Stellar Populations
55 years after the Vatican conference

Symposium 6, EWASS 2012
Pontificia Università Lateranense (Rome - Italy)
July 2 - 4, 2012

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FOREWORD

The European Week of Astronomy and Space Science (EWASS) of the European Astronomical Society in 2012 (July 1–6) was organized in collaboration with the Italian Astronomical Society. The venue was the Pontificia Università Lateranense in Rome.

Among the ten scientific symposia organized for EWASS 2012, the number six (S6) was focussed on *Stellar Populations 55 years after the Vatican conference* (STEPOP55). It was held from July 2 to 4 and during the 2.5 days of the symposium we have had more than 18 invited speakers, 24 contributed talks and 24 posters. All in all, we have had more than 130 participants to the different sessions.

The current proceedings include a large part of them, together with the paper associated to the Plenary Talk given by Prof. C. Chiosi on Friday 6. We are grateful to all the participants for sending us their papers. We are all aware of the impact that the famous Vatican Conference had on modern astrophysics, and these proceedings will stand forever as a written memory 55 years after. At the same time, we are also very grateful to the Scientific Organizing Committee (SOC) of EWASS 2012 for selecting our Symposium and the Local Organizing Committee (LOC) for the smooth an pleasant organization of the entire event.

The symposium started with the Welcome Address given by the Director of the Vatican Observatory, Prof. J. Funes (S.J.) and was closed by the Summary given by Prof. C. Chiosi. In between, we have had seven sessions with topics ranging from the Milky Way to Nearby Cosmology.

The co-chairs acknowledge the SOC of STEPOP55 for their constant support and for their valuable suggestions and advice concerning the cut of the symposium and the selection of speakers. They are also very indebted with the LOC of STEPOP55, since they have been able to fix many daily problems, which the organization of a meeting in a very crowded environment can have. We are very grateful to Giuliana Giobbi for her crucial help in dealing with the interaction with EWASS 2012 and to Marco Castellani for mastering the web page of the meeting. A special mention to M. Monelli, he has really been the jack for all trades, and in particular for the smooth handling of the schedule.

We would like to thank the technical and administrative staff of both the Rome Observatory and the Dipartimento di Fisica, Università di Roma Tor Vergata.

The co-editors of the proceedings are very grateful to the Director of *Memorie della Società Astronomica Italiana*[1], Piercarlo Bonifacio and to the Scientific Advisory Board for giving us this opportunity. We also acknowledge the editorial staff of the journal for the help in the final revision of the contributions.

The poster of the meeting and the cover of the proceedings were created by ”OM Grafica”[2]. We would like to express our deep gratitude for their friendly service.

Co-Chairs: R. de Grijs & G. Bono

Co-Editors: A. Omizzolo, M. Fabrizio & G. Bono

[1] `http://sait.oat.ts.astro.it/`

[2] `http://www.exormaedizioni.com/`

Cover and poster illustration

The background image of the poster shows a picture of the participants to the Vatican Conference in 1957. In the lower portion of the poster the scheme labels the participants:

a) Rév Père D. O'connell, Président de la Semaine d'Étude - Città del Vaticano
b) S.E. Prof. Dr. G. Armellini - Roma
c) Dr. W. Baade - Pasadena, California
d) Dr. A. Blaauw - Williams Bay, Wisconsin
e) S.E. Prof H.A. Brück - Dublin
f) Dr. D. Chalonge - Paris
g) Dr. W. A. Fowler - Pasadena, California
h) Prof. Dr. O. Heckmann - Hamburg
i) Dr. G. H. Herbig - Mount Hamilton, California
j) Mr. F. Hoyle - Cambridge
l) S. E. Prof. Dr. G. Lematre - Louvain
m) Prof. Dr. B. Lindblad - Saltsjobaden
n) Dr. W. W. Morgan - Williams Bay, Wisconsin
o) Prof. Dr. J. J. Nassau - East Cleveland, Ohio
p) Prof. Dr. J. H. Oort - Leiden
q) Dr. E. E. Salpeter - Ithaca, NY
r) Dr. A. R. Sandage - Pasadena, California
s) Prof. Dr. M. Schwarschild - Princeton, New Jersey
t) Prof. Dr. L. Spitzer - Princeton, New Jersey
u) Prof. Dr. B. Strömgren - Williams Bay, Wisconsin
v) Dr. A. D. Thackeray - Pretoria
w) Rév Père P. Treanor S.I., Secrétaire scientifique de la Semaine d'Étude
x) Dr. P. Salviucci, Chancelier de l'Académie Pontificale de Sciences
z) Mme V. Préobrajenski, chef du secrétariat

The globular cluster synthetic image located inside the frame refers to Omega Centauri. The image was generated by M. Nonino by using the multi-band photometric catalog provided by Castellani et al. (2007, ApJ, 663, 1021) and by Calamida et al. (2008, ApJ, 673, L29). The former data set is based on ground-based (U, B, V, I) images, while the latter on $F435W$ and $F625W$ images collected with ACS at *HST*. The above catalogs were adopted to create three (B, V, I) synthetic fits images using `artdata.mkobjects`. The synthetic images were at first exported into three `pgm` files via `iraf.export` and eventually merged into a single RGB file.

A Color-Color Diagram ($U - V$ vs $B - I$) of the Carina dwarf spheroidal galaxy is superimposed to the poster layout (Bono et al. 2010, PASP, 122, 651). The curved box encloses candidate Carina stars (grey dots). The black dots represent probable field objects. Predicted distributions (Rocca-Volmerange et al. 2008, SF2A, 33) of elliptical (asterisks), spiral (pluses), SB (triangles), irregular and star burst (squares) galaxies as a function of the redshift are also showed.

Preface

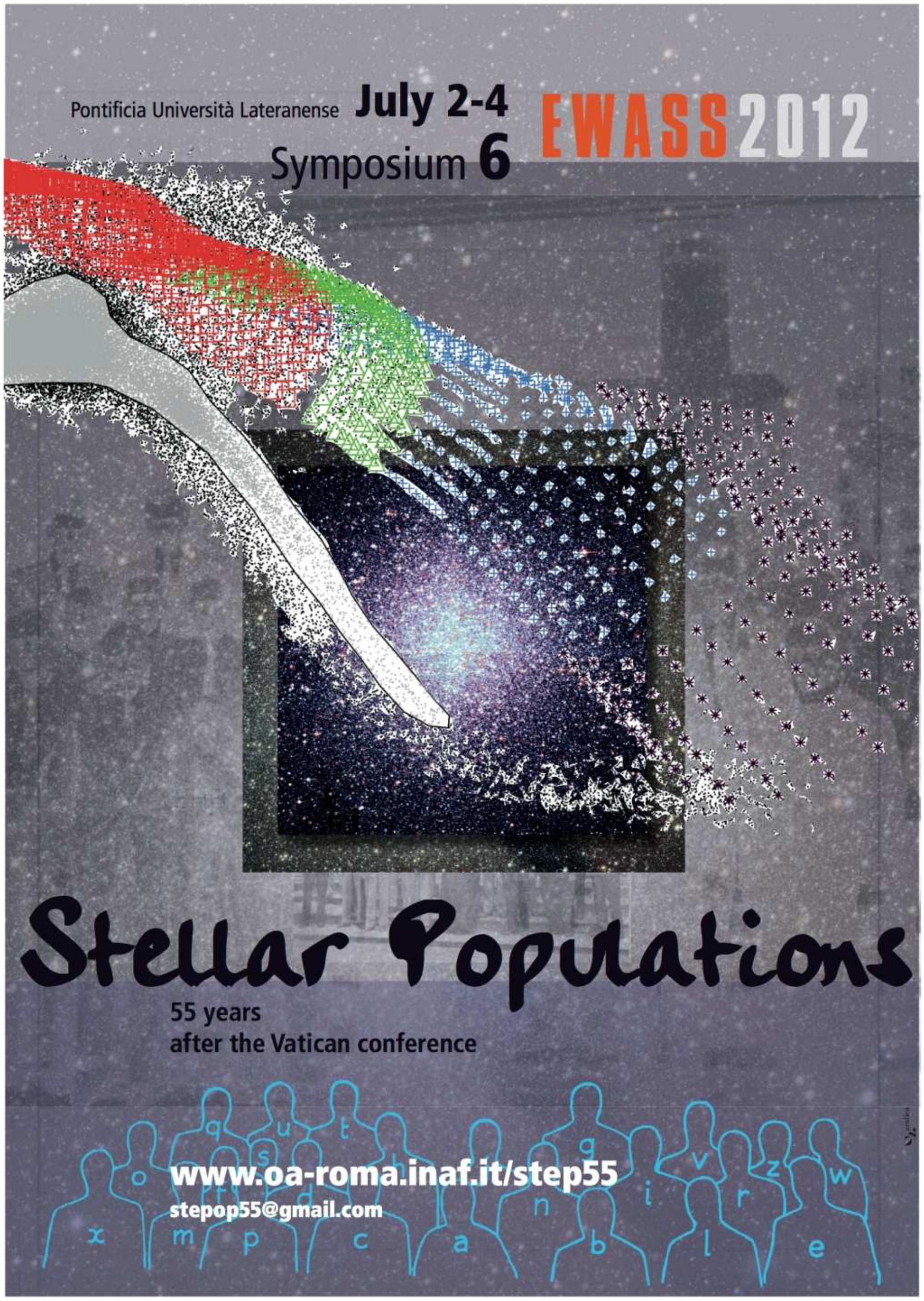
During the last half century stellar physics has been the quantitative side of modern astrophysics and our knowledge of the physical mechanisms driving stellar evolution, stellar spectroscopy and stellar pulsation have significantly improved. A significant fraction of the astrophysical problems attacked by the community in this period started with the stellar population definitions of the seminal Vatican conference in 1957 and 55 years later we decided to celebrate its impact by organizing an EWASS symposium on the same topic.

Despite the tremendous progress in our study of the mechanisms driving the evolution of stars and of whole galaxies gained in the last decades, we still lack a solid understanding of stellar populations, gas content and dynamical properties of stellar systems in the Local Group (LG, $d <$ 1 Mpc) and in the Local Volume (LV, $d <$ 25 Mpc). However, our knowledge concerning the star formation history (SFH), the chemical evolution and the kinematic properties of nearby stellar systems significantly improved. This quantitative information is crucial to constrain theoretical models, and in turn to explore the physical mechanisms governing the evolution of galaxies.

Moreover, in the near future new and interesting results are expected from ongoing (RAVE, OGLE, VISTA, VST, Pan-STARRS) and future surveys and ground-based and space observing facilities (Gaia, LSST, JWST, E-ELT/TMT/GMT). These are the reasons why we considered a Symposium on this topic at the annual meeting of the European Astronomical Society particularly timely. Moreover, a new generation of homogeneous spectroscopic and photometric data are becoming available, together with detailed cosmological simulations. Extragalactic chemical abundances based on a variety of diagnostics are also becoming available, together with deep and precise optical and near-infrared color-magnitude diagrams of a relevant fraction of the galactic spheroid. The new data will provide the opportunity to fully exploit the observing capabilities of the next generation of telescopes in constraining resolved and unresolved stellar populations in the LG in the LV and beyond.

Together with photometric and spectroscopic survey, evolutionary and pulsation models made a significant improvement concerning the treatment of both micro (opacity, equation of state, nuclear cross sections) and macro (atomic diffusion, extra-mixing, mass loss). Homogeneous sets of evolutionary models (isochrones, luminosity functions) covering a broad range of chemical compositions became available for main sequence and advanced evolutionary phases. Moreover, detailed synthetic color-magnitude diagrams provided a unique opportunity to constrain the stellar content of both simple and complex stellar systems.

The proposed meeting was a stepping stone to cope with future challenges in the field of stellar populations (evolution, pulsation, kinematics, abundances).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