

First Circular – Workshop of the International Space Science Institute (ISSI)**4 April 2012****Helioseismology and Dynamics of the Solar Interior****Convenors**

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Date: 24 - 28 September 2012**Background**

Helioseismology, the study of the Sun's interior from observations of the vibrations of its surface, has since 1970 become a highly productive technique given the ongoing excitation of the interior vibration modes, probably by turbulence in the convection zone. Long observing times are essential to measure the oscillation frequencies with the precision required, and to extract the lowest mode frequencies involved. Earth-based observations have been undertaken with widely spread networks. In addition, the enormous value of long-term space-based observations has been demonstrated by the three helioseismology instruments aboard the Solar and Heliospheric Observatory (SOHO) located in space at the Sun-Earth L1 point. The Solar Dynamics Observatory's Helioseismic Magnetic Imager (SDO-HMI) is now adding further high quality observations to the large volume of space data already available.

Objectives of the Workshop:

The Workshop is designed to review in depth what has been achieved in helioseismology, to examine the techniques employed and to chart a course for the future development of this important discipline particularly in relation to advancing understanding of the dynamics of the solar interior. Application of these techniques to stellar interiors is growing in importance and so the helioseismology/asteroseismology relationship will be examined. However the principal aim of the Workshop is to comprehensively review the status of solar studies.

Following discussion by the Convenors, it is proposed that the Workshop will cover the following main themes:

1. Historical overview of helioseismology
 - techniques, instruments and results
 - space missions and their output
2. Understanding solar abundances and the structure and microphysics of the solar interior
3. Understanding solar dynamics, rotation, convection and overshoot
4. Understanding solar magnetism and the 11-yr cycle
5. The importance of long-term synoptic observations and datasets
6. Sub-photosphere to solar atmosphere connection
 - Irradiance as a function of solar latitude and longitude
7. Computational helioseismology: forward and inverse problems
8. New data analysis techniques and data assimilation
9. New observational techniques
10. Helioseismology with Solar Orbiter
11. Future mission concepts for helioseismology
12. The solar-stellar connection
 - Temporal and wavelength variation of solar irradiance
 - Asteroseismology of solar-like stars
13. Summary

Short presentations by those attending will be structured around the above headings. This list could, subject to discussion and assessment at the Workshop, become the set of chapter headings for the ISSI book. All of those attending will be expected to contribute to one or more of the chapters.

Product

Following the Workshop, its output will be published as a volume in the Space Science Series of ISSI by Springer, in parallel with the publication of the papers in Space Science Reviews. It is expected that a total of about 12 to 15 review style and quality papers, submitted to the usual refereeing process will be published in the book. Papers

will be based on talks presented at the Workshop and will reflect the discussions that will be held among the participants during the Workshop.

Location

The Workshop will be held at the International Space Science Institute, Hallerstrasse 6, 3012 Bern, Switzerland.

Attendance

This will be by invitation only with ~ 40 participants maximum.

Young scientists

Under its special programme for supporting young scientists, ISSI will invite five early career scientists, within two years of their PhD, to take a full part in the Workshop.

Funding

ISSI will provide the subsistence costs (hotel and a per diem to cover meals) to all participants but not the travel costs. There will be no registration fee for the Workshop.

Schedule

Invitations and First Circular:	4 April 2012
Registration deadline:	11 May 2012
Second Circular and final program:	10 August 2012
Workshop:	24–28 September 2012