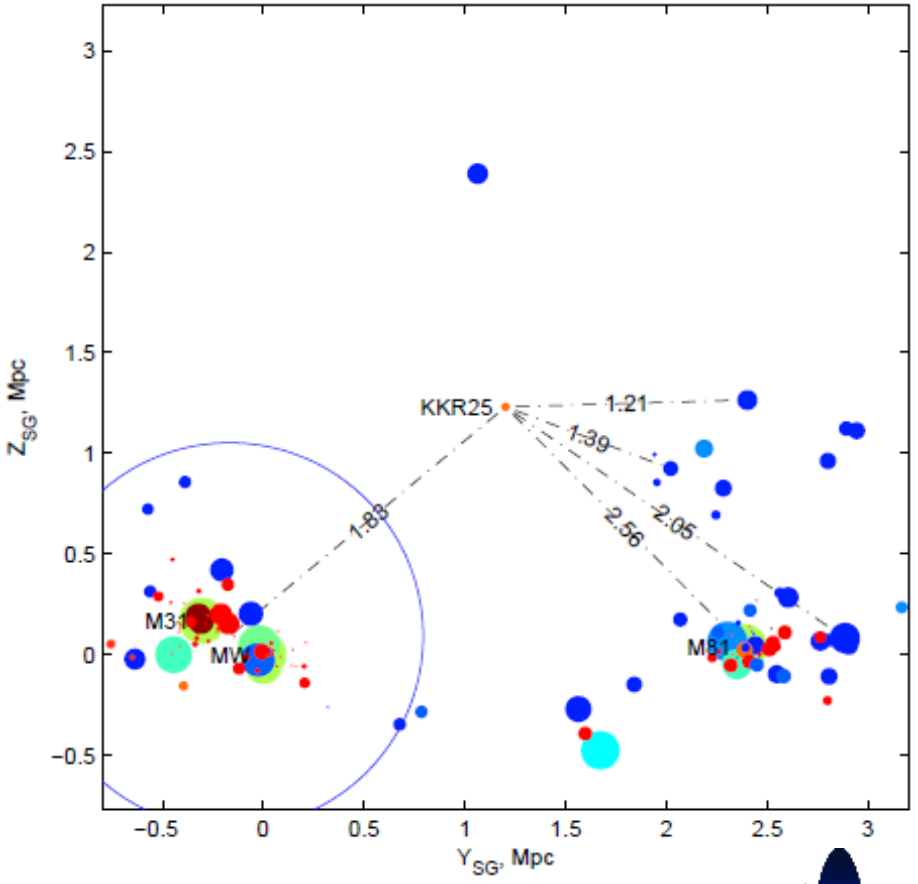
Mon. Not. R. Astron. Soc. **425,** 709–719 (2012) doi:10.1111/j.1365-2966.2



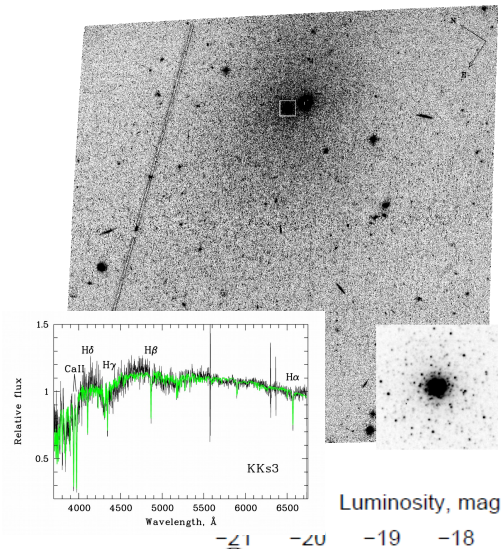
A unique isolated dwarf spheroidal galaxy at $D = 1.9$ Mpc

Dmitry Makarov,[1]★ Lidia Makarova,[1] Margarita Sharina,[1] Roman Uklein,[1]
Anton Tikhonov,[2]† Puragra Guhathakurta,[3] Evan Kirby[4] and Natalya Terekhova





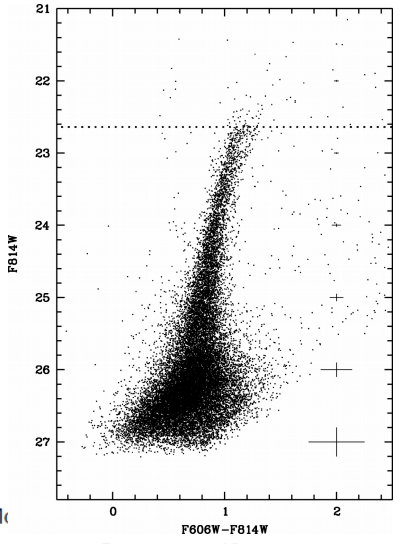
KKs 3

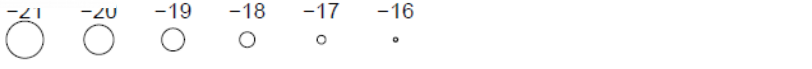


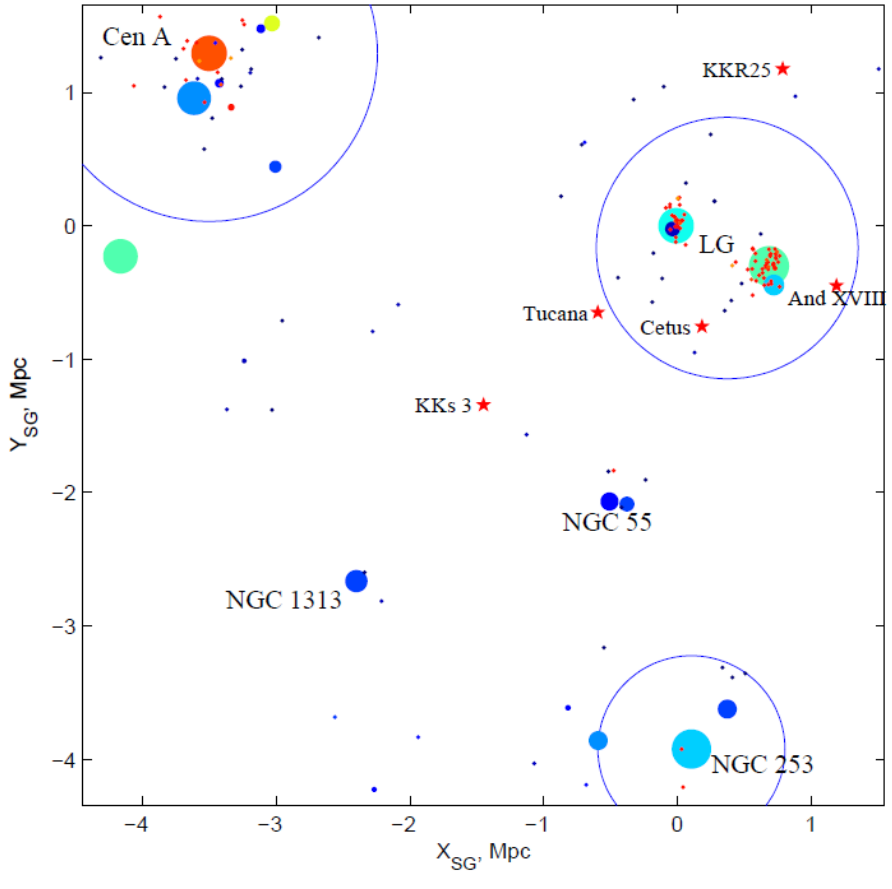
MNRAS **447,** L85–L89 (2015) doi:10.1093/mnrasl/slu181

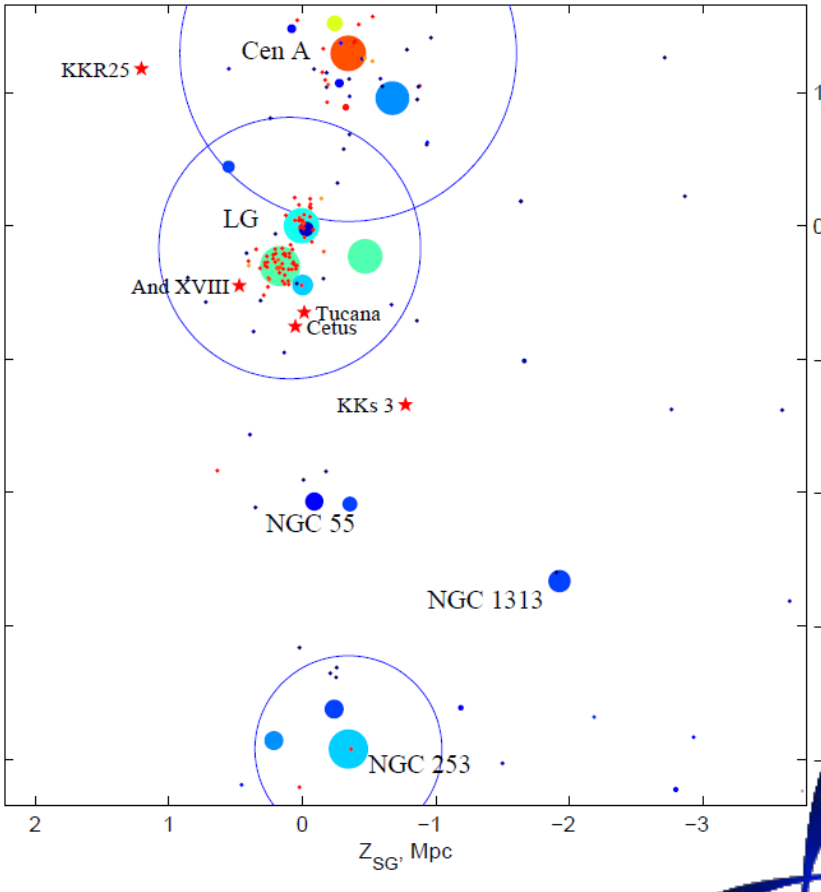
A new isolated dSph galaxy near the Local Group

I. D. Karachentsev,[1]★ L. N. Makarova,[1] D. I. Makarov,[1] R. B. Tully[2] and L. Rizzi[3]





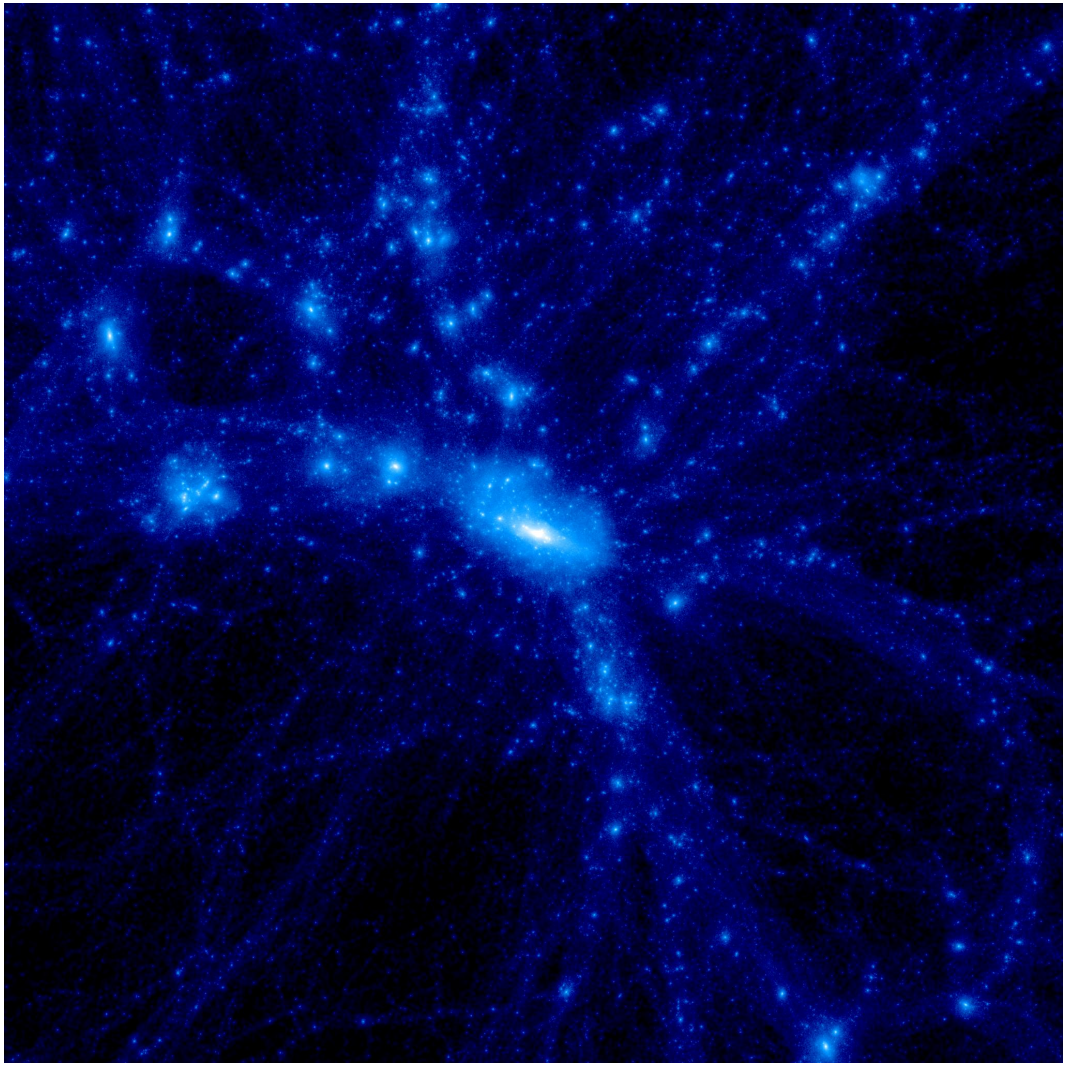


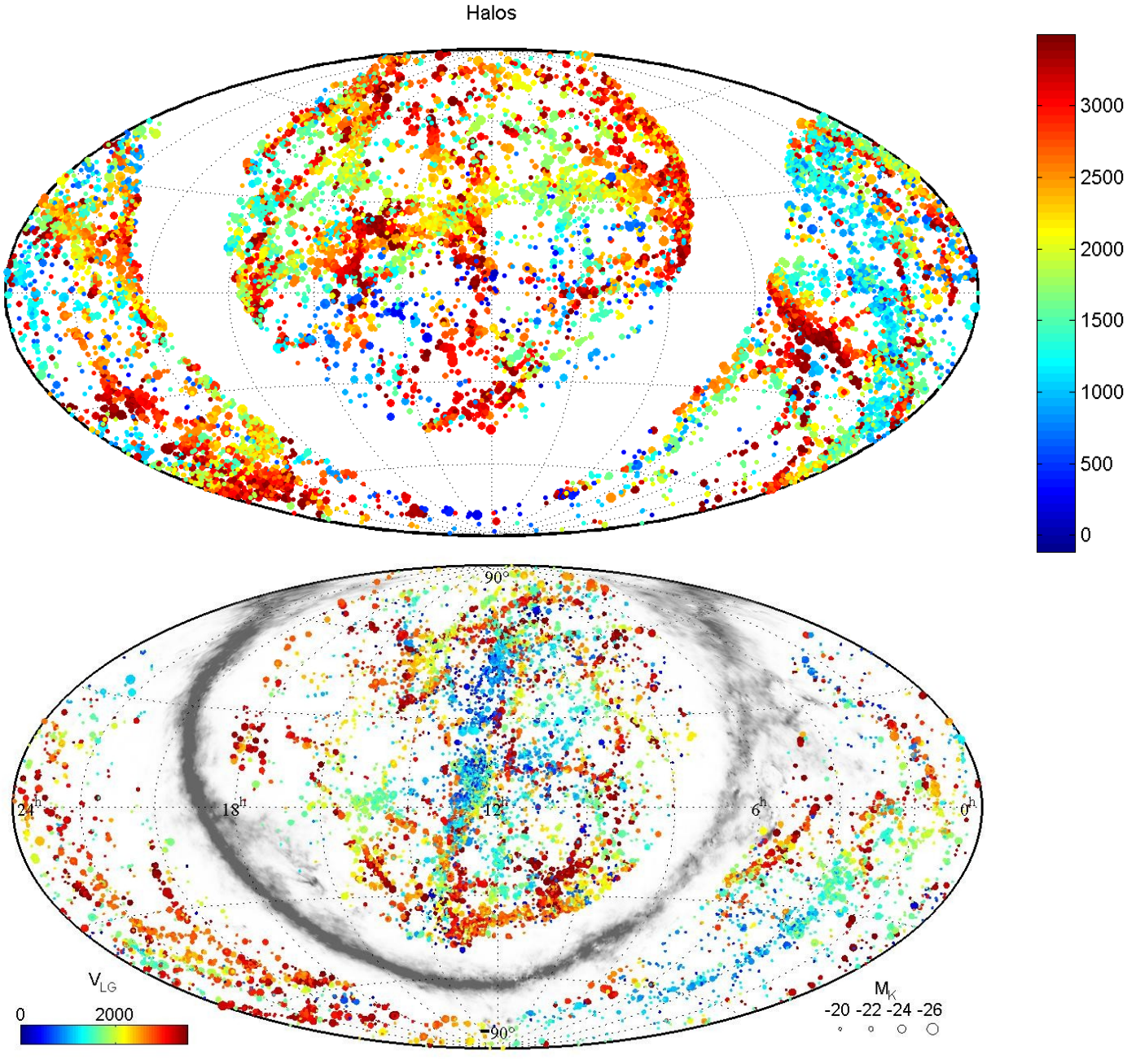


CLUES

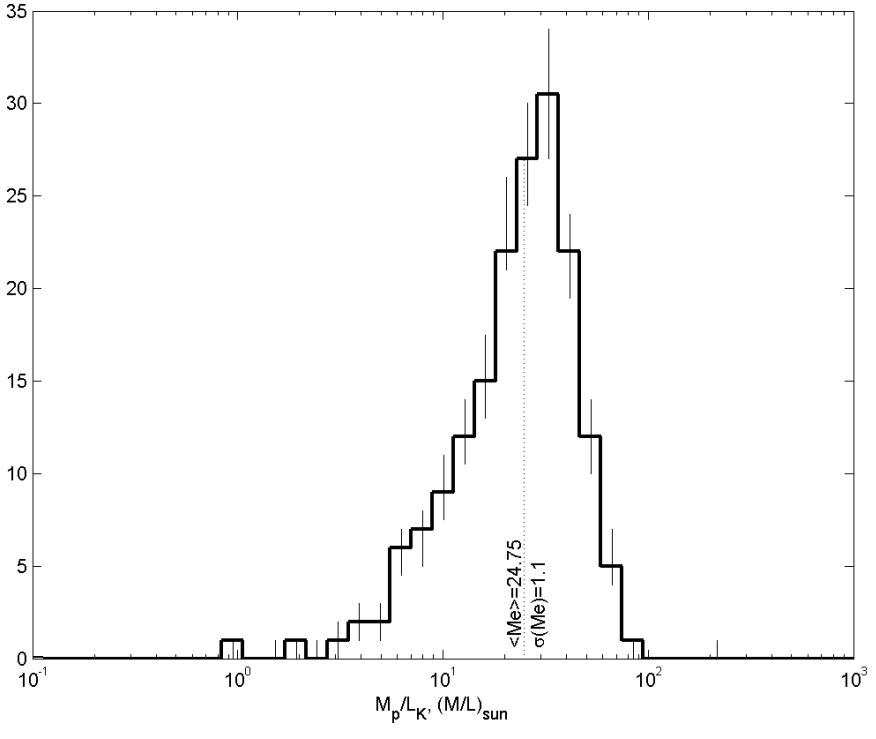
Constrained Local UniversE Simulations

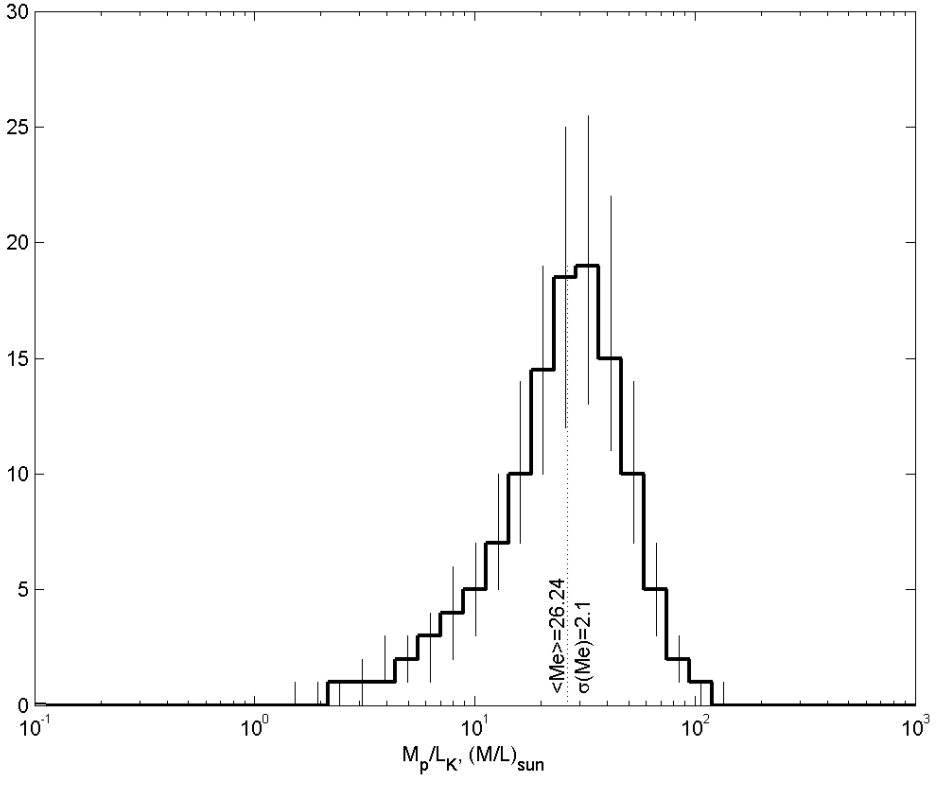
Stefan Gottlober Yehuda Hoffman Anatoly Klypin Gustavo Yepes



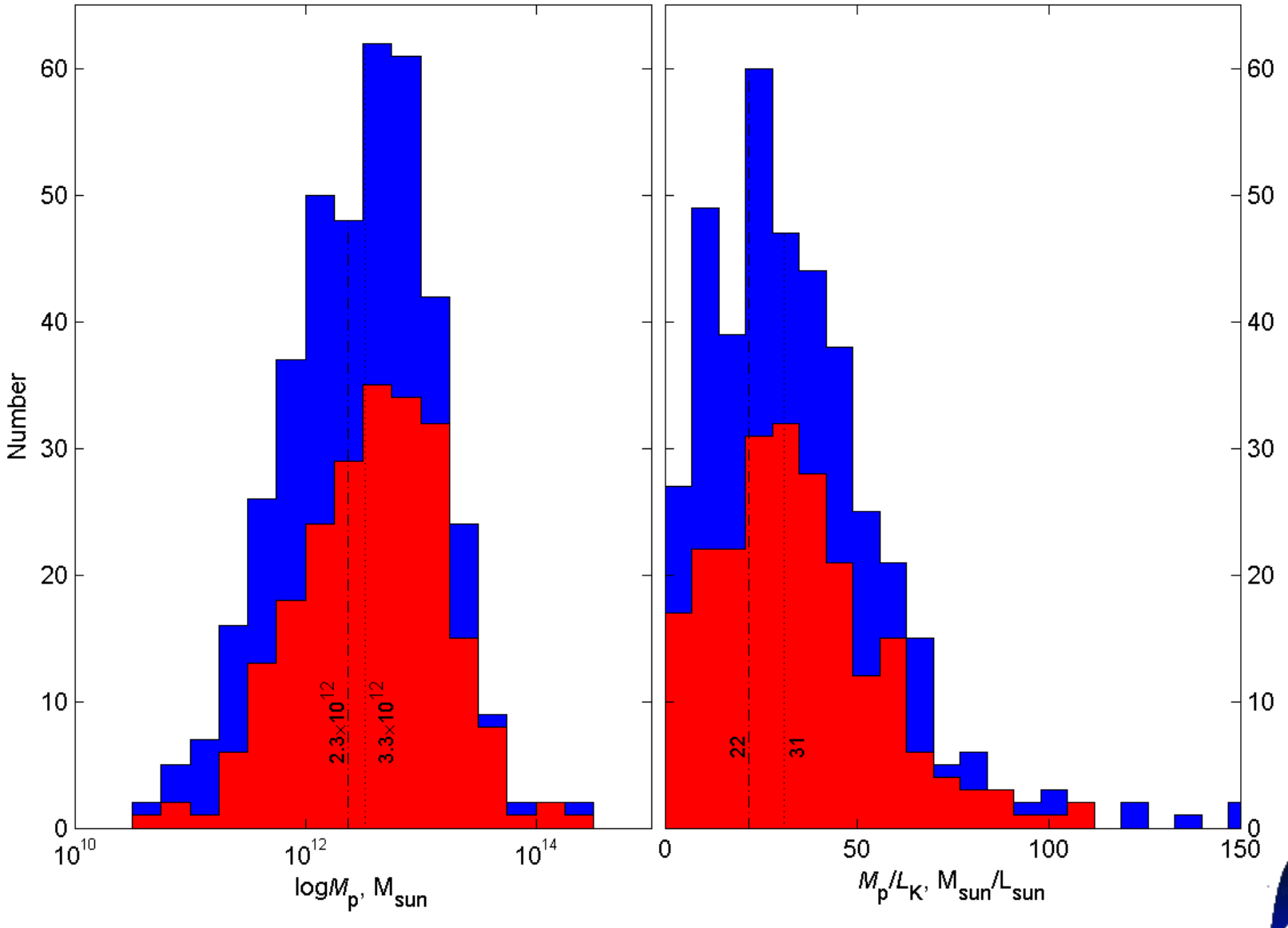

Halos
3000
2500
2000
1500
1000
500
0
90°
24h
18h
12h
6h
0h
-90°
VLG
0
2000
MK
-20 -22 -24 -26

Distribution by M/L





Mass and Mass-to-Light ratio



Thank you for your attention