Indication of Mass Segregation in LMC Star Clusters

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Abstract In this contribution we present our investigation on mass segregation in selected LMC star clusters. As a diagnostic of mass segregation we use: (1) Colour-magnitude diagrams at various distance from each cluster centre; (2) Radial-density profiles at various magnitude ranges; and (3) comparison with dynamical models which provide core-radius, a measure of a cluster's compactness.

1 Results

We construct the number-density profiles for 6 Large Magellanic Cloud (LMC) clusters of various age based on WFPC2 images from the HST archive.[1] The dependence of the derived from model fitting [1] core-radius with magnitude as presented in Table 1 is used to trace mass segregation. In the investigated clusters here we see trend in two clusters already suspected in mass-segregation, NGC 1711 [3] and NGC 2157 [2]. For NGC 1711 and NGC 2157 there is clearly a trend of increasing core-radius with magnitude. Clusters NGC 1898, NGC 2031, NGC 2157

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[1]http://archive.stsci.edu

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Table 1 Derived core-radius for each magnitude bin

Name	mag	r_c	Name	mag	r_c
NGC 1711	15–16	8.61 ± 3.66	NGC 2011	15–16	0.07 ± 8.39
	16–17	7.09 ± 0.54		16–17	7.89 ± 1.76
	17–18	12.38 ± 0.98		17–18	15.00 ± 0.61
	18–19	12.21 ± 0.63		18–19	9.89 ± 0.76
	19–20	10.27 ± 0.61		19–20	6.80 ± 3.69
	20–21	15.27 ± 0.10		20–21	10.64 ± 0.49
	21–22	13.29 ± 1.24		21–22	9.31 ± 1.81
	22–23	11.88 ± 0.51		22–23	15.60 ± 1.33
	23–24	16.28 ± 0.39		23–24	10.75 ± 2.23
NGC 1984	15–16	3.82 ± 1.55		24–25	14.38 ± 0.67
	16–17	3.92 ± 0.85	NGC 1898	16–17	19.44 ± 6.01
	17–18	7.62 ± 1.05		17–18	3.66 ± 2.04
	18–19	7.38 ± 1.90		18–19	2.64 ± 2.98
	19–20	8.91 ± 0.71		19–20	7.49 ± 0.47
	20–21	6.01 ± 0.37		20–21	10.95 ± 0.43
	21–22	7.85 ± 0.92		21–22	13.01 ± 0.62
	22–23	3.28 ± 1.07		22–23	13.17 ± 0.30
	23–24	2.00 ± 2.27	NGC 2214	16–17	5.63 ± 1.21
NGC 2031	16–17	6.79 ± 0.56		17–18	14.75 ± 2.18
	17–18	5.34 ± 0.35		18–19	11.55 ± 0.75
	18–19	11.92 ± 0.39		19–20	11.45 ± 0.50
	19–20	12.86 ± 0.40		20–21	10.15 ± 0.32
	20–21	14.02 ± 0.27		21–22	15.18 ± 0.20
	21–22	11.51 ± 0.58		22–23	14.35 ± 0.41
	22–23	18.60 ± 0.85		23–24	14.79 ± 0.99
	23–24	17.84 ± 0.69		24–25	10.40 ± 0.20
	24–25	20.58 ± 0.58			

and NGC 2214 also indicate presence of mass segregation, unlike NGC 1984 and NGC 2011.

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