

Chemical Evolution of Dwarf Galaxies and Stellar Clusters

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It is our pleasure to celebrate the success of our 2008 summer conference with the publication of this special supplement issue, in which we have collected the articles of at least the majority of the review talks presented at the meeting.

The 2008 MPA/ESO/MPE/USM Joint Astronomy Conference focused on the chemical signatures and evolution of dwarf galaxies and stellar clusters. It took place in Garching at the end of July (21–25 July), and it was attended by 148 participants. There were no Proceedings, as the Local Organising Committee had decided to collect articles from the review speakers instead and have them published ‘somehow’ in the ESO Messenger. This ‘somehow’ has now become a special supplement to the December 2008 issue of the ESO Messenger.

The choice of the scientific topic of this year’s Joint Astronomy Conference in Garching was driven by the current intensive work in determining stellar abundances in galactic stellar systems (notably globular clusters) and Local Group dwarf galaxies. Many of these projects are being actively pursued with the latest instruments, and have revealed surprising results. Abundances and kinematics are now routinely measured for hundreds of stars per galaxy/cluster, thanks to the latest generation of multiplex facilities. Our mapping of the Local Group is basically changing on a month-to-month basis (sometimes even more often), and the recent discovery of several ultra-faint dwarf galaxies clearly offers new horizons to explore.

As globular clusters and dwarf galaxies form a mass sequence, and possible connections between the two classes of stellar systems have always been proposed (e.g., globular clusters as the cores of former dwarf galaxies), a confrontation and comparison of cluster and dwarf galaxy chemical evolution appeared to be

interesting and possibly helpful in understanding the origin of the abundances in both classes.

Indeed, the meeting turned out to be very lively and stimulating, with many interesting new results presented. So many that several review speakers mentioned that their presentations, especially in terms of number of known dwarf galaxies, were up-to-date ‘only’ until the week before the meeting, clearly demonstrating the incredible pace at which new ultra-faint galaxies are being discovered from the Sloan Digital Sky Survey.

All the major areas were covered by at least one review talk, followed by many invited and contributed presentations. This issue collects most of the review articles: from Mario Mateo’s opening talk, to Raffaele Gratton’s and Kim Venn’s presentations on the chemical signatures of globular clusters and dwarf galaxies respectively; to Santi Cassisi’s and Francesca D’Antona’s reviews on how these abundances can be interpreted in terms of stellar evolution models and how they could be connected; and last, but not least, the concluding remarks by Ken Freeman.

Further, at the meeting, Eva Grebel investigated the links among ages, kinematics, metallicities and other properties of dwarf galaxies and presented the dynamical and chemical evolution of an isolated system with the properties of a self-gravitating three-component dwarf galaxy consisting of gas, stars and dark matter. Also, we heard a lot about the formation of stellar systems, in the nice reviews given by Pavel Kroupa and Oleg Gnedin, the latter broadcast via video-connection from Gnedin’s home institution. Kroupa talked about the early evolution of dense stellar systems, its dependence on mass, and discussed some hitherto poorly understood scaling relations in the transition region between star clusters and dwarf galaxies. Gnedin presented an overview of the dynamical evolution of globular clusters and dwarf galaxies over cosmological timescales, with an emphasis on Local Group systems. He also described current ideas on the formation of massive star clusters in the first several gigayears after the Big Bang, as well as the latest models of star formation in

small dark matter halos, which address the ‘missing satellites problem’ and help to explain the detailed star formation histories of dwarf galaxies in the Local Group.

All the presentations, including all the posters, are publicly available and linked from the conference website <http://www.mpa-garching.mpg.de/mpa/conferences/garcon08/>. This has also been a major accomplishment, and we would like to thank all participants and presenters publicly for having been so responsive to our calls for papers and presentations. Special thanks go to the review speakers who made it into this supplement issue. We know that the deadline was very tight, but our (now achieved) goal was to publish this supplement as close as possible to the time of the conference. Finally, our warm thanks go to all the students and technical/administrative supporters who have contributed to the success of this meeting.

Enjoy the reading!

Francesca and Achim