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Memorie della

HELAS: the European Helio- and Asteroseismology Network

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Abstract. The Helio- and Asteroseismology Network (HELAS) is a Coordinated Action funded for the period 2006-2010 by the FP6-Infrastructure-Programme of the European Commission. INAF is one of the ten partners of HELAS. The objective of HELAS is to co-ordinate European activities in Helio- and Asteroseismology, transfer knowledge and data analysis techniques, and prepare the European research community for important missions in the immediate future.

Key words. Stars: oscillations, asteroseismology – Sun: oscillations, helioseismology

1. Introduction

During the past 40 years, Helioseismology through the careful analysis of the sound waves observed at the surface has become the prime technique to verify the quite complex set of mathematical equations and material properties which describe what we believe the physics of the interior of the Sun to be. In addition, the success of helioseismology has spurred investigators to extend this diagnostic to other stars which show multimode pulsations. This discipline, known as Asteroseismology, opened a new window on the astrophysics research: the possibility to study and to understand the behaviour of other stars by applying the tools and the techniques well developed and used in helioseismology.

European science counts numerous active research groups in the field of Helio- and Asteroseismology. However these groups require networking activities in order to structure and rationalize their efforts.

2. HELAS

The Helio- and Asteroseismology Network HELAS, was established in the 2006 as Coordination Action (CA) funded under the European Commission's Sixth Framework Programme (FP6). It was created to coordinate activities among those European institutions and organizations that support major research groups in Helio- and Asteroseismology, in order to enhance the quality and quantity of these sciences performed in Europe. It offers the unique opportunity to facilitate the exchange of knowledge and the coordination of research in Helio- and Asteroseismology through international conferences, smaller meetings, staff exchange and a strong plan for the dissemination of the latest results.

HELAS is led by ten major research groups in the field from nine European countries:

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4. Institut for Fysik og Astronomi, Århus Universitet, Århus, Denmark
5. Centro de Astrofsica da Universidade do Porto, Porto,Portugal
6. Max-Planck-Institut für Sonnensystemforschung, Katlenburg-Lindau, Germany
7. INAF, Istituto Nazionale di Astrofisica, Roma, Italy
8. Instituut voor Sterrenkunde, Katholieke Universiteit Leuven, Leuven, Belgium
9. Instytut Astronomiczny Uniwersytet Wrocławski, Wrocław, Poland
10. Centre National de la Recherche Scientifique, Observatoire de la Côte d'Azur, Nice, France

It is useful to point out that the HELAS activities although coordinated by the ten above partners are extended to all the interested European institutions. The funding of HELAS started on April 1, 2006, and will last until March 31, 2010. Further information can be obtained through the HELAS website `http://www.helas-eu.org`.

3. Network activities

HELAS, according to the FP6 rules, cannot fund research and development, but supports the coordination of the following activities:

Management: it handles the overall coordination of the consortium, the financial administration and the interaction with the European Commission.

Forum: it generates and exploits synergies, organizes annual international conferences and manages an internet portal which allows the exchange and distribution of softwares, data and any other information relevant for the field.

Global Helioseismology: it coordinates the distribution of data, methods and tools for global helioseismology.

Local Helioseismology: it aims to create and enlarge the European competences in local Helioseismology.

Asteroseismology: it coordinates the distribution and comparison of observational data, analysis tools, stellar evolution codes and stellar models.

Public outreach: it aims at raising awareness and interest in the field in the general public and at all levels of the educational system.

4. INAF as HELAS partner

The Helio- and Asteroseismology group of INAF, Istituto Nazionale di Astrofisica, which consists of several institutes of astronomy and astrophysics in Italy was established in 2001 with the idea to gather people with complementary skills in the field. The group is involved in the study of stellar oscillations with regards to photometric and spectroscopic observations and data analysis, particularly of solar-type, δ Scuti, γ Doradus, sdB and white dwarfs stars. The theoretical works focuses on expertises in the interpretation of the observed oscillation spectra, in particular by the application and development of helioseismic inversion techniques useful to unveil solar and stellar internal regions. The team employes its own stellar evolution codes (ATON and FRANEC) with the aim to study the internal structure of the stars in various phases of their evolution. The group is actively involved in several space stellar missions such as COROT (launched in 2007), Kepler by NASA (launch in 2009) and PLATO by ESA (not yet definitely accepted). The team is also taking part in ADAHELI, which is an ASI solar space mission whose proposal is still in phase A. Further information for the Italian researchers can be obtained through the HELAS Italian website `http://www.iasf-roma.inaf.it/helas`.

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