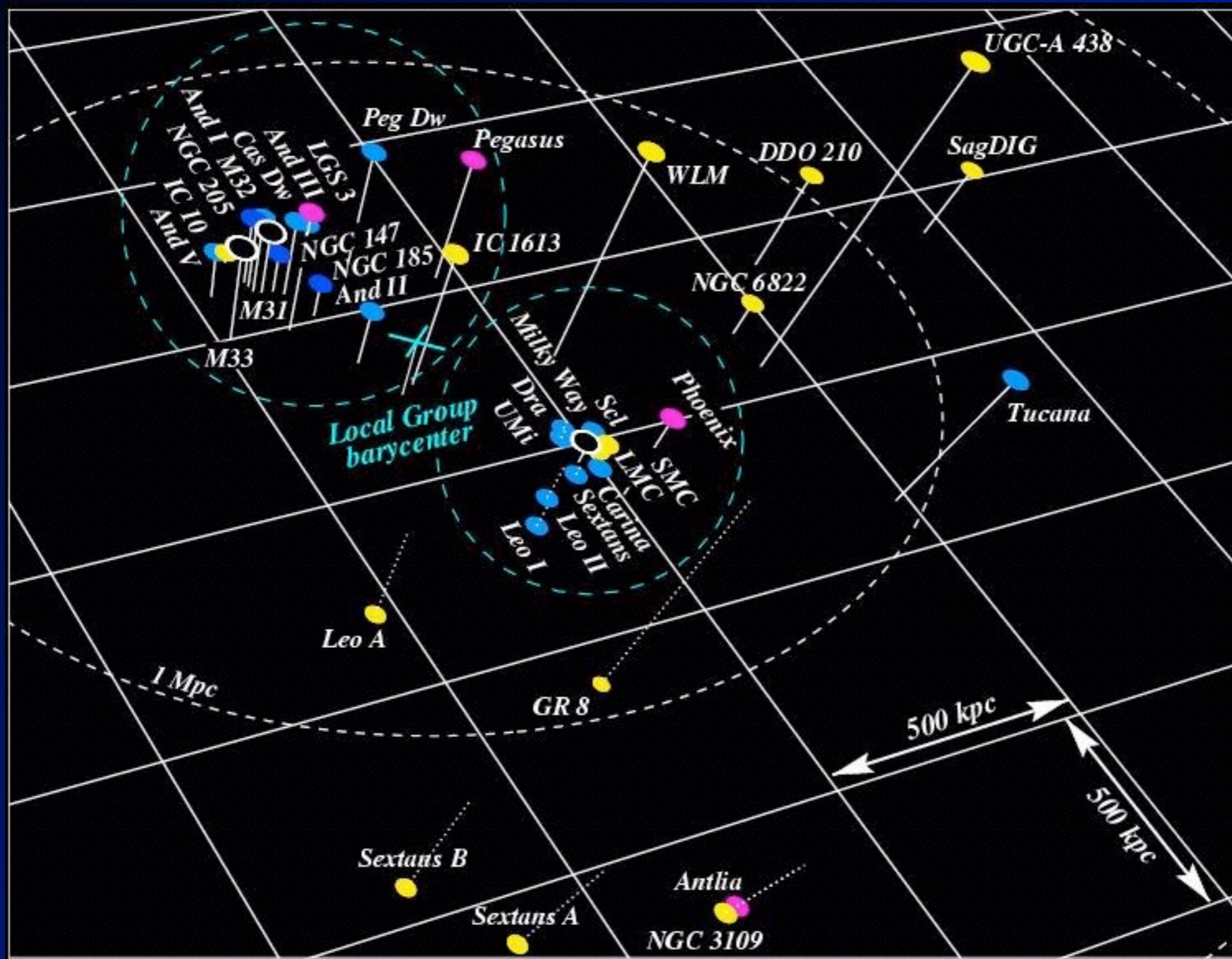


Galaxies: The local group

ASTR 505



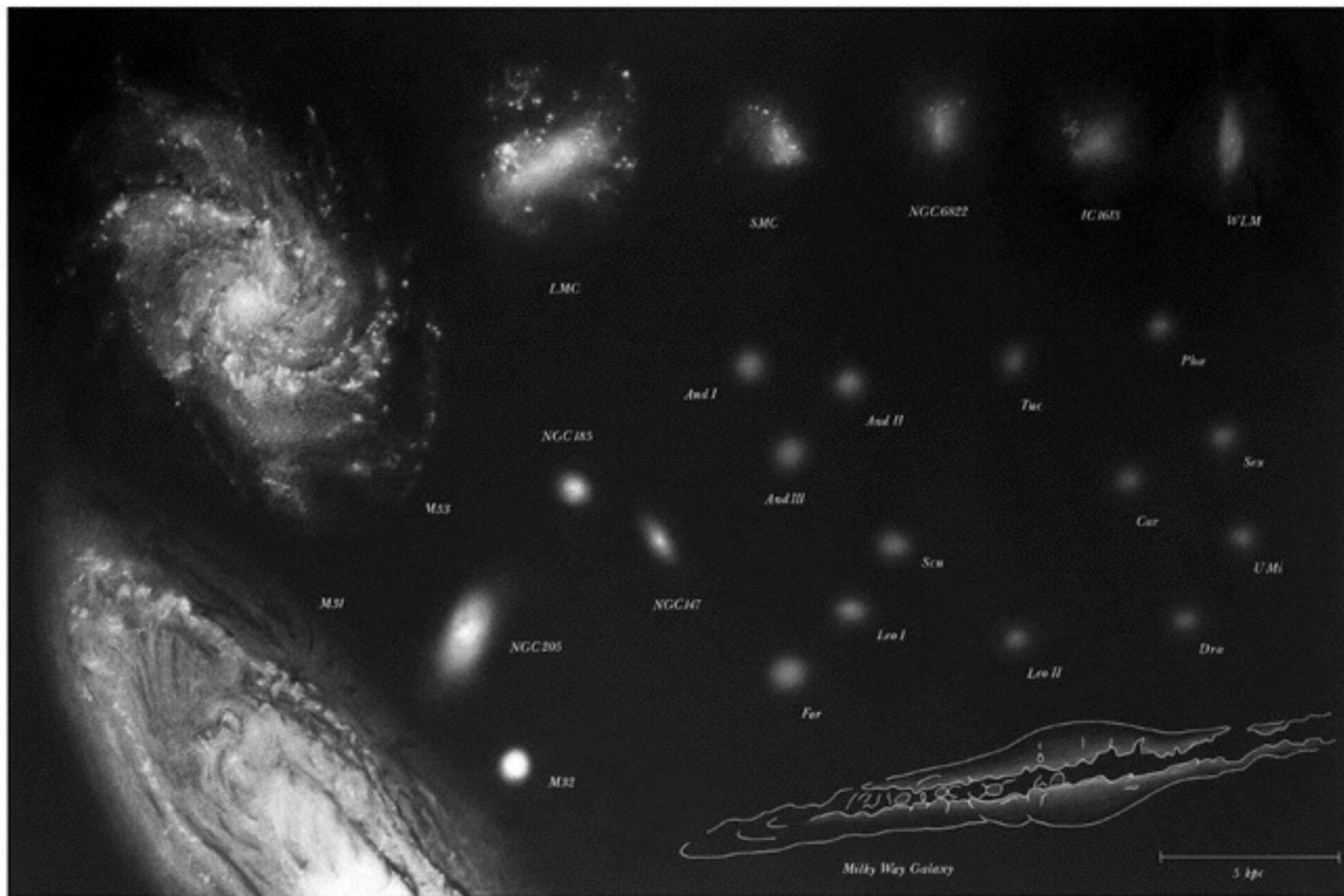


Fig 4.1 (B. Binggeli) 'Galaxies in the Universe' Sparke/Gallagher CUP 2007

DERIVED PROPERTIES OF PROBABLE LOCAL GROUP GALAXIES

Name	Alias	DDO Type	$(m-M)_0$	M_V	l (deg)	b (deg)	D (kpc)	$\cos \theta$
M31	NGC 224	Sb I-II	24.4	-21.2	121.17	-21.57	760	0.88
Milky Way	Galaxy	S(B)bc I-II:	14.5	-20.9:	000.00	00.00	8	-0.15
M33	NGC 598	Sc II-III	24.5	-18.9	133.61	-31.33	795	0.73
LMC .....	...	Ir III-IV	18.5	-18.5	280.19	-33.29	50	-0.80
SMC .....	...	Ir IV/IV-V	18.85	-17.1	302.81	-44.33	59	-0.61
M32	NGC 221	E2	24.4	-16.5	121.15	-21.98	760	0.88
NGC 205 .....	...	Sph	24.4	-16.4	120.72	-21.14	760	0.88
IC 10 .....	...	Ir IV:	24.1	-16.3	118.97	-03.34	660	0.94
NGC 6822 .....	...	Ir IV-V	23.5	-16.0	025.34	-18.39	500	0.29
NGC 185 .....	...	Sph	24.1	-15.6	120.79	-14.48	660	0.91
IC 1613 .....	...	Ir V	23.3	-15.3	129.73	-60.56	725	0.47
NGC 147 .....	...	Sph	24.1	-15.1	119.82	-14.25	660	0.92
WLM	DDO 221	Ir IV-V	24.85	-14.4	075.85	-73.63	925	0.32
Sagittarius .....	...	dSph(t)	17.0	-13.8::	005.61	-14.09	24	-0.04
Fornax .....	...	dSph	20.7	-13.1	237.24	-65.66	138	-0.25
Pegasus	DDO 216	Ir V	24.4	-12.3	094.77	-43.55	760	0.76
Leo I	Regulus	dSph	22.0	-11.9	225.98	+49.11	250	-0.44
And I .....	...	dSph	24.55	-11.8	121.69	-24.85	810	0.86
And II .....	...	dSph	24.2	-11.8	128.91	-29.15	700	0.78
Leo A	DDO 69	Ir V	24.2	-11.5	196.90	+52.41	690	-0.14
Aquarius ^a	DDO 210	Ir V	25.05	-11.3	034.04	-31.35	1025	0.40
Sag DIG ^a .....	...	Ir V	25.7:	-10.7:	021.13	-16.23	1300:	0.22
Pegasus II	And VI	dSph	24.45	-10.6	106.01	-36.30	830	0.83
Pisces	LGS 3	dIr/dSph	24.55	-10.4	126.77	-40.88	810	0.71
And III .....	...	dSph	24.4	-10.2	119.31	-26.25	760	0.86
And V .....	...	dSph	24.55	-10.2	126.22	-15.12	810	0.87
Leo II .....	...	dSph	21.6	-10.1	220.14	+67.23	210	-0.26
Phoenix .....	...	dIr/dSph	23.0	-9.8	272.19	-68.95	395	-0.30
Sculptor .....	...	dSph	19.7	-9.8	287.69	-83.16	87	-0.06
Tucana .....	...	dSph	24.7	-9.6	322.91	-47.37	870	-0.44
Cassiopeia	And VII	dSph	24.2	-9.5	109.46	-09.95	690	0.98
Sextans .....	...	dSph	19.7	-9.5	243.50	+42.27	86	-0.65
Carina .....	...	dSph	20.0	-9.4	260.11	-22.22	100	-0.85
Draco .....	...	dSph	19.5	-8.6	086.37	+34.71	79	0.77
Ursa Minor .....	...	dSph	19.0	-8.5	104.88	+44.90	63	0.66

NOTE.—Colons denote uncertain values.

^a Membership in Local Group not yet firmly established.

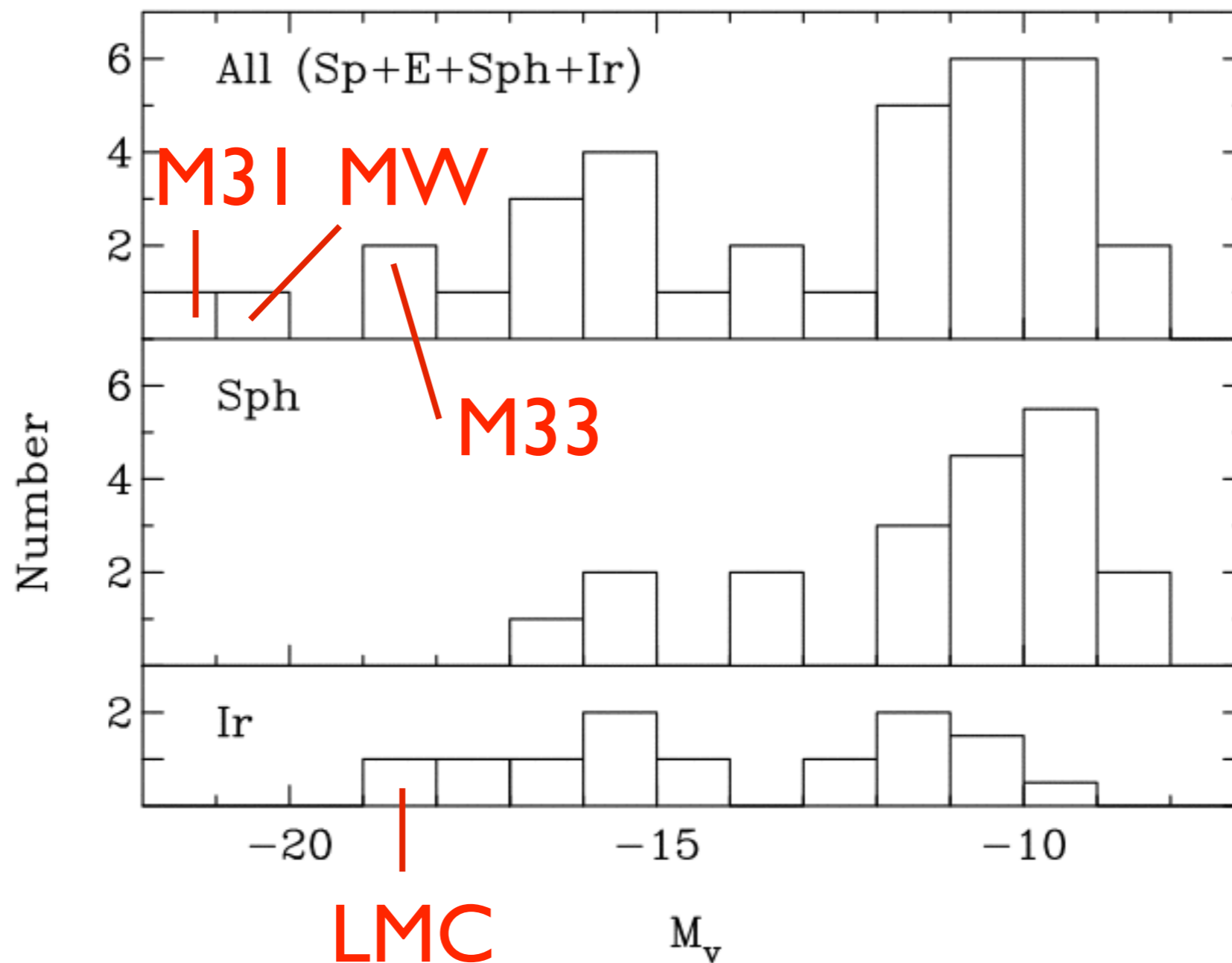


FIG. 1.—Histogram of the luminosity distribution of Local Group members, with absolute magnitude data taken from Table 1. The top panel gives the luminosity distribution for all Local Group members, and the middle and bottom panels show the luminosity distributions for Ir/dIr and Sph/dSph morphological types. Four galaxies appear in the top panel but not in the lower panels: the spirals M31, the Milky Way, and M33; and the elliptical M32. The galaxies Pisces and Phoenix (dIr/dSph) are counted with weight 0.5 in each of the lower two panels.



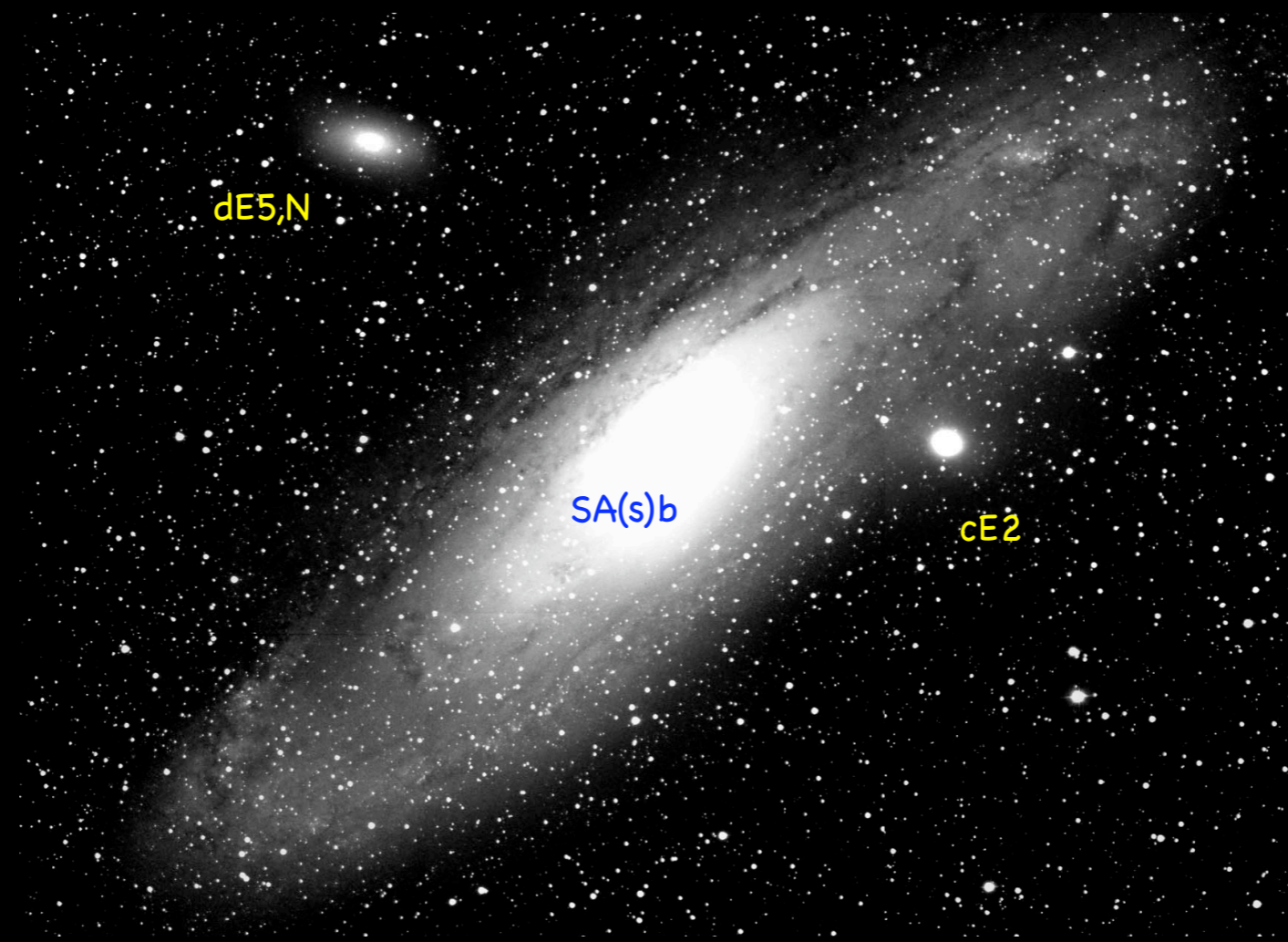




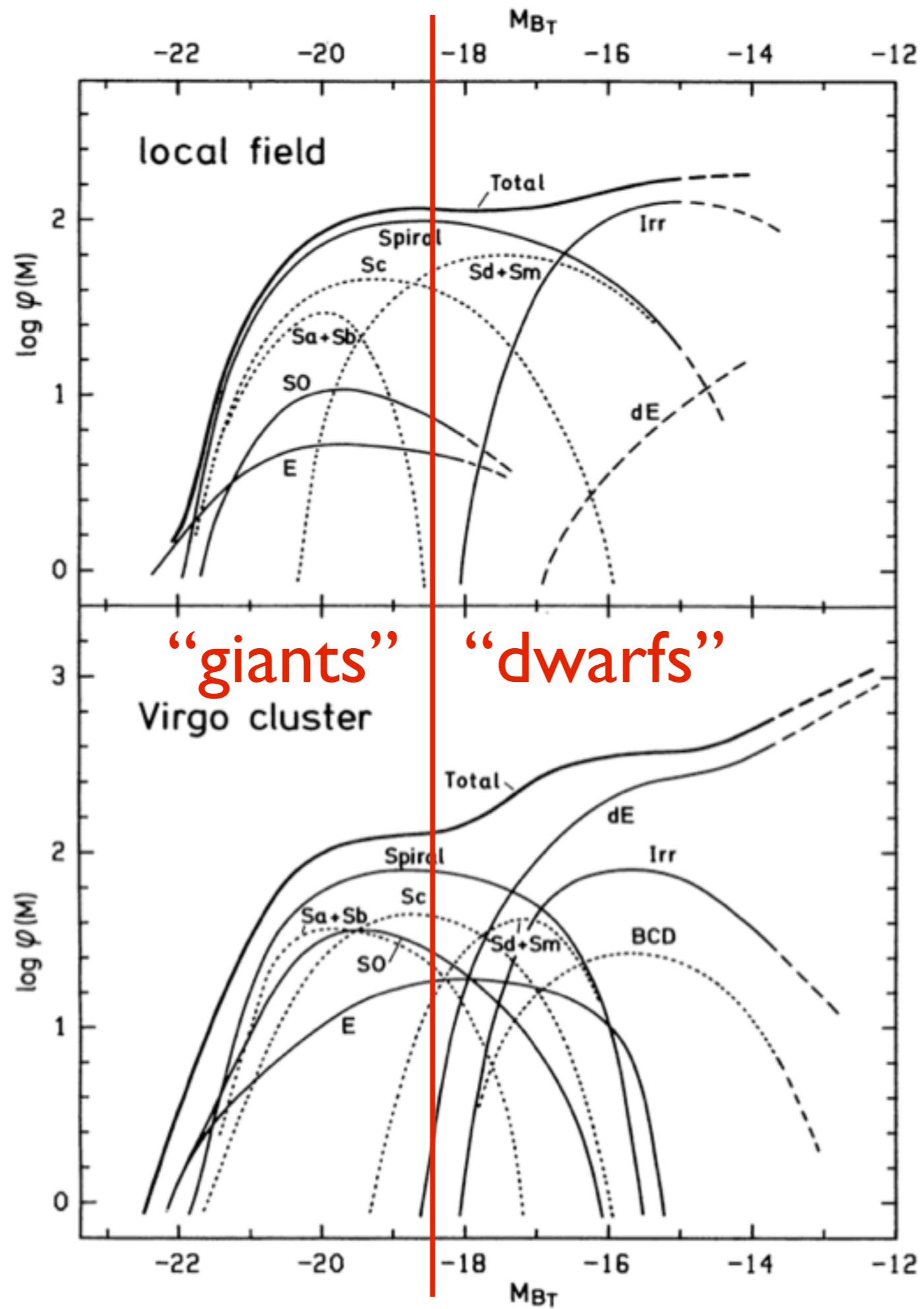




M32 and NGC205: Low-Mass E Galaxies

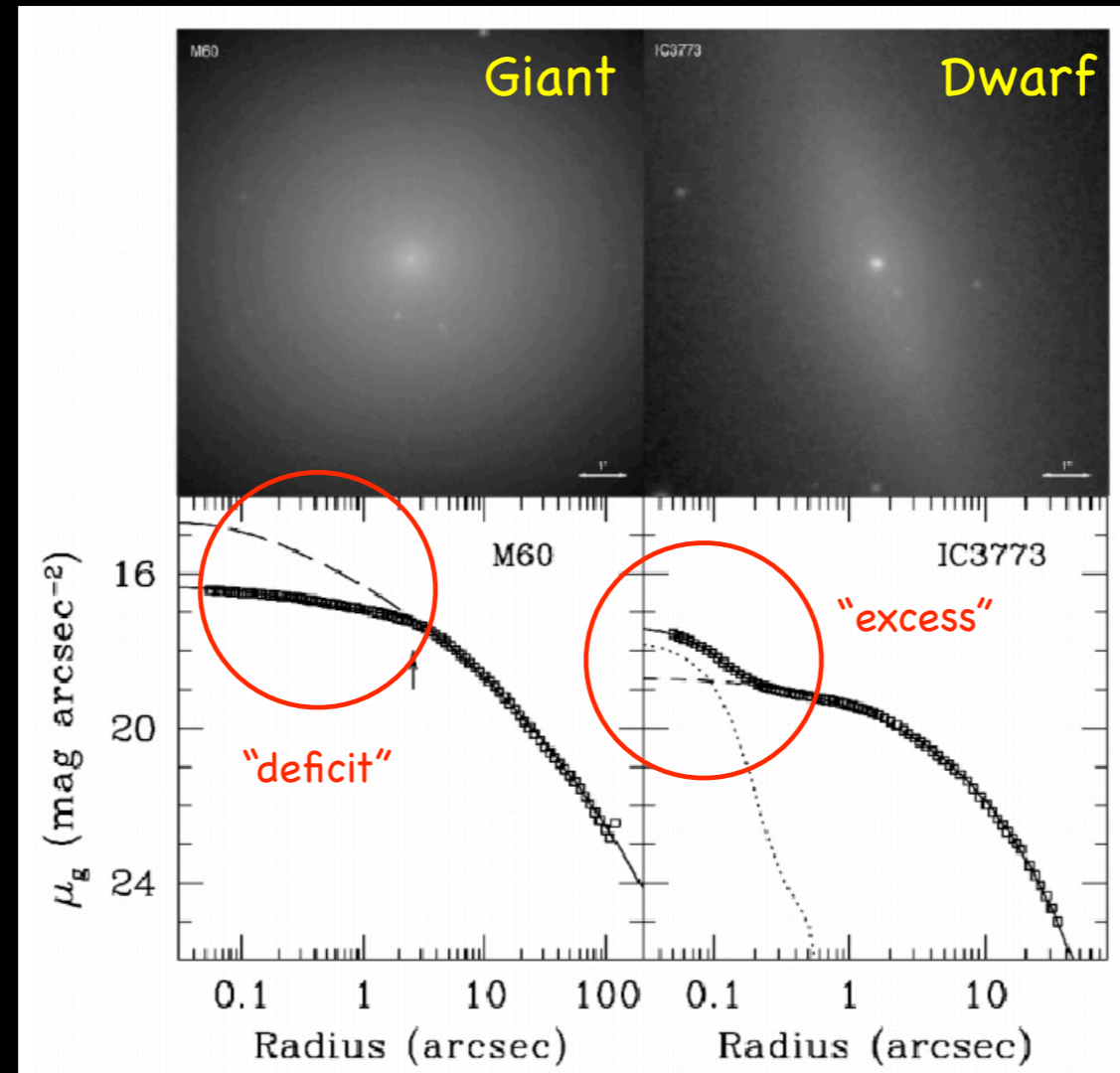


Andromeda, M32 and NGC205 - Ground-Based - 1.5X2



Motivation for the Core-Sérsic Parameterization: VCC1978 (M60)

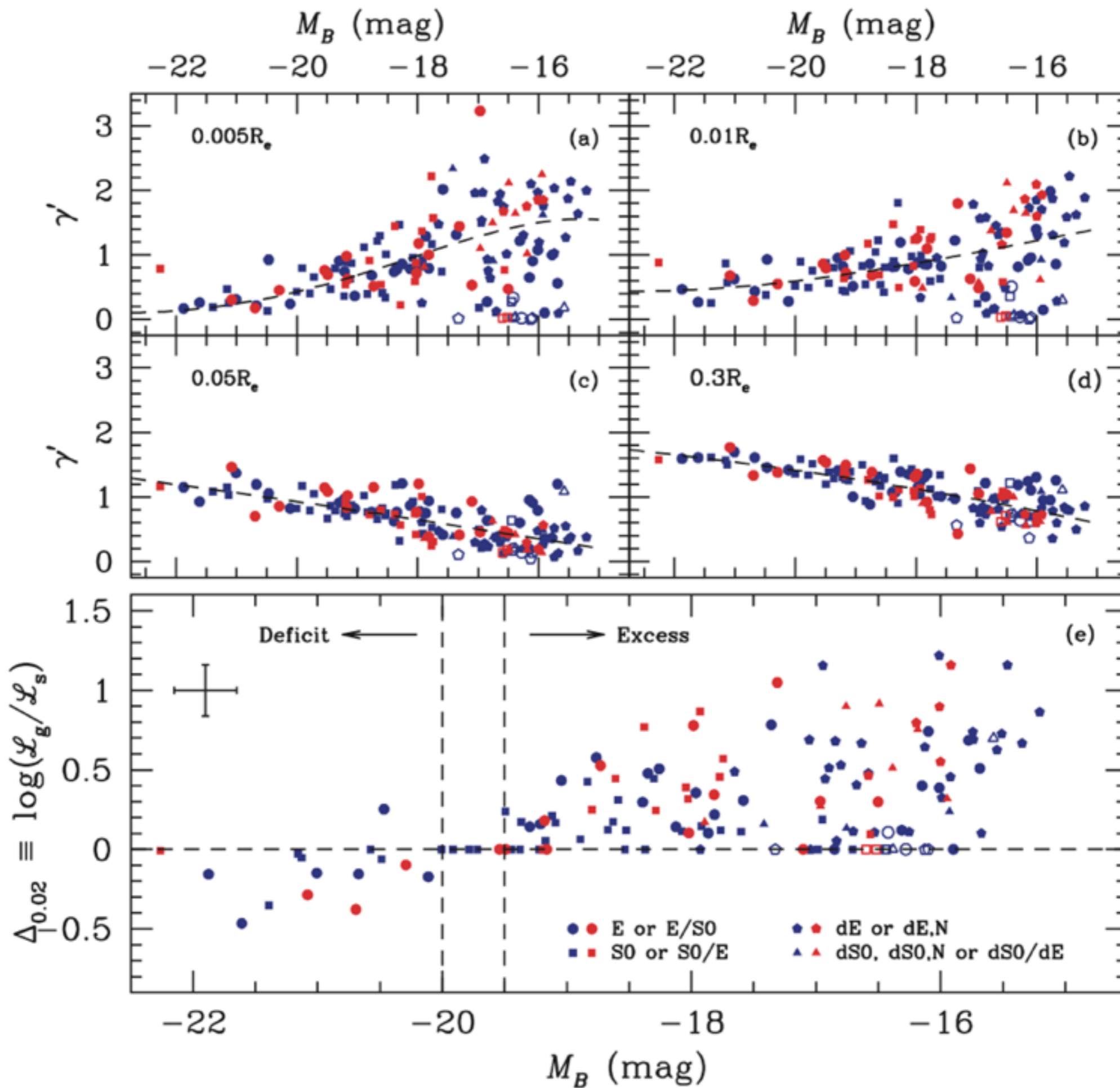
core-Sérsic
models



double Sérsic
models

Ferrarese et al. (2006)

$$I_S(R) = I_e \exp \left\{ -b_n \left[\left(\frac{R}{R_e} \right)^{1/n} - 1 \right] \right\}$$



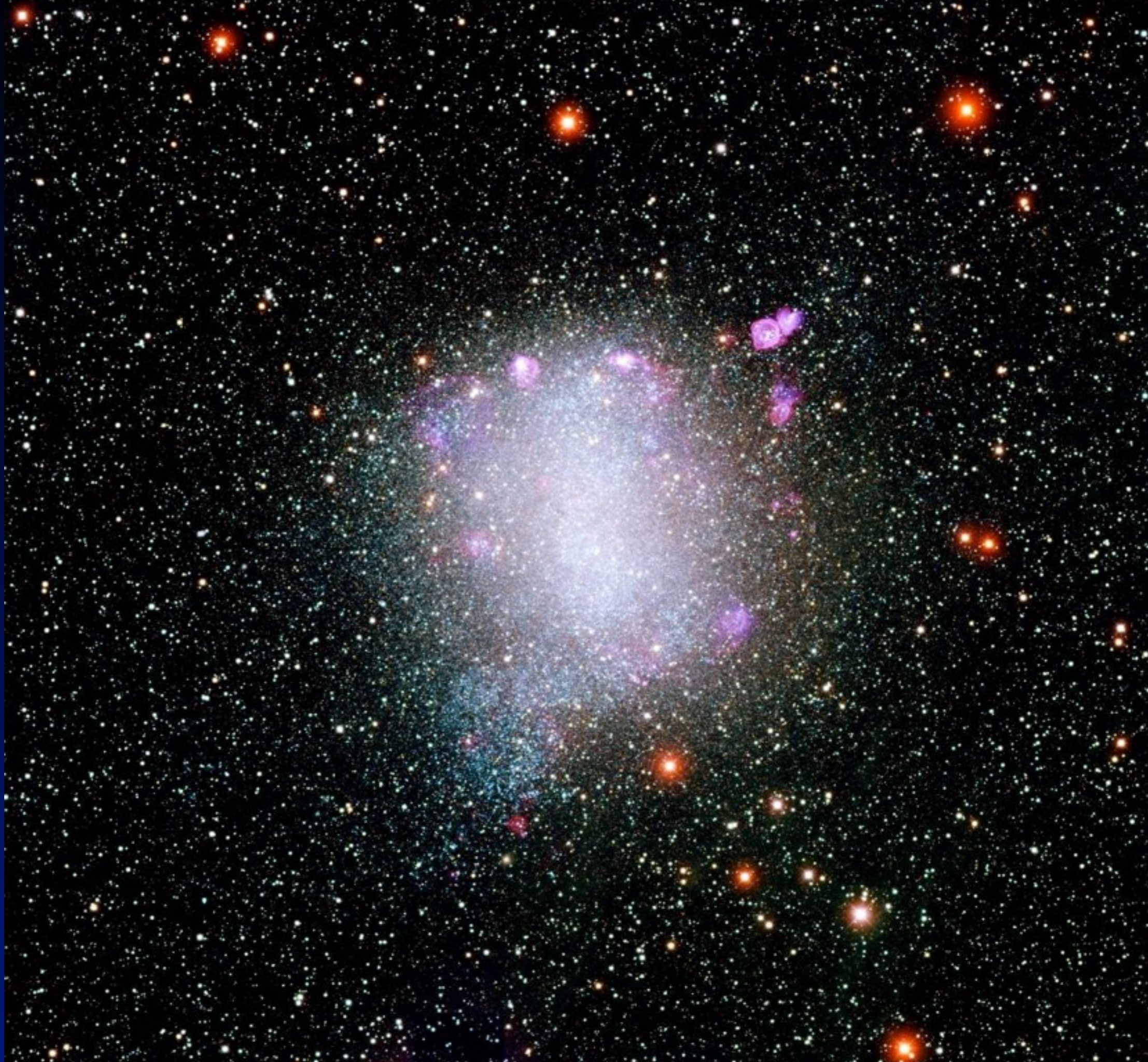


Pegasus dwarf spheroidal galaxy



1,000 light years

Keck 10 meter telescope / Grebel & Guhathakurta



Sagittarius Dwarf Irregular Galaxy

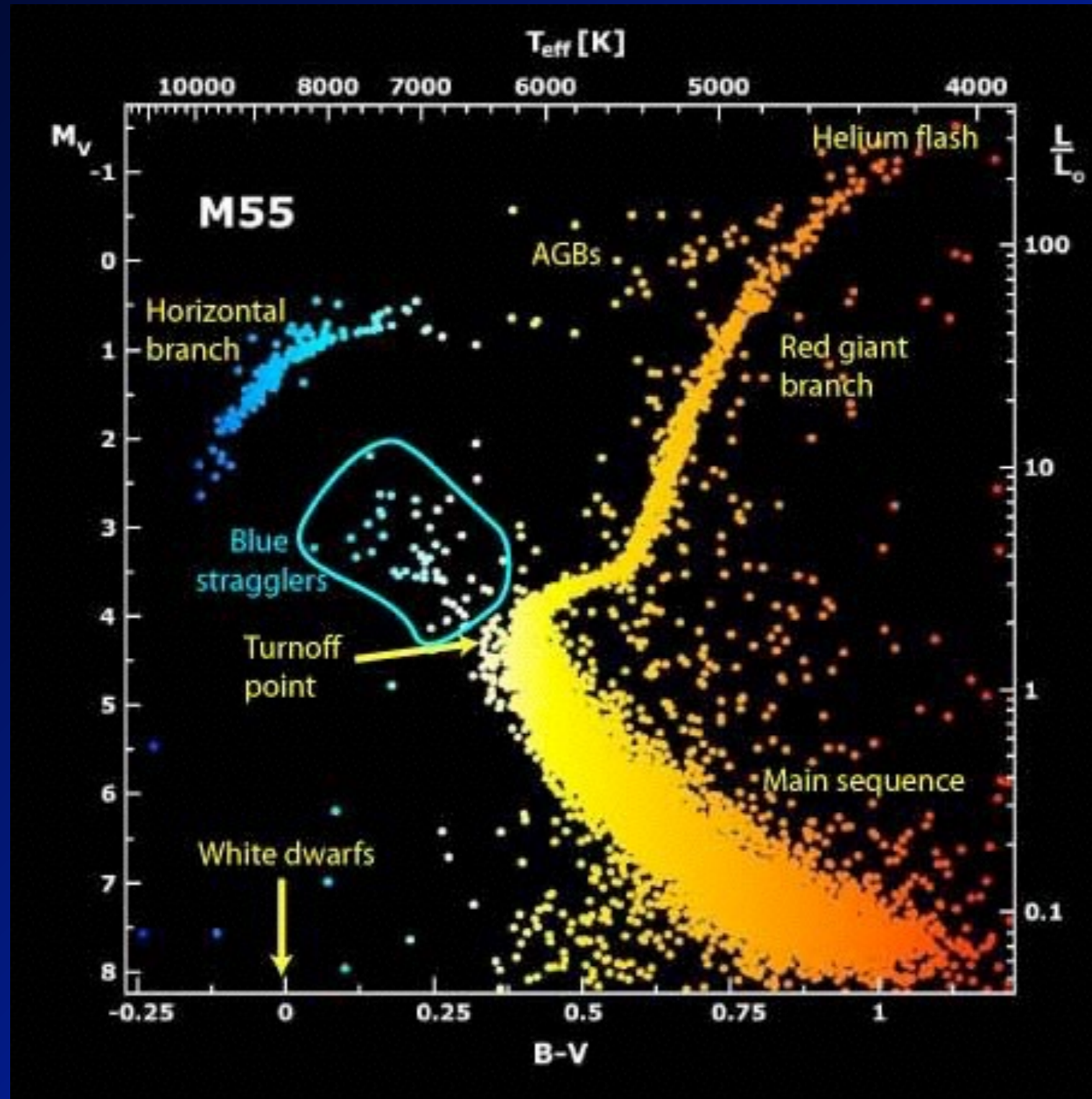


Hubble
Heritage

NASA, ESA, and The Hubble Heritage Team (STScI/AURA)
Hubble Space Telescope ACS • STScI-PRC04-31b



Globular clusters as simple stellar populations



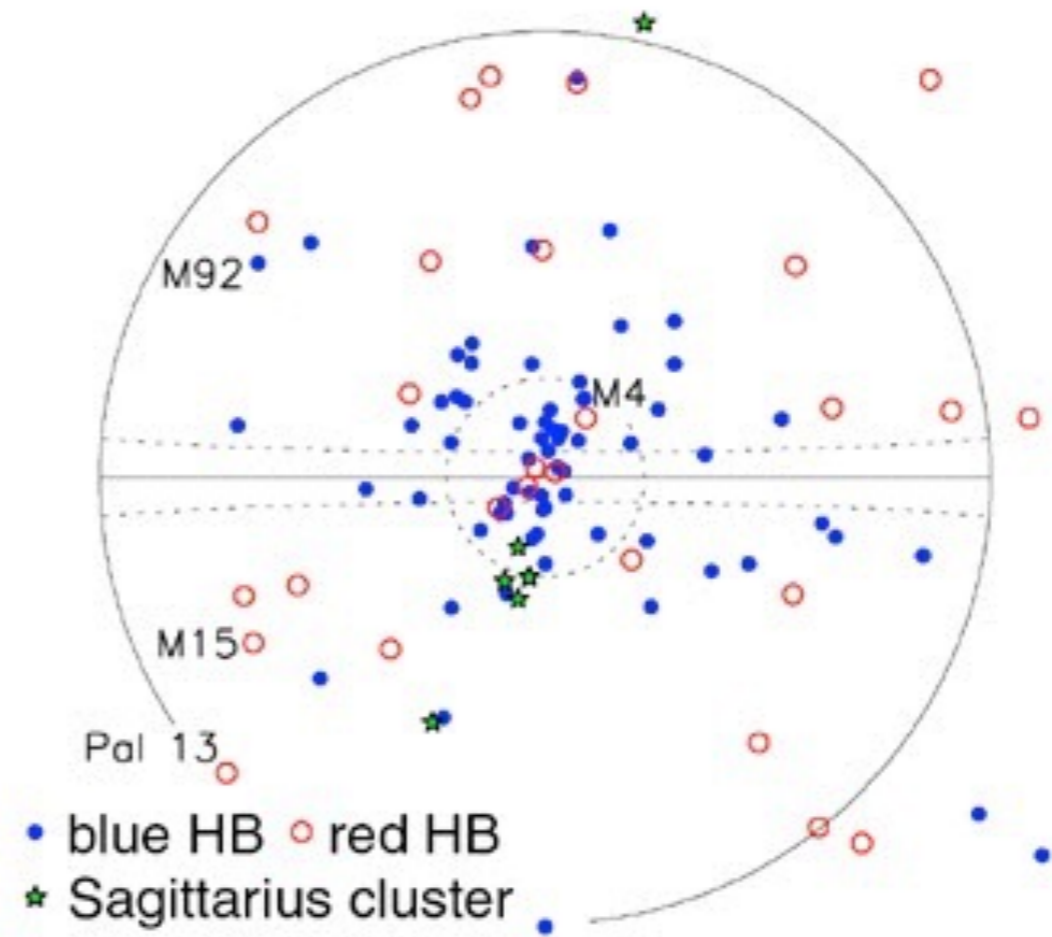
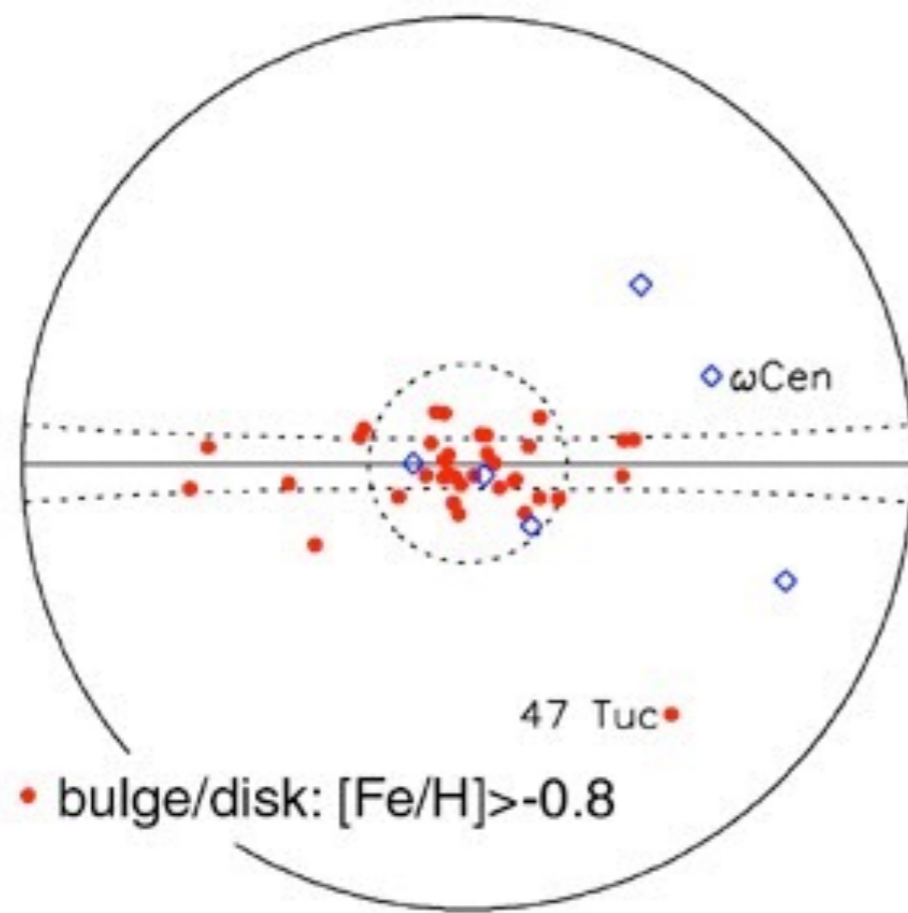
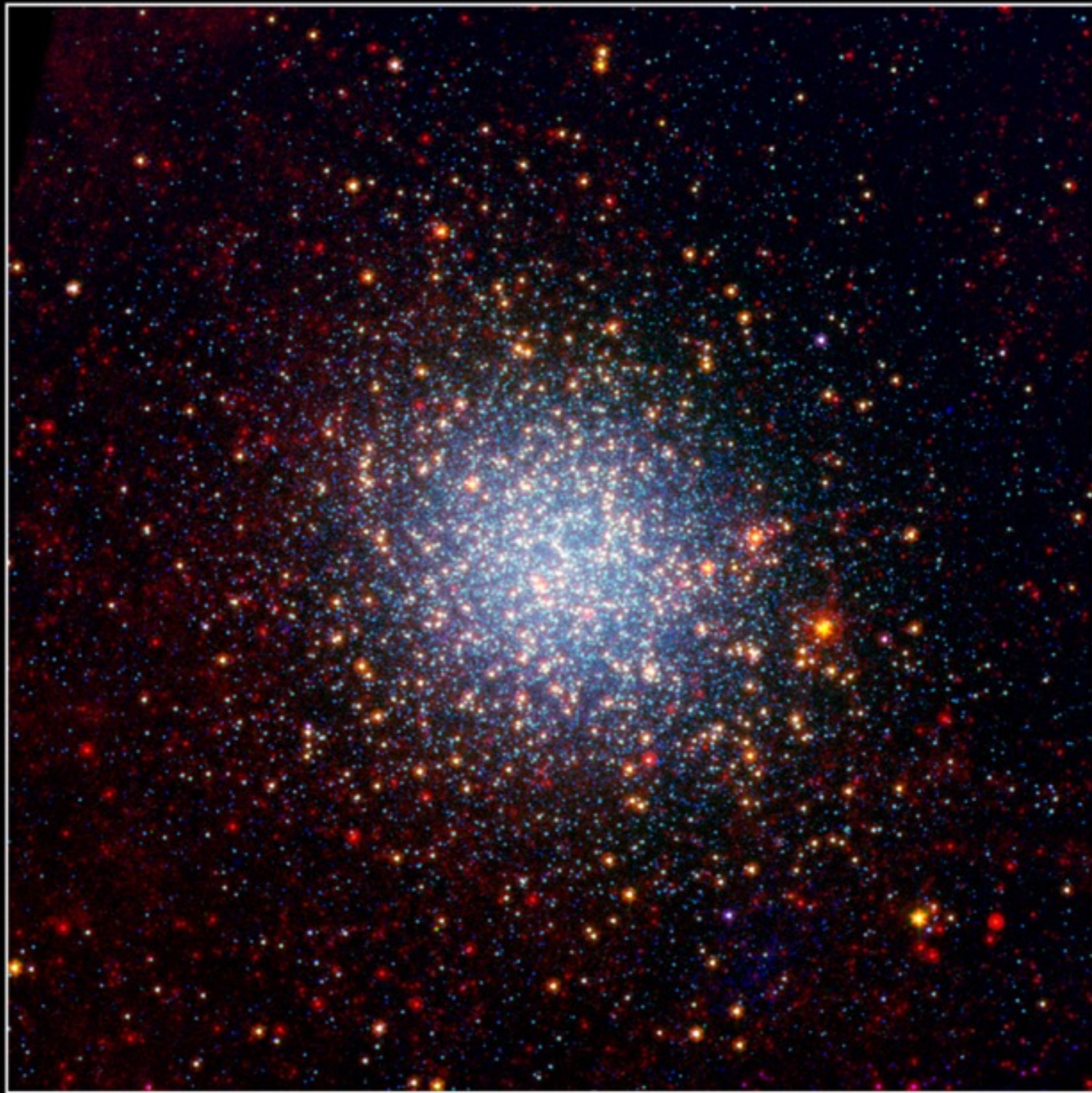


Fig 2.15 (D. Mackey) 'Galaxies in the Universe' Sparke/Gallagher CUP 2007



Globular Cluster Omega Centauri

**Spitzer Space Telescope
IRAC • MIPS**

NASA / JPL-Caltech / M. Boyer (Univ. of Minnesota)

ssc2008-07a



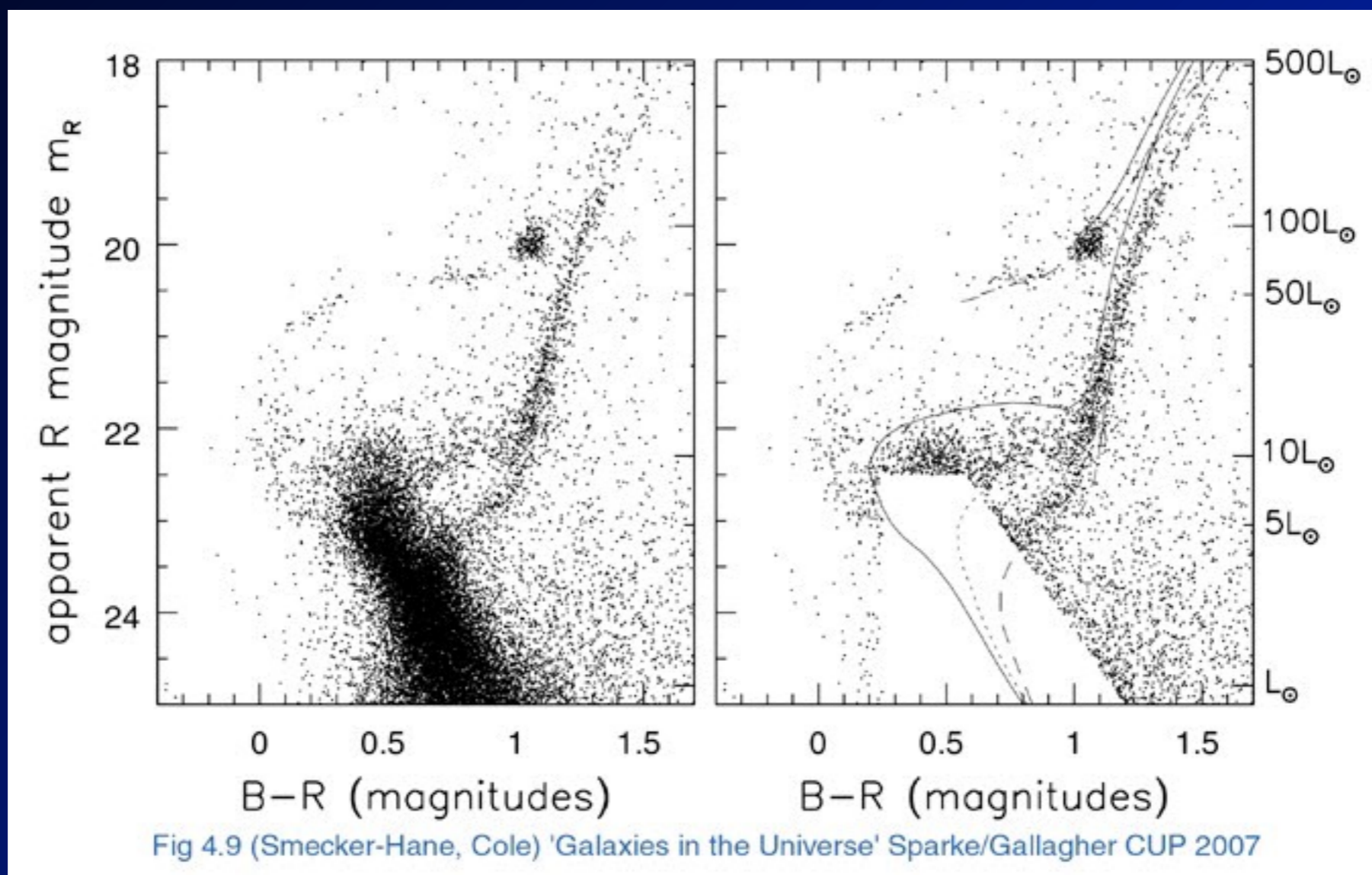
**Globular Cluster G1
in Galaxy M31**

HST · WFPC2

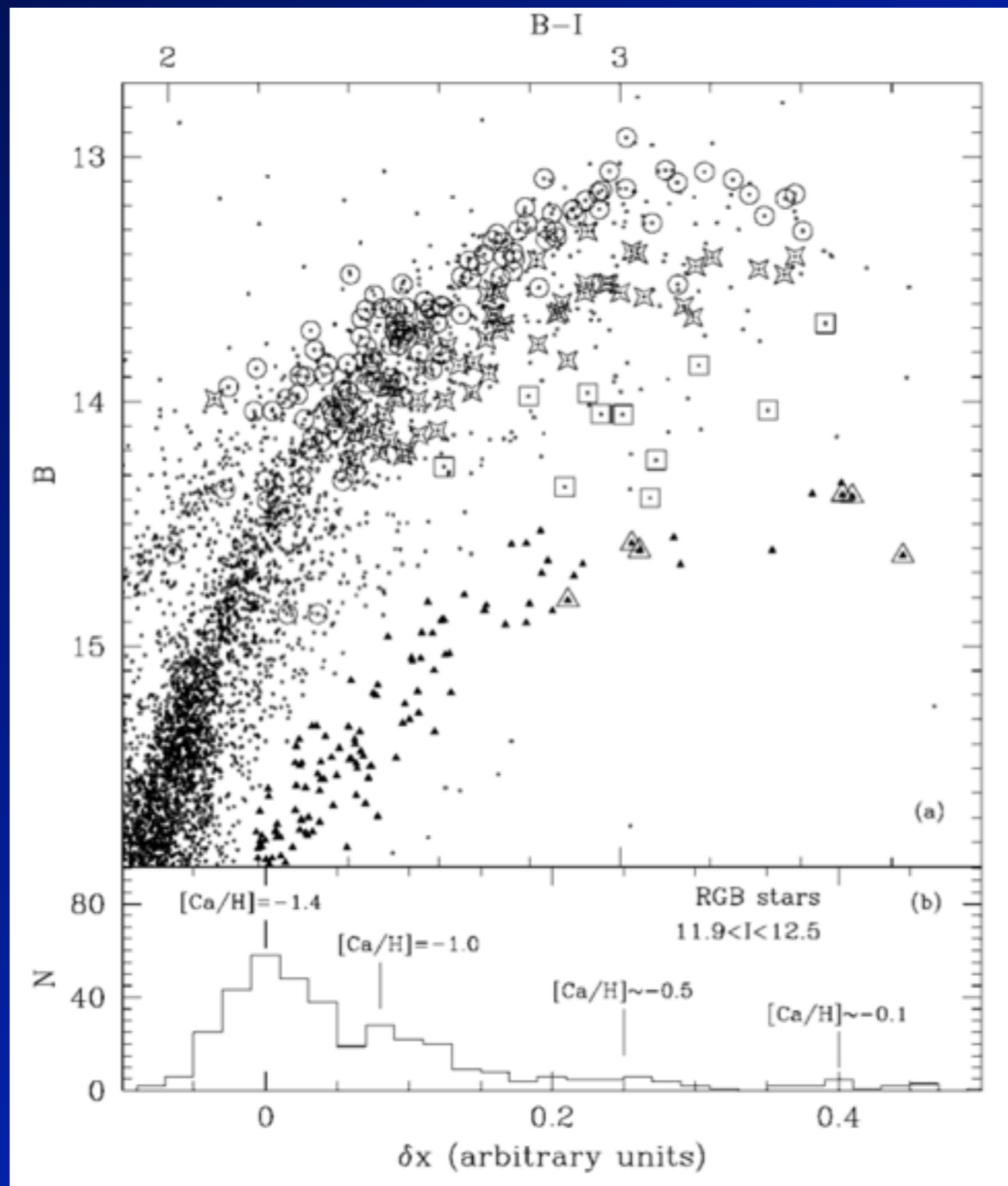
PRC96-11 · ST ScI OPO · April 24, 1996

Michael Rich, Kenneth Mighell, and James D. Neill (Columbia University),
Wendy Freedman (Carnegie Observatories) and NASA

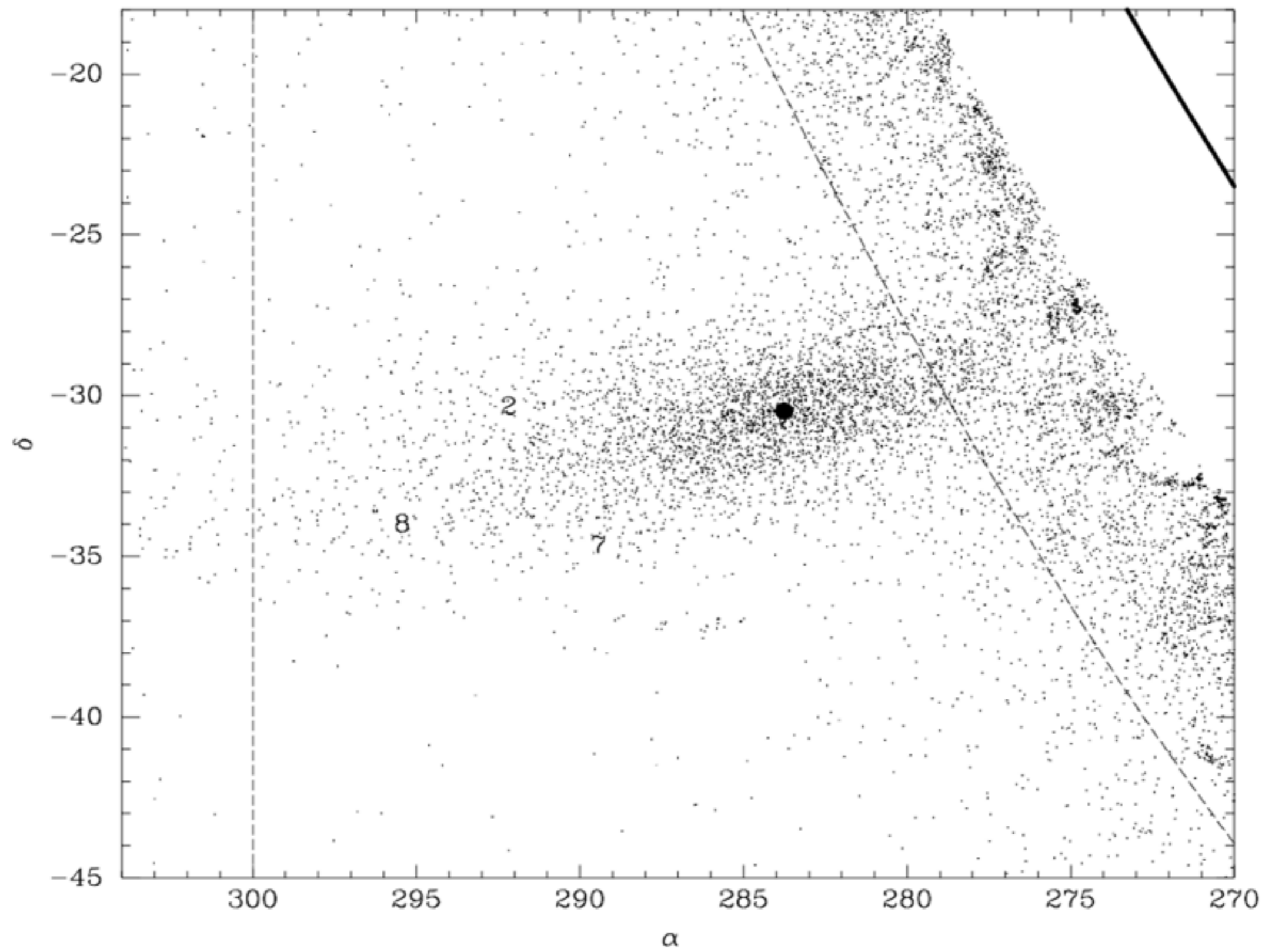
Multiple stellar pops in the Carina dwarf galaxy

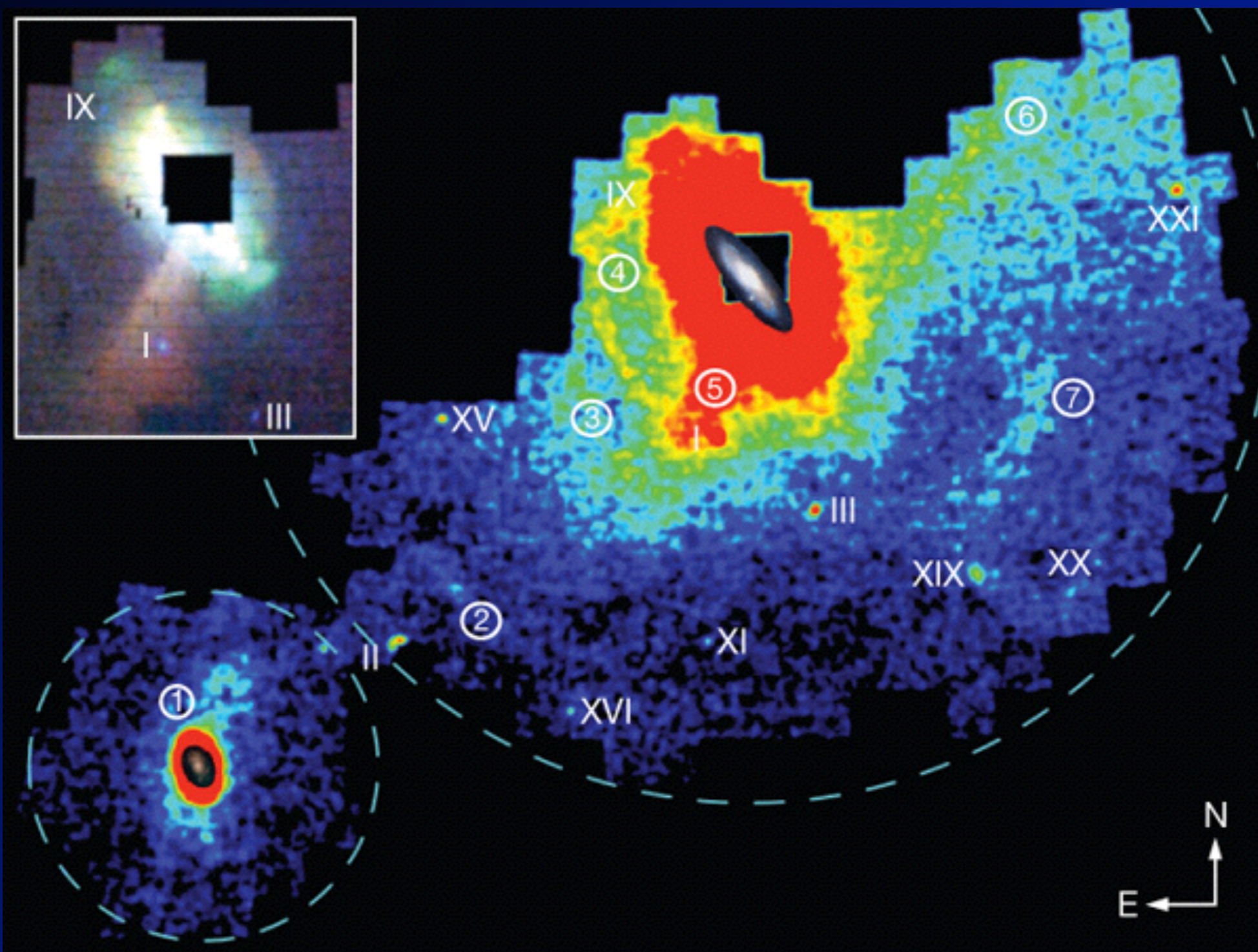


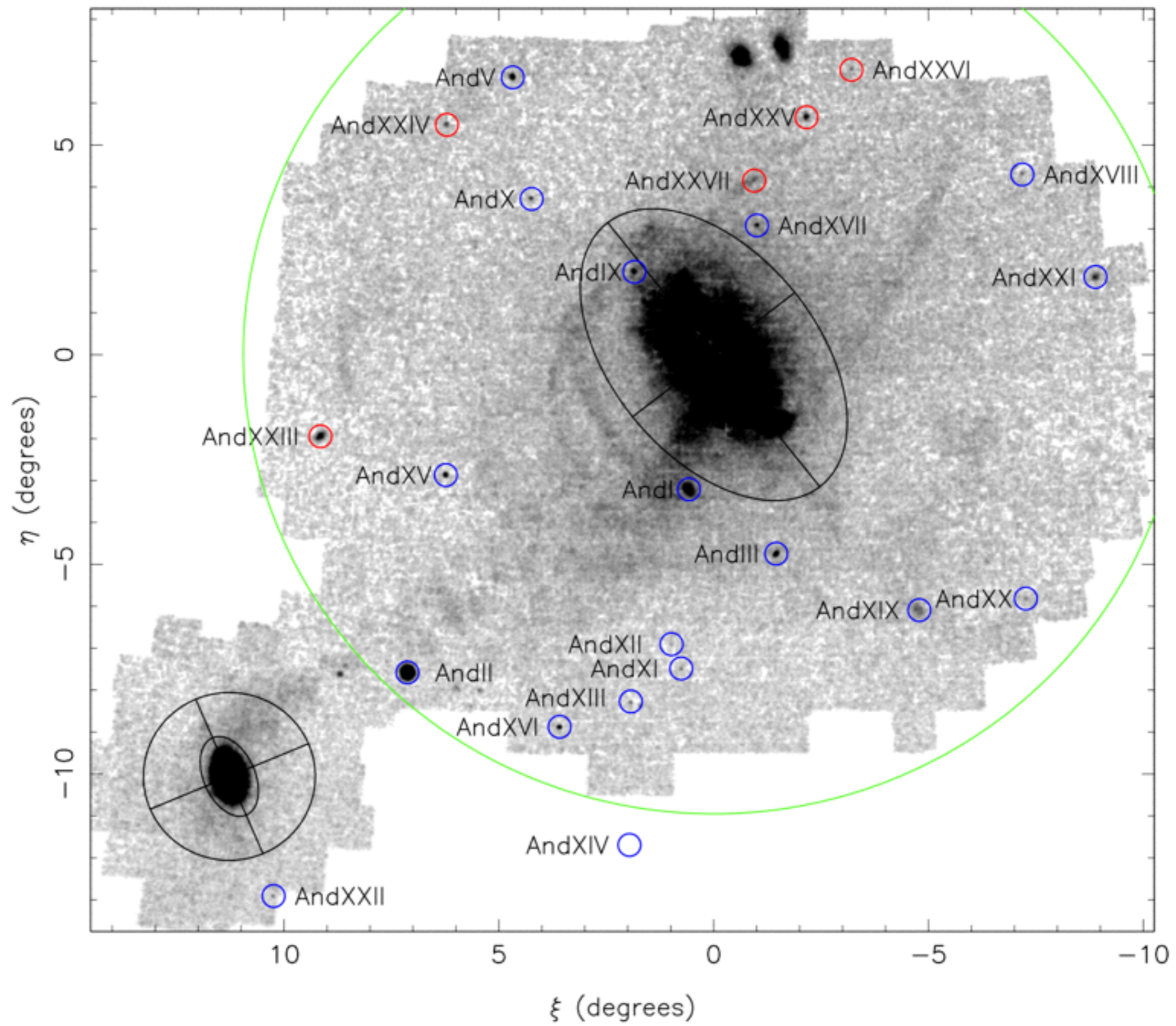
Multiple stellar pops in Omega Cen?



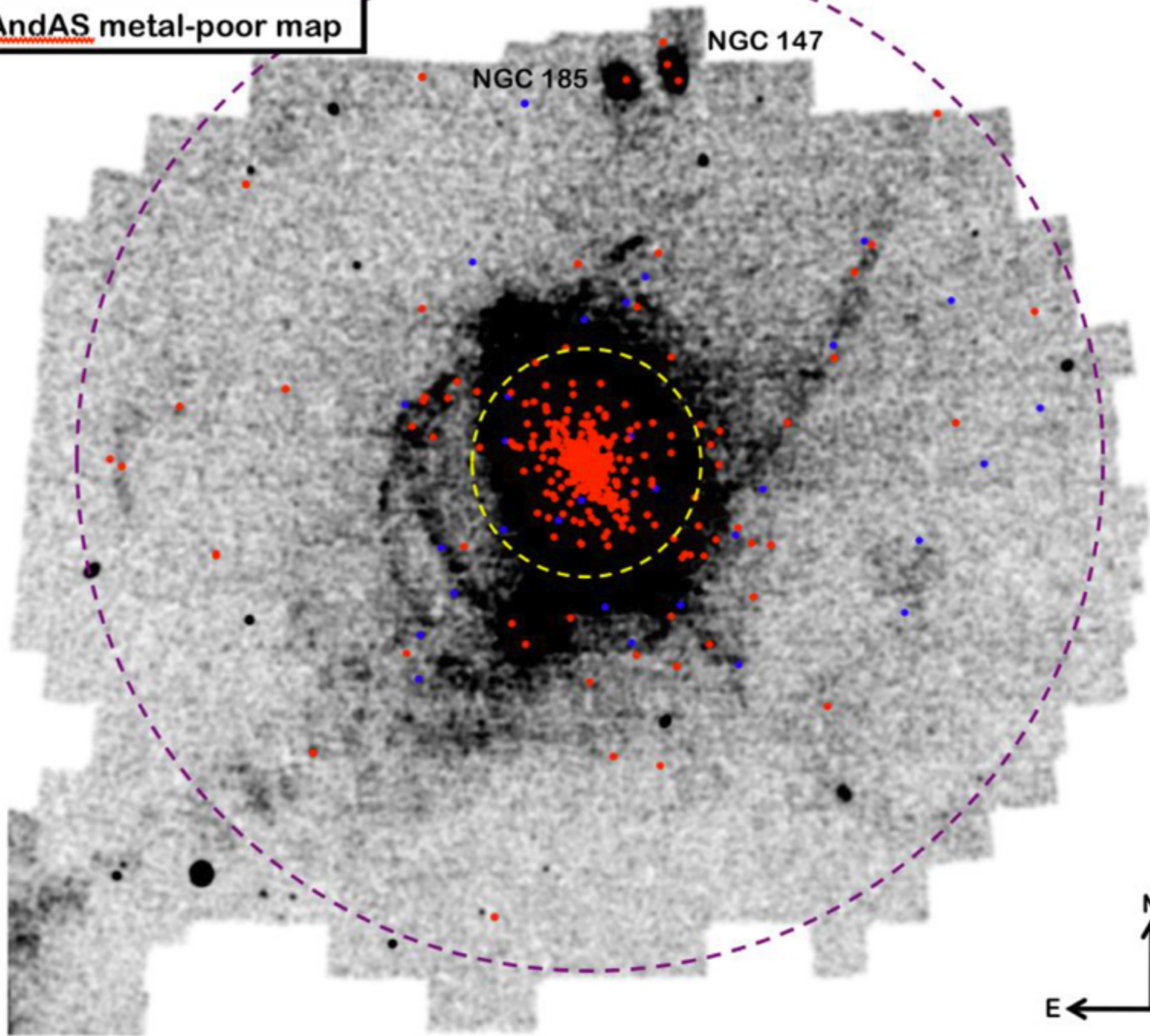


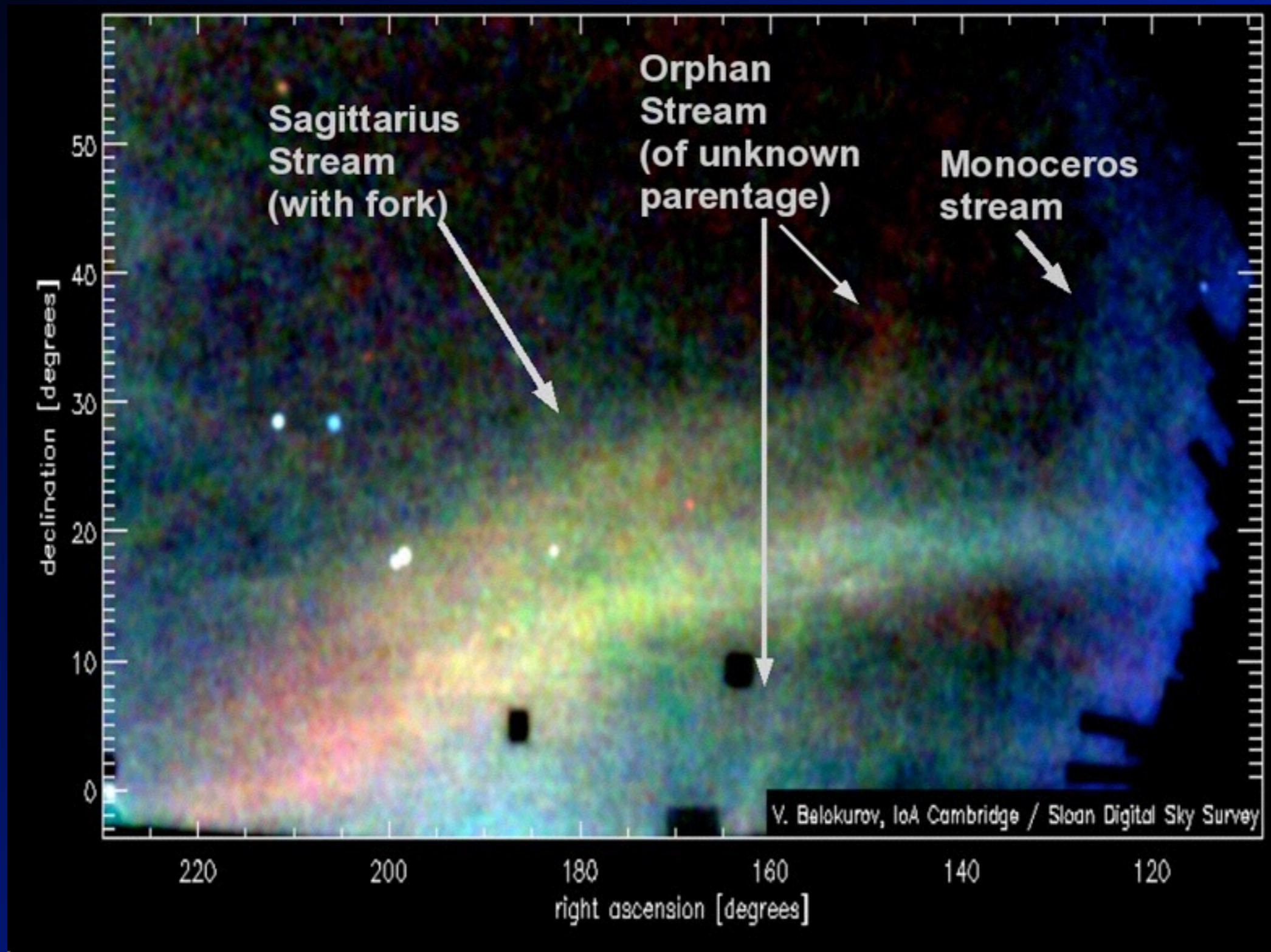


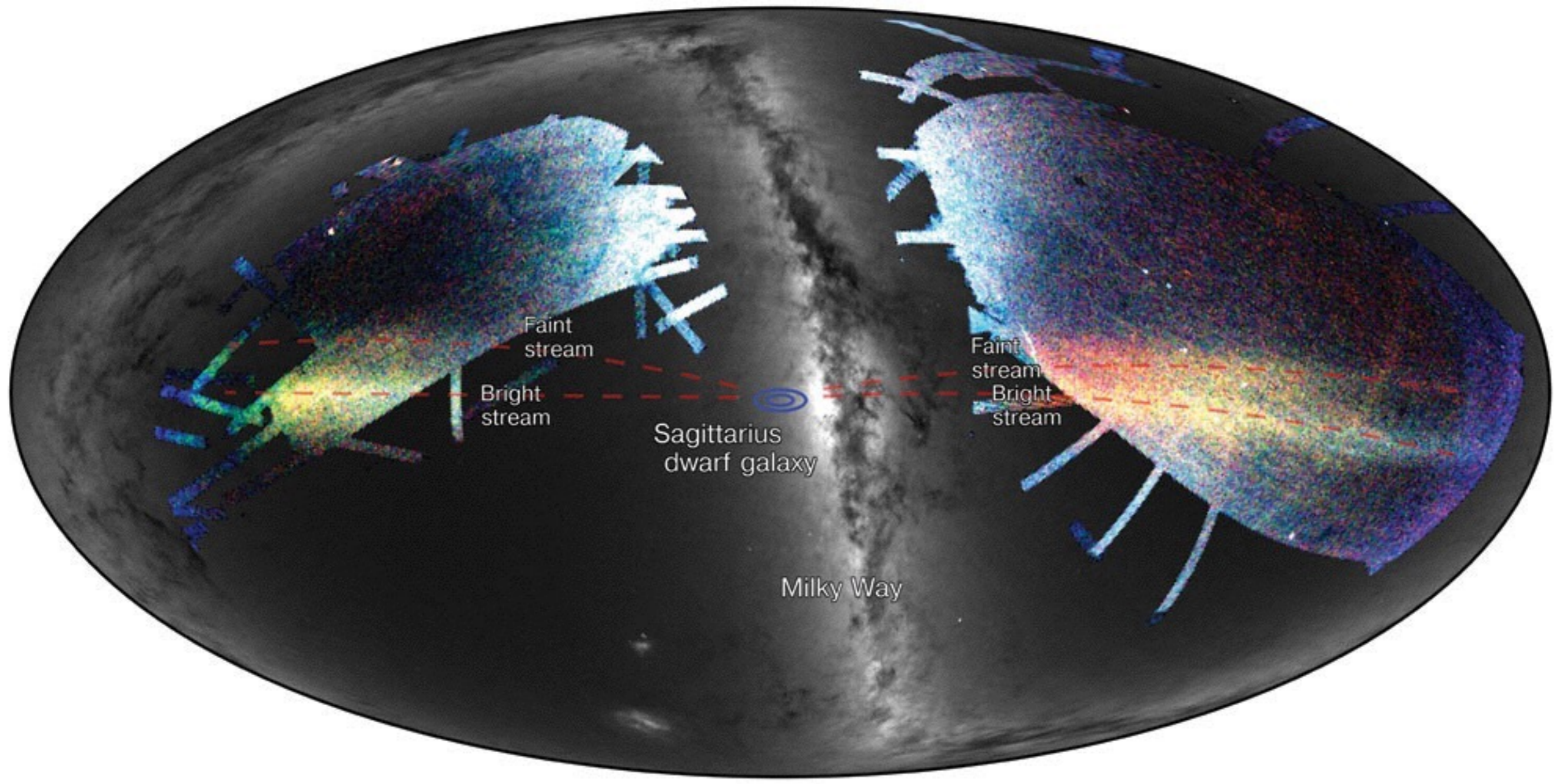




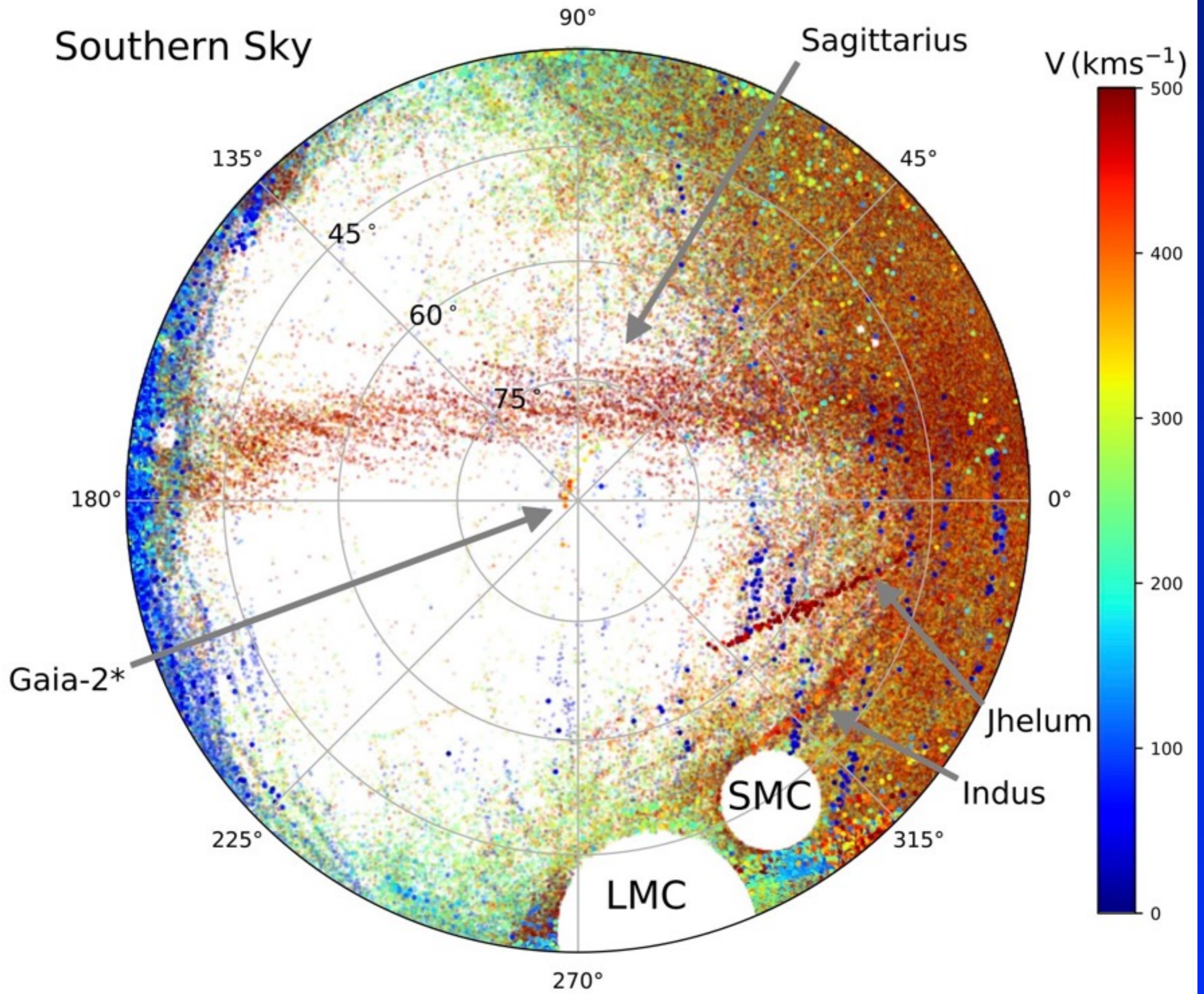
PAndAS metal-poor map







Southern Sky



Two body relaxation and dynamical friction

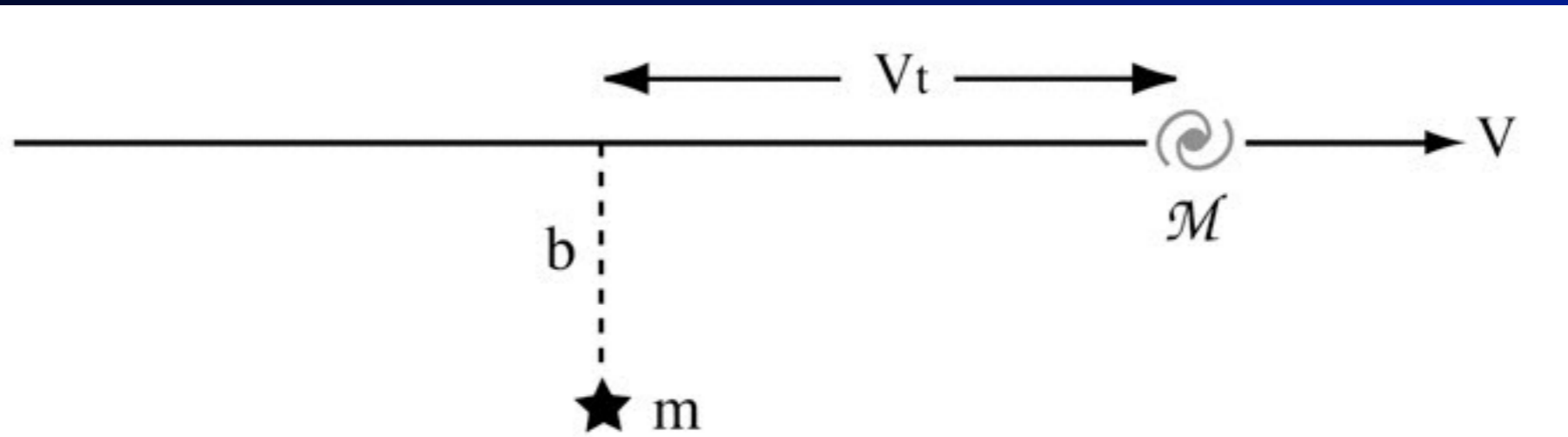


Fig 7.4 'Galaxies in the Universe' Sparke/Gallagher CUP 2007

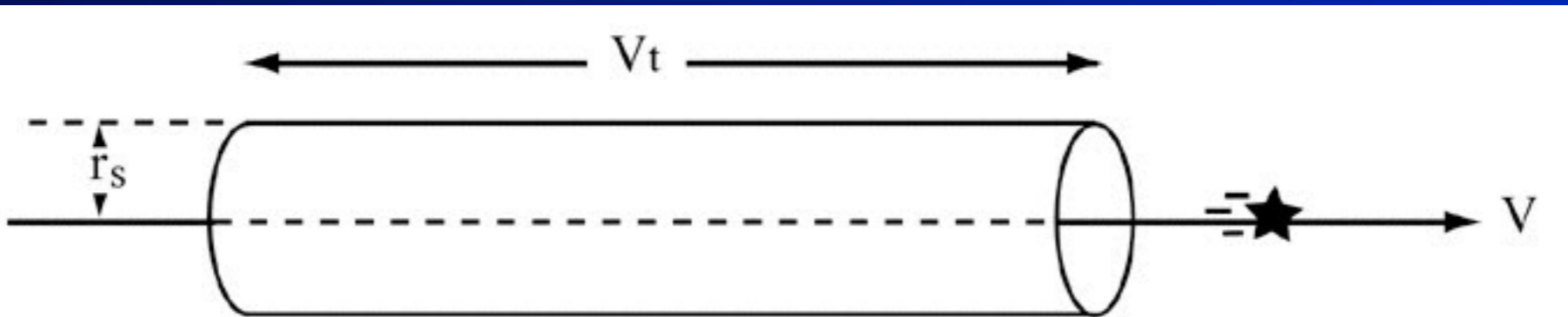
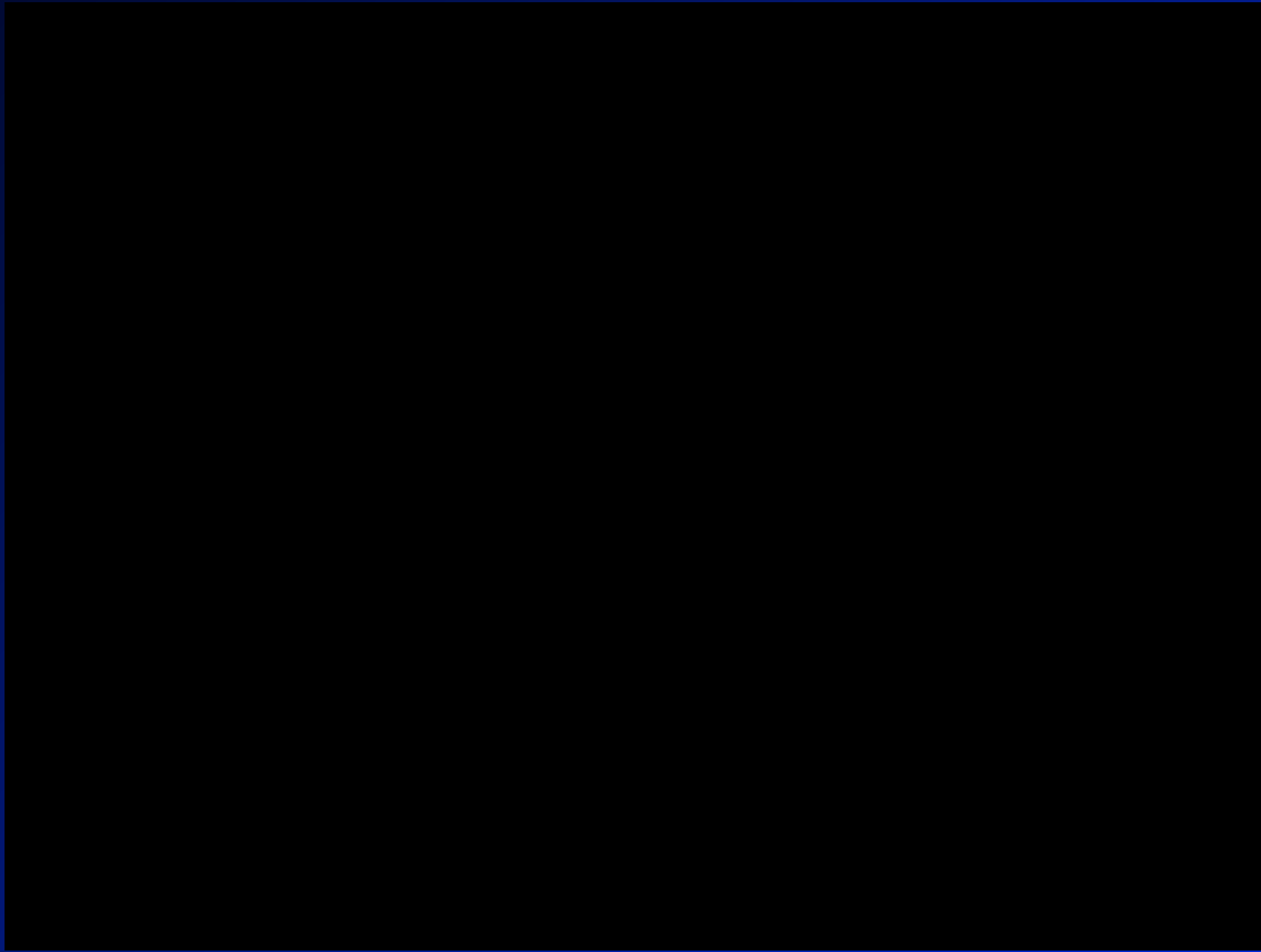
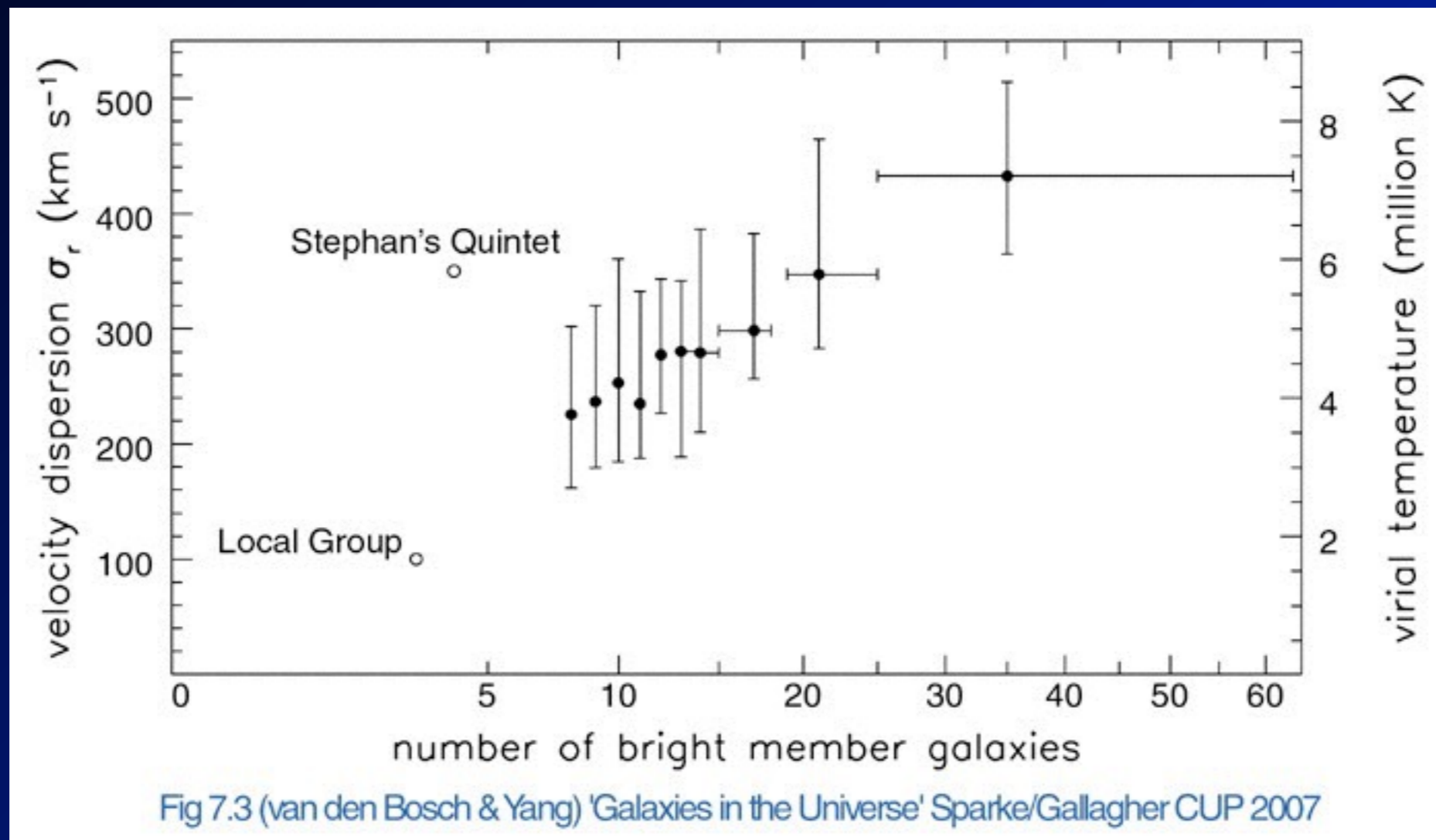


Fig 3.4 'Galaxies in the Universe' Sparke/Gallagher CUP 2007

Galactic encounters - John Dubinski



The local group as part of the large scale structure



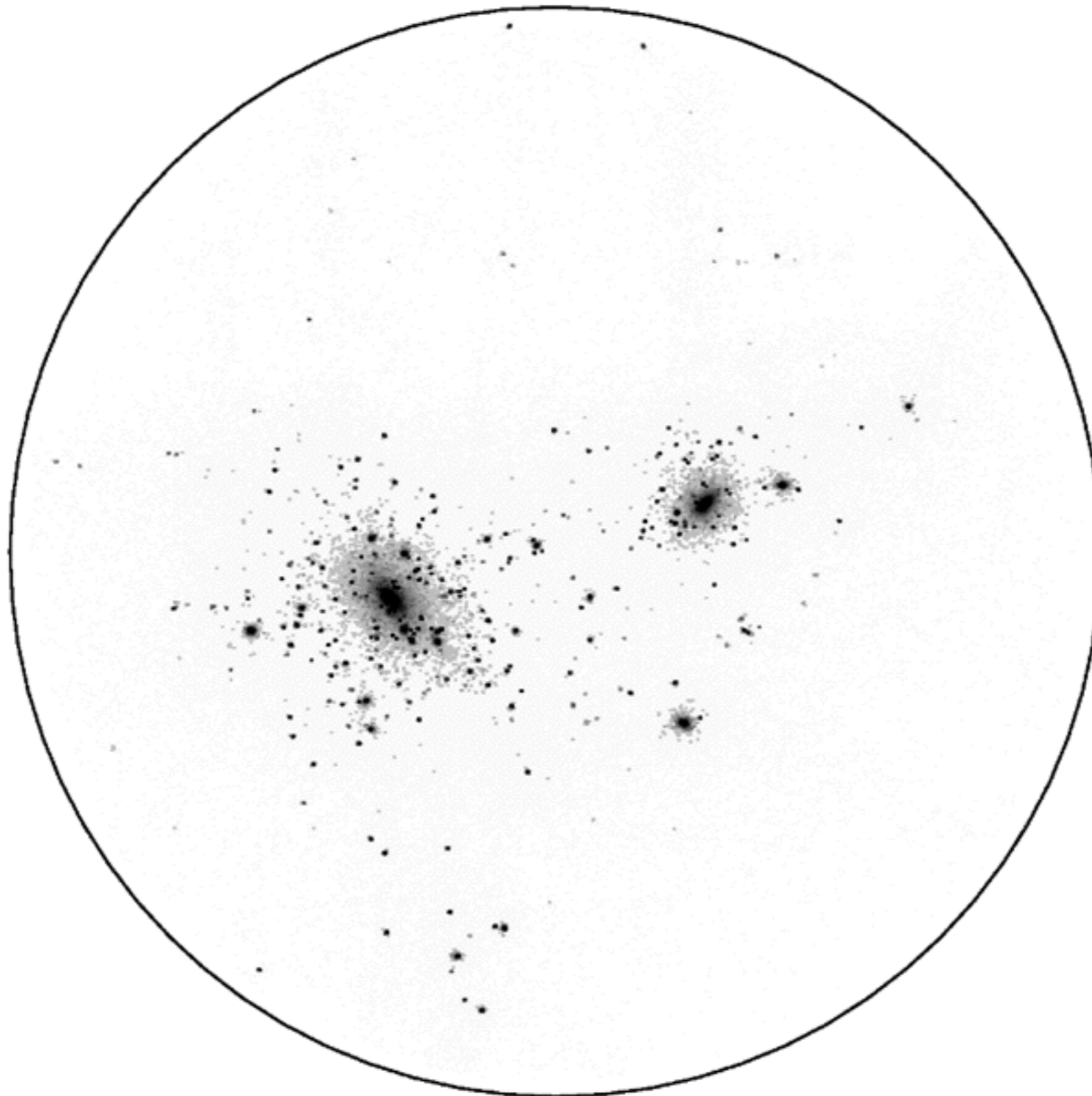
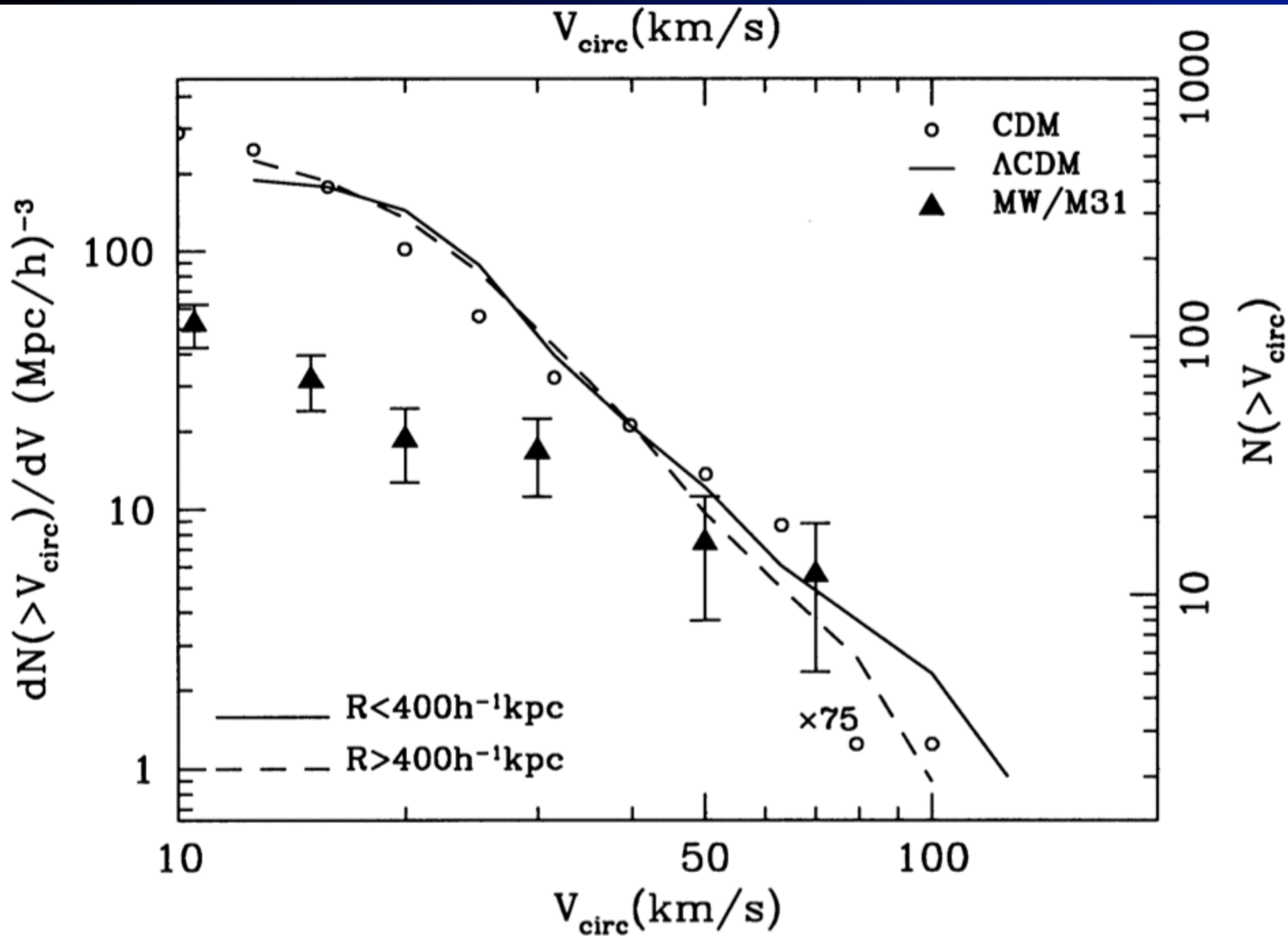


FIG. 2.—Distribution of DM particles inside a sphere of radius $1.5 h^{-1}$ Mpc (*solid circle*) for a small group of DM halos (similar in mass to the Local Group) in the Λ CDM simulation. The group consists of two massive halos with circular velocities of 280 and 205 km s^{-1} (masses of 1.7×10^{12} and $7.9 \times 10^{11} h^{-1} M_{\odot}$ inside a $100 h^{-1}$ kpc radius) and 281 halos with circular velocities greater than 10 km s^{-1} inside $1.5 h^{-1}$ Mpc. The distance between the halos is $1.05 h^{-1}$ Mpc. To enhance the contrast, we have color coded DM particles on a gray scale according to their local density: the intensity of each particle is scaled as the logarithm of the density, where the density was obtained using a top-hat filter with $2 h^{-1}$ kpc radius.



M/L ratios of dwarf galaxies

