

## COMMISSION 29 - STELLAR SPECTRA

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The triennial Business Meeting of the Commission was held on 26 July with about 50 members in attendance. The IAU Executive Committee formally approved the new Commission President to be D. Lambert, the new Vice-President, M. Bessell. New Scientific Organizing Committee (SOC) members elected from among 14 nominations were D. Baade, A. Cassatella, C. Pilachowski, K. Sadakane, B. Barbuy and B. Gustafson; P. Conti continues as Past President. The President thanked retiring SOC members A. Boesgaard, G. Cayrel de Strobel, M. Spite and J. Smolinski for their service to the Commission.

There have been three newsletter mailings to Commission members over the past three years, and 250 astronomers responded positively in their desire for continued membership; 10 resigned, or were deceased. About 40 others gave no indication of further interest in Commission 29 membership and, following guidelines laid out by the SOC in 1988, were recommended to the IAU Secretariat to be purged from our rolls. A list of another 50 or so names who had indicated, from various sources, they wished to become members of Commission 29, was transmitted to the Secretariat for addition to our membership.

Commission 29 has sponsored, or co-sponsored, the following IAU Symposia that have been held since the last General Assembly: #143 Wolf-Rayet Stars, Denpasar, Indonesia June 1990; #145 Photospheric Abundances, Druzba, Bulgaria August 1990; #148, Magellanic Clouds, Sydney, Australia July 1990. We were also involved with IAU Symposia #149 on Stellar Populations in Galaxies, Angra dos Reis, Brazil and #151 Evolutionary Processes in Binary Stars, Cordoba, Argentina, held right after the General Assembly. Commission 29 is also sponsor or co-sponsor for proposed IAU Symposia or Colloquia as follows: Peculiar Versus Normal Phenomena in A-Type and Related Stars, Trieste, Italy, July 1992; Inside the Stars; Stars at the Main Sequence or Close to It, Vienna, Austria, April 1992; The Sun as a Variable Star, Boulder, Colorado, 1993. The first two of these have been approved by the IAU.

A full day Scientific Workshop on "Early Nucleosynthesis in Galaxies", sponsored jointly by Commissions 28 and 35, was organized by P. Conti and A. Maeder. The aim was to bring together new observations and theoretical advances on the abundances, nucleosynthesis and stellar evolution in the early stages of galaxy development. About 80 astronomers listened to 10 review talks and participated in stimulating discussions. An introductory talk by P. Conti posed questions concerning the chemical gradients over SPACE and TIME in our galaxy. How

well established are they? He asked workers to be careful when discussing composition and metal abundance. For example, using the most recent data, halo stars have  $[O/Fe] > 1$  but in the Magellanic Clouds  $[O/Fe] < 1$ . Clearly the halo stars and the Clouds have followed different star formation histories. The most recent discussions of abundance gradients with galacto-centric distance, using B stars and HII regions, do NOT show a uniform decrement with distance, rather merely a tendency toward higher abundances inward from the sun, and lower outward, with considerable scatter. D. Lambert gave a detailed review of abundances in Pop II stars and C. Pilachowski discussed her work with T. Armandroff on CNO abundances in Globular Clusters. They found that 1)  $[C+N+O/Fe]$  is within the range 0.0 to +0.5 in globular clusters over a wide range in  $[Fe/H]$ ; 2)  $[C+N+O/Fe]$  is constant within a cluster with the possible exceptions of Omega Centauri and M22; 3) Log (O) vs Log (C+N) diagrams for the clusters M92, M13, M4, and 47 Tuc are consistent with the mixing of CNO processed material either in the star itself or in an earlier star, and 4) the constancy of  $[C+N+O / Fe]$  within clusters argues strongly that CN variations found in unevolved stars in clusters are not due to contamination by products of triple-alpha burning. M. Bessell gave a comprehensive review of the composition of stars within the Magellanic Clouds.

J. Bergeron followed with a discussion of abundances seen in the absorption line systems toward QSOs. These are currently examples of the least processed material yet studied and give us unique information on the early history of the Universe. B. Pagel presented his recent work about the helium abundances in metal deficient HII regions and HII galaxies. Previous estimates of helium abundances from recombination lines have been improved by selecting objects with negligible neutral helium and careful segregation of objects with W-R spectra (W-R galaxies) which had biased earlier determinations of the primordial helium abundance  $Y_p$  and  $dY/dZ$ . Using the 20 remaining objects, one obtains the maximum likelihood regression  $Y = 0.227 + 120 (O/H)$  and  $dY/dZ = 6$ , considerably larger than predicted recently by Maeder. A. Maeder followed with a review of his work on helium and metal synthesis in massive stars with low Z. This is particularly applicable to understanding the chemical evolution of the Magellanic Clouds.

The contribution of type I and II supernovae to Galactic nucleosynthesis was the topic offered by F.-K. Thielemann. These SNeI and SNeII represent the major sources of heavy element production in galaxies. Stellar winds of intermediate mass stars only contribute significantly to C and N isotopes and are the only source for the STRONG s-process component. Thus, all nuclei from O through the Fe-group, and for heavier nuclei, the WEAK s-process component and all r-process nuclei originate from supernovae. The time variation in the rates for both types of events is different. SNeII, due to their origin from fast evolving massive stars, dominate the heavy element production in the early phase of galactic evolution. SNeIa, originating from mass transfer in binary white dwarf systems, leading to a growth of the more massive star beyond the Chandrasekhar mass, occur only with much longer time scales. The solar system composition is only a snapshot in time at a specific location in the galactic disk. By now, the major solar system abundance features can be understood in this framework, due to the fact that models of SNIa and SNII events (over the mass range of progenitor stars) have become available. M. Grenon discussed the sites of nucleosynthesis for the halo and bulge stars and C. Chiosi finished the day's Workshop with a talk on the chemical evolution in the early Galaxy.

A number of members of Commission 29 met on 25 July to discuss the problem of archiving and distribution of spectroscopic data. This meeting was organized and chaired by R. Viotti. The 35 participants considered that (i) a large amount of unique information has been collected on spectroscopic plates, and (ii) the widespread application of electronic detectors has generated an extremely rapid growth of raw spectral files. The importance of safeguarding these data, and building an accessible catalogue, was recognized. It was suggested that an IAU Working Group be created in order to establish agreed means of archiving and distributing spectroscopic data. The participants included representatives of many important astronomical observatories, and of the two main astronomical data centers (CDS and NASA ADC). Professor Alexander Boyarchuck, IAU President-elect, gave the introductory talk, followed by contributions of Roberto Viotti (the requests of the Astronomical Community), Elena Terlevich (the La Palma Data Archiving System), Miguel Albrecht (the ESO Archive Facility), Robert Garrison (data archives), Willem Wamsteker (the IUE Archive), Carlos Jaschek (CDS and data documentation), and Richard West (spectroscopic plates). There were lively discussions followed by the approval of a specific recommendation to IAU Executive Committee. The Proceedings of the Meeting will be published in 1991 as an Internal Report of the Istituto di Astrofisica Spaziale edited by R. Viotti and G.B. Baratta.

The Working Group on Peculiar Red Giant Stars (joint with Commission 45) held its business meeting on 29 July under the leadership of H.R. Johnson. A twice yearly Newsletter is currently being sent to over 150 astronomers; S. Yorke is continuing as editor. R.F. Wing was elected the new Chairman of the WG and H.R. Johnson, U.G. Jorgensen, J. Magalhaes, M. Querci, R. Stencel, T. Tsuji and S. Yorke were selected as members of the SOC. The directions of future interest of the WG were broadly discussed. Some felt the WG should be more narrowly focussed on chemically peculiar red giants; others suggested yellow giants should be included. The new Chair thought the WG should focus on S and carbon stars. While consensus on this issue was not reached, it was agreed that a new IAU Meeting on red giant stars should be promoted within the next 3 years.

The Working Group on Be stars held its business meeting during two sessions on 31 July, chaired by D. Baade. A new SOC was elected with L. Balona (chair), A. Dachs, D. Gies, P. Harmanec, J. Percy, G. Peters, M. Smith and R. Waters. A symposium on Be and related stars planned for October 1993 at the Cote d'Azur was discussed. Peters will continue to be editor of the Be star Newsletter with financial support from ESO. The first half of the scientific session, chaired by Baade, consisted of a review of the differences between Be and non-Be stars by Balona and a talk by Hearn on what theorists would like observers to do. Ringuet and Doazan presented short contributions. The second half consisted of a lively discussion of new ideas on the Be phenomenon, chaired by Hearn. These included pulsation versus rotational modulation, the bi-stability mechanisms, spectral transients, the effect of increased iron opacities, etc.

The Working Group on Chemically Peculiar stars held its business meeting on 25 July under the leadership of K. Sadakane, with some 25 members in attendance. The new editor of the A Peculiar Newsletter is S. Ansari. New members of the SOC were elected: M. Gerbaldi (Chair), V. Khoklova, D. Leckrone, G. Mathys, G. Michaud, K. Sadakane, and S. Ansari. Short scientific presentations were made by G. Mathys ("Geometry of Ap Stars Magnetic Field; New Constraints from Spectro-polarimetric Observations"), J. Mathews ("Measuring the Limb

Darkening of Pulsating Ap Stars"), and D. Leckrone ("Ultraviolet Spectroscopy of Chi Lupi with the HST GHRS").

The Joint Working Group on Standard Stars (with Commissions 30 and 45) met on 25 July under the Chairmanship of A. Batten. After spirited discussion about the future of this WG, it was decided to continue its existence, perhaps with new emphasis. R. Garrison was elected the new Chairman, and C. Corbally and M. McCarthy graciously volunteered to serve as editors of the Newsletter which would be printed and distributed by the Vatican Observatory. S. Adelman, A. Batten, P. Egret, I. Glushneva, D. Gray, M. McCarthy, E. Olsen and L. Pasinetti were elected to the SOC. Brief scientific communications were presented by A. Batten, J. Rountree-Lesh, R. Viotti, R. Garrison and M. Berger.

There was an informal gathering on 27 July, organized by R. Viotti, of about 25 astronomers engaged in work on Symbiotic Stars. There is an apparent world-wide interest in active exchange of information concerning these enigmatic stars. It was suggested that interested astronomers could gather information through e-mail contacts. R. Viotti (40058::viotti), S. Shore (iue::shore), P. Whitelock (paw@sao.ac.za) and J. Ratter (cfa::cfa8::aavso) volunteered to act as nodes for general, UV, IR, and optical correspondence, respectively. It was agreed to consider organizing a IAU Colloquium on Symbiotic Stars and Related Objects in the near future. It was also thought that there was no need, at the present time, to organize a formal working group within the structure of Commission 29.