

COMMISSION 37: STAR CLUSTERS AND ASSOCIATIONS  
(AMAS STELLAIRES ET ASSOCIATIONS)

Report of Meetings, 20, 21 and 25 November, 1985

PRESIDENT: K.C. Freeman

SECRETARY: C. Pilachowski

Commission 37 participated in Joint Discussion VI: Evolution in Young Populations in Galaxies (Chairman: G. Lynga). The report will be found in Highlights of Astronomy. In addition to the Commission sessions reported below, Commission 37 also participated in the joint session HIPPARCOS, with Commissions 7, 8, 24, 25 and 33.

20 November, 1985

SCIENTIFIC SESSION

This session was on Cluster Dynamics and Formation (Chair: R. Mathieu). The following papers were presented.

- J. Ostriker: "Fokker-Planck Studies of Core Collapse and the Effects of Binaries".
- D. Heggie: "Recent Progress in the Study of Core Evolution".
- D. Sugimoto: "Gravothermal Oscillations in N-body Systems".
- E. Bettwieser: "Observational Consequences of Gravothermal Oscillations".
- M. Mayor: "Radial Velocity Studies of  $\omega$  Centauri".
- J. Grindlay: "X-ray Binary Clues to Globular Cluster Evolution".

21 November, 1985

BUSINESS SESSION

The President summarised the changes in membership of the Commission. Two members have resigned, three have died, and 35 new members have been proposed. Following a postal ballot for one new member, the membership of the Organising Committee for 1986-1988 was accepted:

D.C. Heggie	President
G.L.H. Harris	Vice-President
J. Hesser	
P. Nissen	
C. Pilachowski	
G. Salukvadze	
K. Freeman	Past President

In the period 1982-1985, Commission 37 supported ten proposals for IAU Symposia and Colloquia.

SCIENTIFIC SESSION

This was a poster session, followed by discussion of the posters (Chair: C. Pilachowski). The following poster papers were shown.

J.C. Mermilliod: Present State of Data Compilation for Stars in Open Clusters (Fall, 85).

P. Bottinelli, R. Capuzzo Dolcetta: "Synthetic Evolutionary Properties of Magellanic Cloud Globular Clusters". Synthetic models were computed in order to study the evolution with time of integrated luminosities and colors for stellar systems having total masses and chemical compositions similar to those characteristic of the Magellanic Cloud globular clusters.

A. Aiad: "Proper Motion of the Open Star Cluster NGC 2301". Proper motions of 190 stars in the field of NGC 2301 were determined from photographic plates taken with the Alger astrograph in the years 1898 and 1973.

A. Aiad: "Proper Motion of the Open Star Cluster NGC 2324". Proper motions of 98 stars in the field of NGC 2324 were determined from photographic plates taken with the Alger astrograph in the years 1905 and 1973.

J. Andersen, A. Blecha, J. Storm, M. Walker: "High Resolution Deep Photometry of Star Clusters in the Magellanic Clouds". The main observational difficulties in obtaining deep color-magnitude diagrams of star clusters in the Magellanic Clouds are crowding and field star contamination, The 9-cm McMullan electronographic camera provides the high spatial resolution and large field to overcome these difficulties. (MNRAS 211, 695; Astron. Astrophys. 150, L12; paper in press).

R.G. Noble, R.D. Cannon, W.K. Griffiths: "A New CM Diagram for Faint Stars in Omega Centauri". CCD photometry has been obtained for several hundred faint stars in  $\omega$  Cen. Despite the much higher precision of these data, the upper main sequence is only slightly better defined than in previous photographic work. This indicates that the exceptional metallicity spread seen among the red giants also exists on the main sequence, and is probably primordial. The relatively faint location of the main sequence turnoff found previously is also confirmed; the horizontal branch appears to be anomalously bright.

R. Sagar, R.D. Cannon, M. Hawkins: "NGC 5824 and the Mass of the Galaxy". We have obtained a new CMD for NGC 5824 using CCD data. The cluster has a strong BHB starting at  $V = 18.5$  and extending to out limit at  $V = 20.5$ ; it is thus more distant by about 0.6 mag than was previously believed. The color of the giant branch indicates  $[Fe/H] = -1.7$ . NGC 5824 lies on the line corresponding to a galactic mass of  $2.3 \times 10^{11} M_{\odot}$  in Lynden-Bell's velocity-distance diagram, and thus does not require the existence of an unseen massive halo to remain bound to the Galaxy.

R.D. Cannon, R. Sagar: "New Electronographic CM Diagrams for NGC 1851 and the Fornax Dwarf". BV data to  $V = 21$  have enabled us to locate the main sequence turnoff in NGC 1851 and the horizontal branch in Fornax. The turnoff occurs 3.4 magnitudes below the HB in NGC 1851, which therefore has an age of 15-18 billion years. The Fornax dwarf spheroidal galaxy has a predominantly red HB and a distance modulus of about 20.7. The exceptional width of the Fornax giant branch is confirmed (rms spread in B-V is 0.2).

Jean Brodie, David Hanes: "Metallicity Determinations for Globular Clusters through Spectrophotometry of their Integrated Light". Using an appropriately weighted combination of 16 indices of absorption line strengths measured in low dispersion spectra of the integrated light of globular clusters, we determine metallicities for 36 clusters in the Galaxy. We confirm that Zinn's 1980 scale suffers a systematic error in the region of intermediate metallicity and show that our estimates are insensitive to HB morphology. We

apply a similar method with modified calibration to determine metallicities for the nuclei of six galaxies.

Jean Brodie, David Hanes: "Metal Abundances in the M87 Globular Cluster System". We have derived metallicities from low dispersion spectra of six globular clusters associated with M87. Their mean metallicity is  $[Fe/H] = -0.5$ , considerably more metal rich than the average  $(-1.2)$  for Milky Way clusters. A significant fraction of M87 clusters appear to have higher metallicity than any known in the Galaxy, although the metal poorest cluster in our sample has metallicity comparable to the low abundance Galactic globulars. We see no correlation of cluster metallicity with galactocentric distance, but there is some evidence that less luminous clusters are metal poorer, which may reflect some form of self enrichment in the most massive clusters.

R.D. Mathieu: "The Dynamics of Open Star Clusters".

S. Wrandemark, G. Lynga, L. Johansson: "CO Observations in the Eastern Part of W5". We have studied the small nebula S201 and the bright rim IC 1848A using the Onsala 20-m telescope. Results are interpreted as different centers of star formation, also related to known infrared sources.

Zh. Anosova, V. Orlov: "Dynamical Evolution of Triple Systems". This is a review of investigations on the dynamical evolution of triple systems by numerical experiments. The full text is in Transactions of the Astronomical Observatory of Leningrad State University, vol XL, 1985, pp 66-144.

R.D. Mathieu: "The Stellar Kinematics of Star-Forming Regions".

#### SCIENTIFIC SESSION

This joint session with Commissions 25, 35 and 45 was on Precision Photometry of Clusters (Chair: H. Richer). The following papers were presented.

D. Vandenberg: "A Theoretical Overview: What Can be Learned from Precision Cluster Photometry".

P. Stetson: "Techniques of Data Reduction in Crowded Fields".

K. Janes: "Precision Photometry in Open Clusters".

R. Buonanno: "Precision Photometry in Globular Clusters I".

A. Penny: "Precision Photometry in Globular Clusters II".

B. Carney: "The Main Sequence of the Draco System".

H. Richer: "White Dwarfs in M71".

25 November, 1985

#### SCIENTIFIC SESSION

This session was on Star Clusters and Space Telescope (Chair: R. Cannon). The following papers were presented.

F. Fusi-Peccì and A. Renzini: "Star Cluster Research with the HST: Programs and Simulations.

K. Freeman: "Globular Cluster Kinematics (internal and Systemic)".

- H. Richer: "Ground-based Searches for White Dwarfs in Clusters".
- R. Sagar: "Use of ST to Study Local and Extragalactic Clusters".
- M. Bessell: "Spectroscopic Programs".
- A. Penny: "Some Considerations for Large-scale Programs".
- M. Kontizas and E. Kontizas: "Magellanic Cloud Clusters".
- H. Zinnecker: "The M87 Cluster System".