

SPACEINN

Exploitation of Space Data for Innovative Helio- and Asteroseismology



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Space missions: Kepler (top left), CoRoT (top right), SOHO (lower left), and SDO (lower right).



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ABSTRACT

The main goal of SPACEINN is the full exploitation of space data and complementary ground-based data to allow for innovative approaches in helio- and asteroseismology. Therefore, the overall strategy of the project to accomplish this, focuses on developing innovative approaches for handling, archiving, processing, and the analysis of helio- and asteroseismic data. The work plan includes new developments in seismic analysis, namely, in signal processing, data analysis and stellar modelling.

THE INTERIORS OF THE SUN AND THE STARS

Observations of oscillations on the solar and stellar surfaces are a unique and powerful tool to gain information on the processes in the Sun and stars.

Through helio- and asteroseismology we can obtain detailed inferences of the conditions inside the Sun, and extensive information on the properties of a broad range of stars. Knowledge about the solar interior increases the understanding of structure and evolution for our central star. Also, it gives insight into the operation of the solar magnetic activity which has an important impact on our technological society through the potentially harmful solar eruptions, and which may play a significant role in the Earth's climate variations. The stellar results put the Sun into a broader context and provide an extensive possibility for testing and understanding the physical processes in stars. The resulting improvements in stellar characterization and modelling are crucial for broad areas of astrophysics, including the investigation of the structure and evolution of the Galaxy and the understanding of the formation of elements in the Universe.

With the organization of the large and increasing volume of space- and ground-based data for helio- and asteroseismology, it will become possible to study in depth the interiors of the Sun and the stars. This project will strengthen the cooperation of the major groups working in this important discipline, where Europe plays a leading role.

QUESTIONS & ANSWERS

What is the project designed to achieve ?

To contribute towards the best-optimised impacts in terms of international scope and synergies in the fields of helio- and asteroseismology. This will be done through improved access and use of data and data products from the Solar Heliospheric Observatory (SOHO), the Solar Dynamics Observatory (SDO), CoRoT and Kepler combined with ground-based data from GONG, BiSON, and follow-up observations of stars.

Why is this project important for Europe and how does it benefit European citizens ?

SPACEINN will enhance the effectiveness of the European scientific community by promoting the use of space assets to increase the knowledge in helio- and asteroseismology.

This will create new insights in the generation of the Sun's magnetic field with its influences on near-Earth space and Earth's climate, and on stellar activity, stellar evolution, and the material cycle in the universe.

How does the project exceed the current state of knowledge ?

Space missions such as SOHO, CoRoT, SDO, and Kepler have provided new insights in the structure and dynamics of the solar and stellar interiors. This project will allow the community to go far beyond the present scientific accomplishments by extending the usage of available space data, and developing better tools to process and interpret data obtained from various assets.

LIST OF PARTNERS

- Kiepenheuer-Institut für Sonnenphysik, Germany
- Instituto de Astrofísica de Canarias, Spain
- Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France
- Max-Planck-Gesellschaft zur Förderung der Wissenschaften, Germany
- Istituto Nazionale di Astrofisica, Italy
- Katholieke Universiteit Leuven, Belgium
- Observatoire de Paris, France
- Centro de Astrofísica da Universidade do Porto, Portugal
- University of Birmingham, United Kingdom
- Aarhus Universitet, Denmark
- Université Paris-Sud / Institute Astrophysique Spatial, France
- Consejo Superior de Investigaciones Científicas (CSIC), Spain
- Det Kongelige Bibliotek – Nationalbibliotek og Kobenhavns Universitetsbibliotek / Royal Library, Denmark
- Magyar Tudományos Akademia Csillagászati Es Foldtudományi Kutatóközpont / Konkoly Observatory, Hungary
- National Solar Observatory, United States of America
- University Corporation for Atmospheric Research / High Altitude Observatory, United States of America
- Université Paul Sabatier Toulouse III, France

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PROJECT INFORMATION

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