

## **DIVISION IV / WORKING GROUP ABUNDANCES IN RED-GIANTS**

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## **TRIENNIAL REPORT 2006 - 2009**

### **1. Meetings**

The main activity of the WG on *Abundances in Red Giants* has been to propose a JD for the IAU GA in 2009. The increasing evidence for distinct populations within globular clusters is leading to the view that there is a continuum between globular clusters and the smallest of the galaxies. Our JD was designed to investigate this link. However, our JD was incorporated into IAU Symposium No. 266 *Star Clusters: Basic Building Blocks throughout Time and Space* for the IAU XXVII in Rio de Janeiro, 2009. We will be responsible for organising one session in the Symposium to cover the agenda put forward in our JD proposal.

On a similar topic, many researchers associated with the WG will be attending a Max-Planck Workshop on the similar topic *Chemical Evolution of Dwarf Galaxies and Stellar Clusters* in July 2008.

Members of the WG were closely involved in the organisation of a Royal Astronomical Society specialist discussion meeting on *Super-AGB stars*, in London, February 2008. The conclusion of this meeting was that the single biggest problem for these stars is mass-loss, because it is both crucial and unknown.

### **2. Newsletter**

The AGB Newsletter, run by Jacco van Loon, a member of the WG, and Albert Zijlstra is to be more formally linked to the WG in future. It will form the main organ of communication with researchers in the field, and is distributed regularly.

### **3. Highlights**

Recent scientific highlights of prime interest to our WG include the continuing investigation into mechanisms for driving the ‘deep-mixing’ known to occur in red-giants and almost certainly AGB stars as well. Such work includes investigations of thermohaline mixing and magnetic effects (Eggleton *et al.* 2006, 2008; Charbonnel & Zahn 2007; Busso *et al.* 2007; Stancliffe *et al.* 2007). Implications of these mechanisms are still being investigated but are very promising.

Years ago, Marigo (2002) emphasised the consequences of a carbon-rich envelope and the opacity effects on subsequent thermal pulsing evolution. Recent work by Cristallo *et al.* (2007) has begun to address this.

Super-AGB stars have received a lot of attention recently. These are stars that ignite C under degenerate conditions but still go on to experience thermal pulses, and have masses between about 8 and 12  $M_{\odot}$ . Important papers are those by Siess (2006, 2007) and Poelarends *et al.* (2008), which investigate the evolution of these stars and emphasise the difficulties of such calculations. We are still awaiting a detailed calculation of yields from these stars, and these may be important for the chemical evolution of globular clusters.

McSaveney *et al.* (2007) attempted a direct quantitative test of Hot Bottom Burning by comparing models with LMC AGB stars. The basic quantitative predictions of the models were verified, although some uncertainties remain, likely due to uncertainties in the details of the properties of the convective envelope.

Recent work on very low metallicity stars has been prompted by increasingly sophisticated and complete observational studies, and includes theses by H. Lau (Cambridge) and S. Campbell (Monash) as well as Lau *et al.* (2007, 2008). Indeed, three very active cross-disciplinary areas include these and other works on interpretations of very metal-poor stars, research on the interpretation of the wealth of information present in presolar grains, and the interpretation of new measurement of neutron capture cross sections of astrophysical interest.

The field of red-giant evolution and nucleosynthesis is very active and we imagine the WG will have plenty to do in the next triennium.

John C. Lattanzio  
*chair of the Working Group*

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