RED SEQUENCE DWARF GALAXIES IN CLUSTERS

F. G. Kopylova and A.I. Kopylov

Special astrophysical observatory, Russian Academy of Sciences

Red sequence galaxies in clusters are an important population for understanding galaxy formation and evolution in general. They represent systems with very little or no on-going star formation and thus are a unique tracer of past activity of galaxies. The origin of red sequence galaxies and how the faint end of the red sequence builds up are still not clear. To study the red sequence luminosity function and dwarf-to-giant ratio (DGR), we select 10 clusters of galaxies of the Leo Supercluster ($z \approx 0.035$**,** $D \approx 150 \cdot h_{70}^{-1}\ Mpc$**) (Fig.1). The total masses and K-band luminosities in comparable physical regions (within** R_{200} **close to the virial radius) were determined for them using observational data from the SDSS-DR6 and 2MASS (Table). We isolate and analyze red sequence galaxies in color-magnitude diagrams (CMD) of these clusters. Galaxies are selected if they are within** $\pm 3\sigma$ **of the fit to the average CMD for the cluster members with** $r < 17.8$ **mag (Fig.2). We use color cuts:** $\Delta(u-r) \geq -0.24$**,** $-0.1 \leq \Delta(g-r) \leq 0.1$**,** $-0.075 \leq \Delta(r-i) \leq 0.075$**), and photometric redshifts from the SDSS database (*PhotoZ*) for galaxies with** $r = 17.8 - 20$ **mag. We define as dwarfs the galaxies in the magnitude range** $M_r \simeq -19 \div -16$**.**

We construct the composite luminosity function of spectroscopically confirmed members of clusters to $M_r = -18$ **(Schechter function parameters are** $M_r^* = -21.53 \pm 0.23$**,** $\alpha = -1.02 \pm 0.09$**) and the composite luminosity function of red sequence galaxies to** $M_r = -16$ **(**$M_r^* = -22.26 \pm 0.26$**,** $\alpha = -1.16 \pm 0.04$**). We study how the DGR for red sequence galaxies depends on global cluster properties (richness, velocity dispersion, mass, optical luminosity) and find no correlation between them. The average DGR for the red galaxies as a function of clustercentric radius slightly decreases in the central cluster region.**

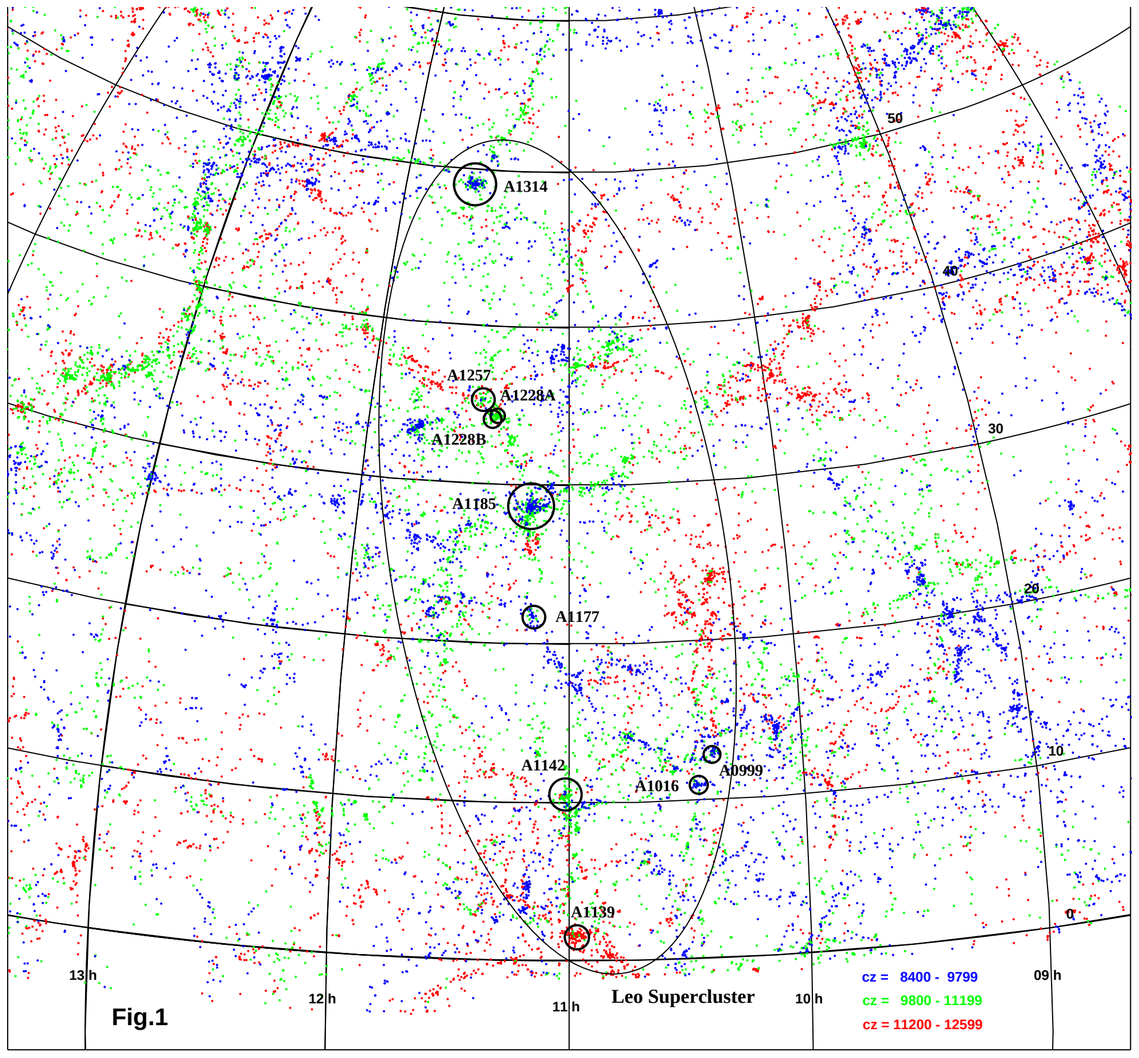

Fig.1

Clust.	RA (2000) DEC	cz km/s	N_{200}	σ km/s	R_{200} Mpc	M_{200} $10^{14} M_\odot$	M/L_K $M_\odot/L_\odot$	$L_x/10^{44}$ erg/s
A0999	10 23 23.8+12 50 06	9553	23	248	0.60	0.26	25	-
A1016	10 27 07.8+11 00 30	9647	26	267	0.65	0.32	26	-
A1139	10 58 11.0+01 36 16	11797	70	437	1.06	1.42	58	0.17
A1142	11 00 51.4+10 31 46	10610	58	526	1.28	2.48	34	0.28
A1177	11 09 44.4+21 45 32	9641	26	337	0.82	0.65	22	0.22
A1185	11 10 41.4+28 42 20	9852	180	695	1.69	5.73	91	0.27
A1228A	11 22 09.4+34 20 56	10486	25	232	0.56	0.21	14	-
A1228B	11 22 56.5+34 06 41	12859	28	347	0.84	0.71	41	0.12
A1257	11 26 17.3+35 20 25	10226	18	357	0.87	0.77	77	-
A1314	11 34 49.3+49 04 39	9938	115	644	1.57	4.56	115	0.27

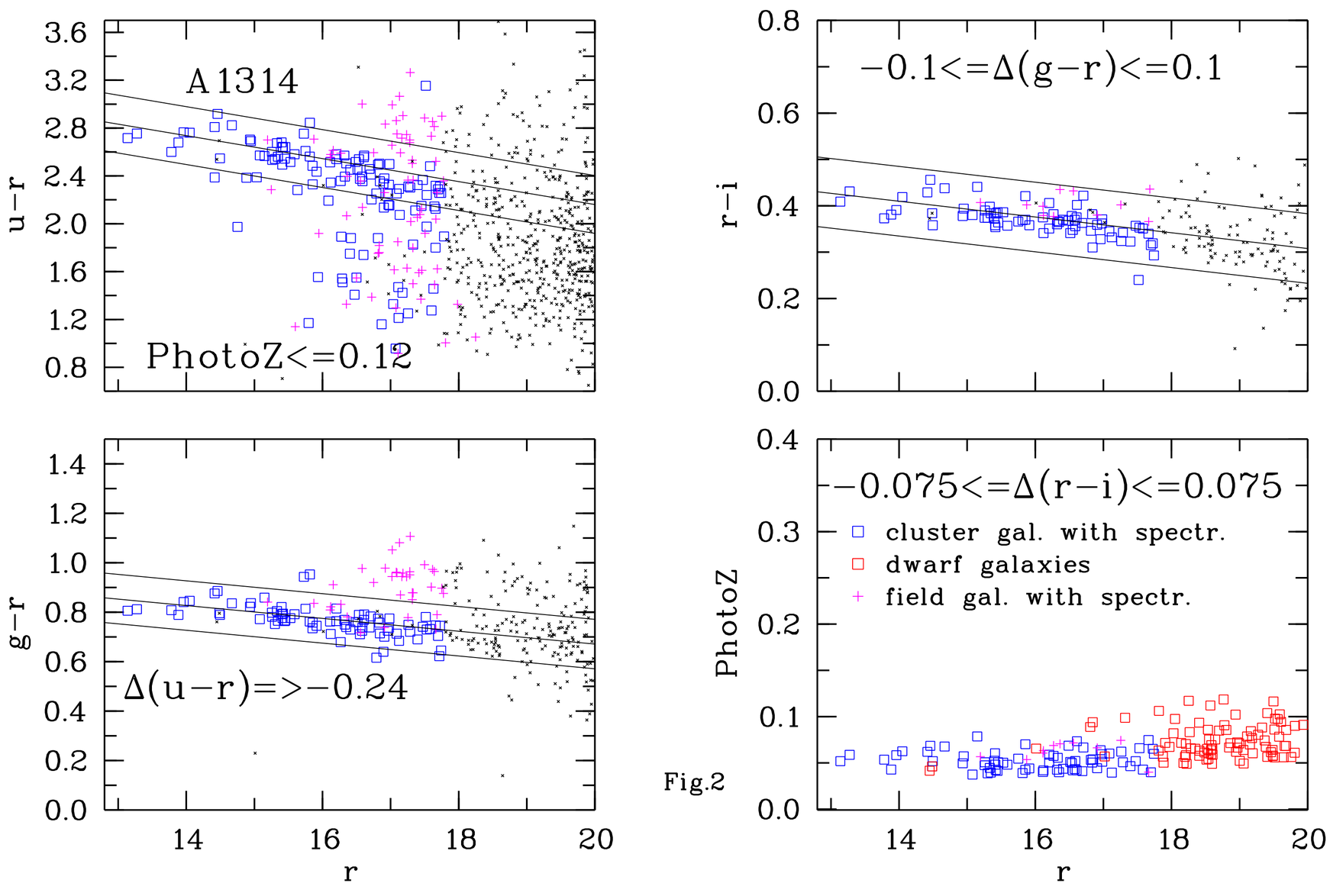

Fig.2