

Chapter VIII

Poster Papers

Cluster Systems in Nearby Galaxies



Charles Peterson and Martha Hazen pinning up.



President Derek Bok officially welcomed the participants

A SEARCH FOR GLOBULAR CLUSTER CANDIDATES IN NGC 2403

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ABSTRACT: A complete search on KPNO 4-m plates has been undertaken in order to determine the whole observable part of the cluster luminosity function of the late-type spiral galaxy NGC 2403. Automatic procedures have been used for object detection and analysis, and then selection criteria, based on geometric and photometric properties, have been applied in order to define the sample of cluster candidates.

1. DATA ANALYSIS AND SAMPLE DEFINITION

The preliminary list of globular cluster candidates in NGC 2403 as derived from visual investigation of plates taken with the Loiano (Bologna) 152 cm telescope (Battistini et al., 1984) refers to objects brighter than $V = 20$. Since the cluster population of the galaxy is expected to contain members which are fainter than such a limit, a new and more complete search on deeper plates has been undertaken in order to determine the whole observable part of the cluster luminosity function. The photographic material, listed in Table I, was kindly lent to us by the observers.

TABLE I
KPNO 4-m Prime Focus plates

Plates	Date	Observer	Exposure	Emulsion	Filter
1879	1975 dec 30	Burkhead	45 min	IIIa-J	GG385
3698	1982 mar 23	Humphreys	75 min	IIa-0	UG2
3699	1982 mar 23	Humphreys	90 min	IIIa-F	RG610

The plates have been digitized with the Trieste PDS 1010A, by using a scanning aperture of 20x20 micron square and step of 20 microns. The digital images of 9000x9000 pixels have been processed with FODS (Faint Object Detection System) (Malagnini et al., 1985) at the Trieste Astronet Pole. Automatic procedures have been applied to the J image in order to detect the objects, and a main catalogue has been created with a total of 11,512 entries referring to "aggregates" with area in the range 10 ± 1000 pixels. Then the locations of the objects on the F and U images have been computed by means of coordinate transformations. To this purpose and for the calibration of machine magnitudes, the stars listed in Tammann and Sandage (1968) Table 1 have been used. For each object different parameters (area, magnitudes, ellipticity,...) have been computed and stored in the catalogue. Since the cluster population is expected in a limited magnitude range, a first selection produces the sample illustrated in Table II. By applying the conditions:

1) $16.5 \leq J \leq 21.5$, 2) $-0.2 \leq J-F \leq 1.4$, and 3) circular symmetry, the sample reduces to a subsample of 1001 "possible cluster candidates". Next step would be a supervised morphological classification of the objects of this subsample.

TABLE II.
Color-magnitude distribution of detected objects

J	J - F				J - F -0.5±2.8
	-0.5±0.2	0.2±0.9	0.9±1.4	1.4±2.8	
16.5±18.5	15	156	154	100	425
18.5±20.5	47	350	268	291	956
20.5±22.5	139	507	803	1385	2834
16.5±22.5	201	1013	1225	1776	4215

REFERENCES

- Battistini, P., Bonoli, F., Frederici, L., Fusi Pecci, F. and Kron, R. G. 1984 Astron. Astrophys. 130, 162.
 Malagnini, M. L., Pasian, F., Pucillo, M. and Santin, P. 1985 Astron. Astrophys. 144, 49.
 Tammann, G. A. and Sandage, A. 1986 Astrophys. J. 151, 825.