

To obtain reliable ages for globular clusters, two aspects are basic: first, to secure accurate photometry to faint magnitudes; and second, to derive high-quality isochrones. The modern generation of electronic detectors, such as the CCD, have made improved photometry possible, especially at magnitudes near photographic plate limits. We believe as well that the measurements should be extended to longer wavelengths, since there now exist *BVRI* synthetic isochrones provided by the work of Vandenberg and Bell (1985, ApJS, 58, 561).

At this moment we have published the results of the following ten globular clusters: NGC 104 (47 Tuc), NGC 1851, NGC 2298, NGC 2808, NGC 3201, NGC 4372, NGC 4590 (M68), NGC 5139 (ω Cen), NGC 6121 (M4) and NGC 6362. All the *BVRI* CCD frames have been obtained with the 1.54 Danish telescope and the 2.2-m Max-Planck telescope at ESO - La Silla. In order to minimize errors produced by photometric transfer and differential extinction we have established photoelectric standards in the same cluster fields with the 1-m telescope at La Silla. Data for other clusters are currently being reduced at La Silla and analyzed at the Isaac Newton Institute. The CMD have been compared with the isochrones of Vandenberg and Bell. We find the ages derived for all of them are $16 \pm 2 \times 10^9$ yr, suggesting that the globular cluster system could be coeval, and hence that the epoch of the galactic contraction was rather short.

PHOTOMETRIC VARIATIONS OF SOUTHERN Be STARS

R.E. Mennickent and N. Vogt

Grupo de Astrofísica,
Pontificia Universidad Católica de Chile

Differential *uvby* photometry of 20 southern Be stars has been obtained with the ESO and Danish 50-cm telescopes at La Silla during 1983-91 by the ESO "Group of Variable Stars", section of Be stars. We found short-term (days to weeks). HR 4074 showed a period of 4.66 days. An outburst of amplitude $\sim 1^m$ in *v* was detected in the non-radial pulsator HR 2749 (ω CMa) in March 1986. In addition, long-term (months to years) variations were observed in several stars, being the extreme amplitudes of $0^m.02$ (HR 4074) and $0^m.50$ (HR 2749). Quasi-periodic changes were observed in HR 2492 (3.6 yrs) and HR 2545 (2.7 yrs). There are some evidence that short-term amplitudes are correlated with long-term amplitudes. The variations are being analyzed together with those of spectra taken at the Manuel Foster Observatory of the Catholic University of

Santiago. We are indebted to FONDECYT (Grant 369/88) for a partial support of this research.

RESULTS OF A NOVA SEARCH: 1982 - 1991

William Liller

Instituto Isaac Newton,
Ministerio de Educación de Chile

Beginning in mid-1982 the author began a nova patrol of the Southern Milky Way using nothing more than an equatorially-driven 35mm camera with a 55mm f/1.4 lens and an inexpensive (i.e., home-made) stereocomparator. As of 1 June 1991, this search, which was coordinated with the PROBLI-COM program initiated by Mayer (see, e.g., Liller and Mayer 1987, PASP, 99, 606), has resulted in the discovery of 14 novae and nova-like objects. Two novae were found in the Large Magellanic Cloud which was searched on occasion using longer focal length cameras (135 and 300mm).

Because over a third of all galactic novae are found in the Sagittarius-Scorpius region south of declination -25° , the region of the Milky Way most carefully searched in my patrol, a new estimate has been made of the frequency of all novae that occurred in the Galaxy during the decade of the 1980s.

During this ten-year period, a total of 30 novae were discovered with $V < 11.0$ (not including two dwarf novae and a probable "flasher"); four are recurrent (RS Oph, U Sco, V394 CrA, V745 Sco). After making incompleteness allowances owing to (1) interference of the sun and moon, (2) bad weather, (3) down time (vacations, illness, etc.), (4) and simply missed (because of rapid fading, nearness to other stars, photographic defects, etc.), it is estimated that on the average 11.1 novae occurred per year with $V < 11.0$.

Distance estimates indicate that all 30 novae occurred within a 60° sector centered of the galactic nucleus. An estimated additional 15 were not seen because of heavy obscuration especially near the galactic center, but the work of Ciardullo *et al.* (1986) suggests that this number is highly uncertain.

Combining all the above information leads us to the result that each year an average of 76 ± 22 novae occur in the Galaxy. This number is to be compared to the 26 found by Arp (1956, AJ, 61, 15) in one year in M 31, but Ciardullo *et al.* (1986, BullAAS, 18, 918) have found many more in this spiral by patrolling the nuclear region in $H\alpha$. Clearly, what is now needed is a deep patrol of the center of our Galaxy using $H\alpha$ (or $P\alpha$) imaging devices. It would be most intriguing if we found that our Galaxy produces three times as many novae as M 31.

INDICE DE AUTORES/AUTHORS' INDEX

- Abadi, M., P. Tissera, and D. García Lambas, Statistical Properties of CDM Galactic Halos, 305.
- Alcaíno, G., W. Liller, F. Alvarado, and E. Wenderoth, Ages of Globular Clusters Derived from *BVRI* CCD Photometry, 309.
- Allen, C. and A. Santillán, An Improved Model of the Galactic Mass Distribution for Orbit Computations, 255.
- Alonso, M.V., Véase Calderón *et al.*, 304.
- Alvarado, F., See Alcaíno *et al.*, 309.
- Berrios Salas, M.L., M. Guzmán V., J. Fernández L., y M. Maldini S., Variabilidad fotométrica y espectroscópica de estrellas tipo RS CVn, 307.
- Binette, L., See Raga *et al.*, 243.
- Binette, L., See Raga and Binette, 265.
- Biro, S., See Raga *et al.*, 243.
- Bothun, G., See Schommer *et al.*, 304.
- Bravo, S. and G. Ocaña, Physical Properties of the Skylab North Polar Coronal Hole with an Extended Base and its MHD Self-consistent Modelling, 181.
- Calderón, J.H., P.S. Pellegrini, C. Willmer, y L.N. da Costa, Corrimiento al rojo de galaxias australes, 304.
- Calderón, J.H., M.V. Alonso, P.S. Pellegrini, y S. Paolantonio, Dispersión de velocidades en galaxias elípticas, 304.
- Cantó, J., See Planesas *et al.*, 19.
- Cantó, J., See Raga *et al.*, 243.
- Cardona, O., E. Chavira, and E. Parsamian, Periodicities in the Flare Star II II 2411, 213.
- Carrillo, R., See Cruz-González and Carrillo, 217.
- Chamaraux, P., See Fouqué *et al.*, 303.
- Chavira, E. and E. Parsamian, New Flare Stars and Repetitions in the Orion Association Region, 15.
- Chavira, E., See Cardona *et al.*, 213.
- Cidale, L.S., M.E. Iglesias, A.C. Vázquez, and A.E. Ringuelet, Be Stars: Solutions of the Mass, Momentum and Energy Equations of the Radiative Transfer Problem, 306.
- Clariá, J.J., See Geisler *et al.*, 305.
- Combes, F., See García-Barreto *et al.*, 197.
- Cruz-González, I. and R. Carrillo, Jet Models and Observed Jets in a Sample of Superluminal Active Galactic Nuclei, 217.
- da Costa, L.N., Véase Calderón *et al.*, 304.
- Della Valle, M., B.J. Jarvis, and R.M. West, The Early Evolution of Nova Muscae 1991: A Candidate Black Hole?, 307.
- de Oliveira-Abans, M. and M. Faúndez-Abans, Extinction Distances to the Planetary Nebulae NGC 6565 and He 2-436, 3.
- Di Leo, N., See Mara *et al.*, 306.
- Dettmar, R.-J., See García-Barreto *et al.*, 197.
- Donzelli, C.J., Estado actual de la fotometría superficial de galaxias en Córdoba, 305.
- Escalante, V., See Góngora and Escalante, 113.
- Faúndez-Abans, M. See de Oliveira-Abans and Faúndez-Abans, 3.
- Fernández L., J., Véase Berrios Salas *et al.*, 307.
- Fouqué, P., E. Gourgoulhon, P. Chamaraux, and G. Pagurel, A Hierarchical Algorithm to Disentangle nearby groups of Galaxies ($< 6000 \text{ km s}^{-1}$), 303.
- García, J., See Martín-Pintado *et al.*, 11.
- García-Barreto, J.A., R.-J. Dettmar, F. Combes, M. Gerin, and B. Koribalski, The Nuclear Ring of the Barred Galaxy NGC 1326, 197.
- García Lambas, D., See Abadi *et al.*, 305.
- García Lambas, D. and H. Muriel, Systematics in the Orientation of Galaxies, 307.
- García Lambas, D., See Mosconi and García Lambas, 309.
- Geisler, D., J.J. Clariá, and D. Minniti, A New Abundance Calibration for the Washington System and Some Early Results, 305.
- Gerin, M., See García-Barreto *et al.*, 197.
- Gómez-González, J., See Planesas *et al.*, 19.
- Góngora-T., A. and V. Escalante, Tables of Relative Strengths of Spectral Lines with Mixed Vector Couplings: Dipole Transitions Between LS and other Couplings, 113.
- Gourgoulhon, P., See Fouqué *et al.*, 303.
- Grosso, M., See Levato *et al.*, 306.
- Guzmán V., M., Véase Berrios Salas *et al.*, 307.
- Hobart, M.A., See Maupomé *et al.*, 235.
- Hobart, M.A., J.H. Peña, and R. Peniche, Photometric Analysis of RR Lyrae Stars II. T Sextantis, 275.
- Iglesias, M.E., See Cidale *et al.*, 306.
- Infante, L. and C. Pritchett, Counts, Colors and Clustering of Medium Redshift Galaxies, 305.
- Jarvis, B.J., See Della Valle *et al.*, 307.

- Koo, D.C., Are Field Galaxies Randomly Distributed on Scales of 100+ Mpc?, 308.
- Koribalski, B., *See* García-Barreto *et al.*, 197.
- Lahulla, J.F., *See* Martín-Pintado *et al.*, 11.
- Levato, H., S. Malaroda, M. Grosso, N. Morrell, and G. Solivella, Radial Velocity Research Using the Facilities of Some Observatories at the Southern Andes, 306.
- Liller, W., *See* Alcaíno *et al.*, 309.
- Liller, W., Results of a Nova Search: 1982 - 1991, 310.
- López-Cruz, O., J.H. Peña, R. Peniche, G. Salazar, and E. Montes, Fast Spectroscopic Variability in Ap Stars I. HD 11503, 249.
- Malaroda, S., *See* Levato *et al.*, 306.
- Maldini S., M., *Véase* Berrios Salas *et al.*, 307.
- Mara, C., N. Di Leo, and A.E. Ringuelet, Atmospheric Oscillation in Beta Mon A, 306.
- Martín-Pintado, J., J. García, F. Sánchez, and J.F. Lahulla, Precise Positions of Asteroids and Comets in 1988, 11.
- Maupomé, L., E. Rodríguez, M.A. Hobart, J.H. Peña, and R. Peniche, Photoelectric Observations of W UMa Stars: U Pegasi and AB Andromedae, 235.
- Meirelles Filho, C., On the Double Nured Solution of Two Temperature Accretion Flows, 191.
- Mennickent, R.E. and N. Vogt, Photometric Variations of Southern Be Stars, 310.
- Minniti, D., *See* Geisler *et al.*, 305.
- Montes, E., *See* López-Cruz *et al.*, 249.
- Morrell, N., *See* Levato *et al.*, 306.
- Mosconi, M.B. and D. García Lambas, Formation of Galaxies with Dissipation, 309.
- Mould, J.R., *See* Schommer *et al.*, 304.
- Muriel, H., *See* García Lambas and Muriel, 307.
- Ocaña, G. *See* Bravo and Ocaña, 181.
- Pagurel, G., *See* Fouqué *et al.*, 303.
- Paolantonio, S., *Véase* Calderón *et al.*, 304.
- Parsamian, E., *See* Chavira and Parsamian, 15.
- Parsamian, E., *See* Cardona *et al.*, 213.
- Peimbert, M., *See* Sánchez and Peimbert, 285.
- Pellegrini, P.S., *Véase* Calderón *et al.*, 304.
- Pellegrini, P.S., *Véase* Calderón *et al.*, 304.
- Peniche, R., *See* Maupomé *et al.*, 235.
- Peniche, R., *See* López-Cruz *et al.*, 249.
- Peniche, R., *See* Hobart *et al.*, 275.
- Peña, J.H., *See* Maupomé *et al.*, 235.
- Peña, J.H., *See* López-Cruz *et al.*, 249.
- Peña, J.H., *See* Hobart *et al.*, 275.
- Pérez, M.R., The Young Open Clusters NGC 2244 and NGC 2264; Revisited, 99.
- Planesas, P., J. Gómez-González, L.F. Rodríguez, and J. Cantó, Radio Observations of H II Regions with Narrow Radio Recombination Lines, 19.
- Pritchett, C., *See* Infante and Pritchett, 305.
- Quintana, H., Groups with Apparent High M/L Ratios, 303.
- Quintana, H., *Véase* Ramírez y Quintana, 308.
- Raga, A.C., S. Biro, J. Cantó, and L. Binette, Images and Line Profiles from Nonadiabatic Jet Models, 243.
- Raga, A.C. and L. Binette, Models of Spatially Resolved Recombination Regions in H-H Objects, 265.
- Ramírez, A. y H. Quintana, Análisis óptico de cúmulos de galaxias con emisión superficial doble en rayos-X: fotometría de A1750, 308.
- Ringuelet, A.E., *See* Mara *et al.*, 306.
- Ringuelet, A.E., *See* Cidale *et al.*, 306.
- Rodríguez, E., *See* Maupomé *et al.*, 235.
- Rodríguez, L.F., *See* Planesas *et al.*, 19.
- Ruelas-Mayorga, R.A., Distribution and Studies of the Infrared Stellar Population in the Galaxy. I. The Model, 27.
- Ruelas-Mayorga, R.A., Distribution and Studies of the Infrared Stellar Population in the Galaxy. II. The Data Base, 43.
- Ruelas-Mayorga, R.A., Errata: Distribution and Studies of the Infrared Stellar Population in the Galaxy. I. The Model, 297.
- Ruelas-Mayorga, R.A., Errata: Distribution and Studies of the Infrared Stellar Population in the Galaxy. II. The Data Base, 297.
- Salazar, G., *See* López-Cruz *et al.*, 249.
- Sánchez, F., *See* Martín-Pintado *et al.*, 11.
- Sánchez, L.J. and M. Peimbert, Scattered Light in M8, 285.
- Santillán, A., *See* Allen and Santillán, 255.
- Schommer, R.A., G. Bothun, and J.R. Mould, Large Scale Peculiar Motions in the Southern Sky, 304.
- Solivella, G., *See* Levato *et al.*, 306.
- Tissera, P., *See* Abadi *et al.*, 305.
- Vázquez, A.C., *See* Cidale *et al.*, 306.
- Vogt, N., *See* Mennickent and Vogt 310.
- Wenderoth, E., *See* Alcaíno *et al.*, 309.
- West, R.M., *See* Della Valle *et al.*, 307.
- Williger, G.M., Numerical Models of Ly α Clouds, 309.
- Willmer, C., *Véase* Calderón *et al.*, 304.