

HELAS platform and helioseismology ressources





The HELAS network

- HELAS : European HELio- and ASteroseismology network
- Aim: coordinate scientific efforts in helio- and asteroseismology
 - conferences and workshops
 - websites with scientific material or links to other websites with resources



HELAS websites

- **Main site:**

<http://www.helas-eu.org/>

- **Global helioseismology:**

<http://helas.group.shef.ac.uk/>

- **Local helioseismology:**

<http://www.mps.mpg.de/projects/seismo/helasNA4.html>

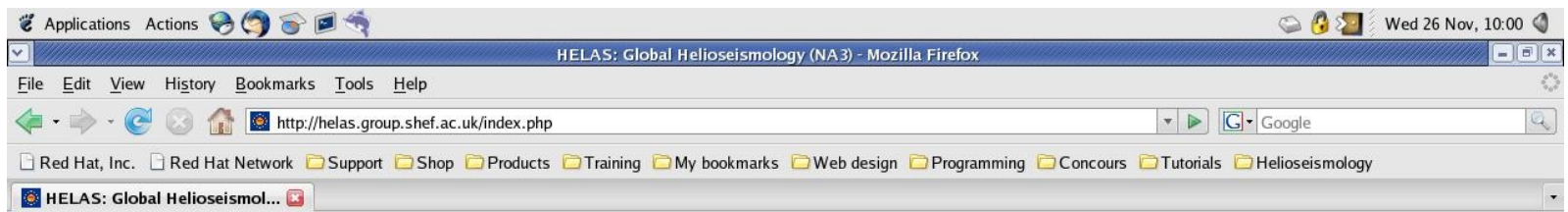
- **Asteroseismology:**

<http://www.ster.kuleuven.be/~zima/helasna5/>

- **Outreach:**

<http://astro.phys.au.dk/HELAS/>

Global Helioseismology



HELAS

Global Helioseismology (NA3)

Home

Outreach

Science

Events

Intranet

HELAS: Global Helioseismology (NA3)

[HELAS](#) (European HELio- and ASteroseismology network) is a network funded by the European Commission as part of the Sixth Framework Programme (FP6). The activities of HELAS will structure this European Research Area by bringing together the European groups active in helio- and asteroseismology.

HELAS is made up of six network activities (NA):

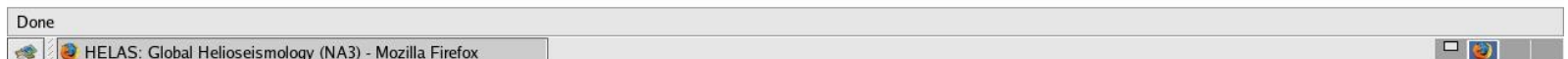
- [NA1 - Management](#)
- [NA2 - HELAS Forum](#)
- NA3 - Global Helioseismology (this website)
- [NA4 - Local Helioseismology](#)
- [NA5 - Asteroseismology](#)
- [NA6 - Public Outreach](#)

The "**Global Helioseismology**" network activity will coordinate the exchange of knowledge concerning the global properties of the Sun. The Network Activity will link groups working on the field of stellar modelling with groups working on the investigation of global solar properties. Large amounts of global helioseismology data from various instruments are accessible; new data from SDO, PICARD and other missions will become available during the Network lifetime. The Network Activity will coordinate the process of developing methods and software for analysing these data in the context of global helioseismology.

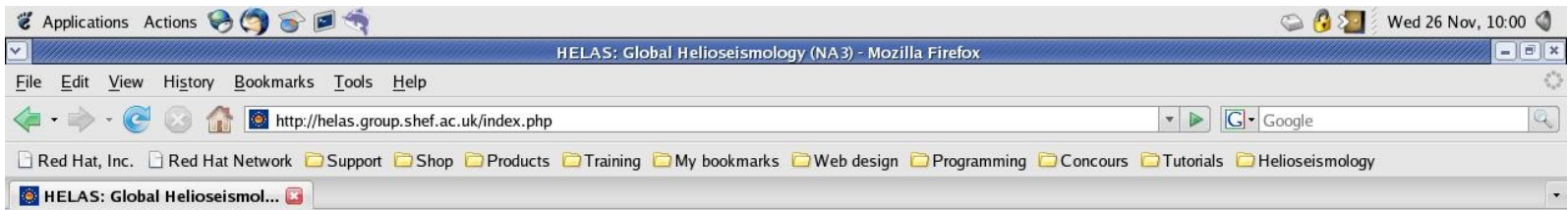


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Last update: November 21st, 2008



Science resources



HELAS Global Helioseismology (NA3)

Home	Outreach	Science	Events	Intranet
		Models		
		Inversion tools		
		Data		
		Fitting techniques		
		Pulsations		
		Asteroseismology		
		Useful links		
		Submit		

HELAS: Global Helioseismology (NA3)

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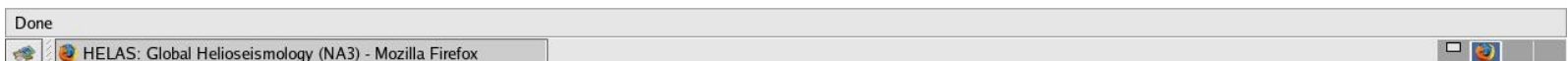
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Models and stellar evolution



Applications Actions     Wed 26 Nov, 10:01


HELAS: Global Helioseismology (NA3) - Mozilla Firefox

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HELAS: Global Helioseismol...



HELAS

Global Helioseismology (NA3)

[Home](#) [Outreach](#) [Science](#) [Events](#) [Intranet](#)


Solar and stellar models





<i>Models</i>	Solar and Stellar Models and Tools (HELAS, 2007)
<i>Models</i>	Solar models, abundances and neutrino research (Bahcall et al, 2005)
<i>Models</i>	Model S (Christensen-Dalsgaard et al, 1996), (description), (1 related entry)
<i>Models</i>	Solar modeling (Guenther, 1996)
<i>Software</i>	CESAM (Morel et al, 2003), (7 related entries) <ul style="list-style-type: none">• English documentation
<i>Article</i>	A compilation of charged-particle induced thermonuclear reaction rates (Angulo et al, 1999)
<i>Article</i>	The Current State of Solar Modeling (Christensen-Dalsgaard et al, 1996)
<i>Article</i>	Updated Opal Opacities (Iglesias and Rogers, 1996)
<i>Article</i>	OPAL Equation-of-State Tables for Astrophysical Applications (Rogers et al, 1996)
<i>Article</i>	Low-temperature Rosseland opacities (Alexander and Ferguson, 1994)
<i>Article</i>	Cosmic Abundances of the Elements (Grevesse and Noels, 1993)
<i>Article</i>	Studies in Stellar Evolution. III. The Calculation of Model Envelopes (Henyey et al, 1965)

Done

HELAS: Global Helioseismology (NA3) - Mozilla Firefox






Solar and stellar models



Applications Actions     Wed 26 Nov, 10:01


HELAS@CAUP - Mozilla Firefox

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    http://www.astro.up.pt/helas/  Google

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HELAS@CAUP



European Helio and Asteroseismology Network

2007@CAUP | 2008-10-04

HELAS@CAUP

- People
- Links
- Contacts

Solar Models

Stellar Models

Tools & Docs

HELAS is a network funded by the **European Union** in its **6th Framework Programme (FP6)** as a *Co-ordination Action* in the Helio- and Asteroseismology area of Astrophysics.

The mission of HELAS is to carry out networking activities amongst the **European Helio- and Asteroseismology** community to catalyse the mutual co-ordination and the pooling of resources in order to:

- Ensure European competence and competitiveness in Helio- and Asteroseismology by spreading expertise
- Increase in quantity and quality the European scientific output in this research area
- Enhance the synergy between Helio- and Asteroseismology
- Improve the public understanding and interest in solar and stellar physics

HELAS is a 4 years funded program, starting on 2006 April 1st.

This website provides data and documentation produced within the **Global Helioseismology** and **Asteroseismology** Network Activities (deliverables NA3-1 and NA5-2), namely

- **Solar models** and their frequencies of oscillation,
- **Stellar models** and their frequencies of oscillation,
- **Numerical tools** useful for Helio- and Asteroseismology
- and associated **documentation**.

Part of the activities at Porto have been funded under the contract **POCIV.5/B0094/2005** supported by **FCT** with funds from **POC2010**.

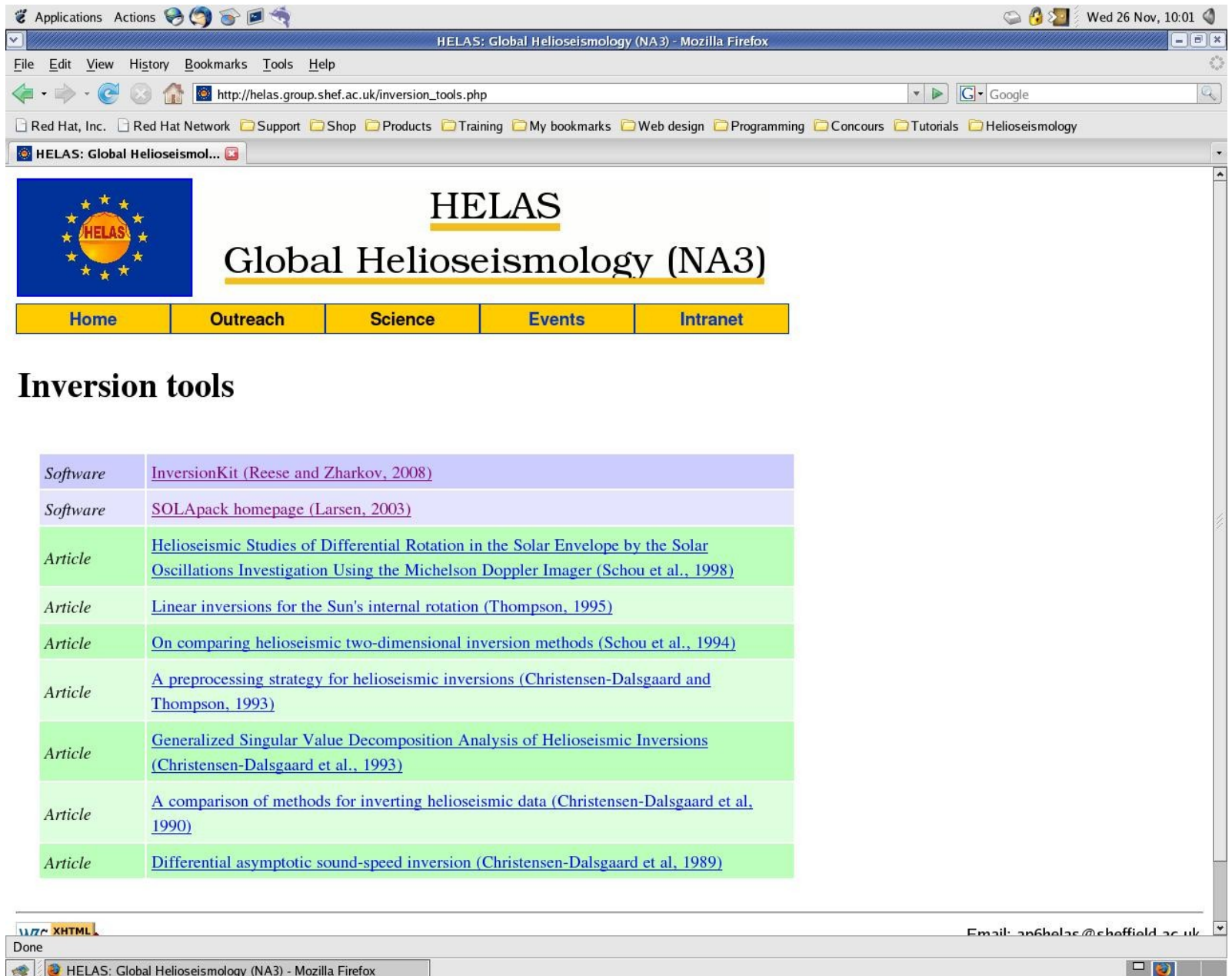
These pages are under development as the activities progress. The **latest changes** are:

- **[2008-10-04]** **ARES** - tool for measuring line equivalent widths in stellar spectra.
- **[2008-03-31]** **ApSS Volume** on ESTA - table of contents of the journal volume.
- **[2008-03-15]** **CESAM** stellar models and frequencies - new collection (B) of data made available.
- **[2007-11-15]** **YREC** solar models and frequencies - new set of data made available.

Done

HELAS@CAUP - Mozilla Firefox

Inversion tools



HELAS
Global Helioseismology (NA3)

Home Outreach Science Events Intranet

Inversion tools

Software	InversionKit (Reese and Zharkov, 2008)
Software	SOLApack homepage (Larsen, 2003)
Article	Helioseismic Studies of Differential Rotation in the Solar Envelope by the Solar Oscillations Investigation Using the Michelson Doppler Imager (Schou et al., 1998)
Article	Linear inversions for the Sun's internal rotation (Thompson, 1995)
Article	On comparing helioseismic two-dimensional inversion methods (Schou et al., 1994)
Article	A preprocessing strategy for helioseismic inversions (Christensen-Dalsgaard and Thompson, 1993)
Article	Generalized Singular Value Decomposition Analysis of Helioseismic Inversions (Christensen-Dalsgaard et al., 1993)
Article	A comparison of methods for inverting helioseismic data (Christensen-Dalsgaard et al., 1990)
Article	Differential asymptotic sound-speed inversion (Christensen-Dalsgaard et al., 1989)

W3C XHTML Done Email: an6helas@sheffield.ac.uk

HELAS: Global Helioseismology (NA3) - Mozilla Firefox

InversionKit



InversionKit

InversionKit is an interactive java program which performs linear inversions (rotational or structural) from frequency data. It was written by Daniel Reese and Sergei Zharkov for the European Helio- and Astero-seismology Network (HELAS), a major international collaboration funded by the European Commission's Sixth Framework Programme.

Download

- Version 1.0
 - [Source](#)
 - [Compiled version](#)

Contacts

If you have any enquiries or discover any bugs please write to [Daniel Reese](#).

Online demo

Due to security restrictions on applets, the online version cannot open or save files, which considerably limits what the program can do. To run the program without these security restrictions, download the program (see above) and run it as a stand-alone application. Instructions are included in the above distributions which explain how to run the program.

Applet InversionKit started

InversionKit - Mozilla Firefox

Data and missions

Applications Actions Wed 26 Nov, 10:44


HELAS: Global Helioseismology (NA3) - Mozilla Firefox

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http://helas.group.shef.ac.uk/data.php

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Global Helioseismology (NA3)

Home Outreach Science Events Intranet

Data

Space missions

Data	SOHO (Solar and Heliospheric Observatory) <ul style="list-style-type: none">• SOI-MDI (Solar Oscillations Investigation - Michelson Doppler Imager)• GOLF (Global Oscillatins at Low Frequency)• VIRGO (Variability of solar IRradiance and Gravity Oscillations) (download data)
Data	SDO (Solar Dynamics Observatory)
Data	PICARD
Data	Solar Orbiter

Ground-based networks

Data	LOWL ECHO (Experiment for Coordinated Helioseismic Observations)
Data	GONG (Global Oscillation Network Group)

Done

HELAS: Global Helioseismology (NA3) - Mozilla Firefox

Data analysis

HELAS
Global Helioseismology (NA3)

Home Outreach Science Events Intranet

Fitting techniques

Spectral Analysis

Software	Period04 (Lenz et al., 2005), (description)
Software	Fourier analysis of gapped time series: Maximum likelihood estimation (Stahn and Gizon, 2008), (1 related entry)
Software	VIRGO Data analysis (Appourchaux, 2003)
Article	Fourier analysis of gapped time series: Improved estimates of solar and stellar oscillation parameters (Stahn and Gizon, 2008)

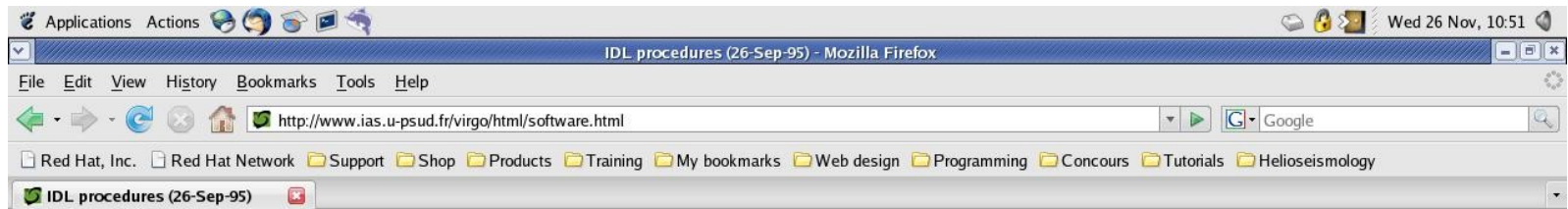
W3C XHTML 1.0

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Done

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VIRGO Data analysis



VIRGO Data analysis

Software

- [Procedures](#) for fitting Fourier spectra with Maximum Likelihood Estimators: a GONG special edition
- **NEW** [Procedures](#) for fitting power and amplitude spectra with Maximum Likelihood Estimators
- [Procedures](#) for reducing time series before the Fourier transform.
- [Procedures](#) for Random-Lag Singular (Cross-) Spectrum analysis

Level-1 algorithms

- [LOI](#) (Postscript 51 kbytes! Version 1.7)
- SPM
- DIARAD
- PMO6


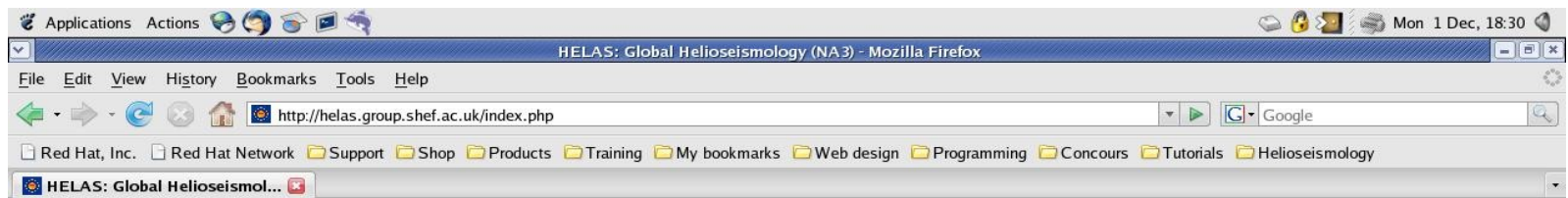
Hare and hounds exercise

No activity!!!!

Last updated by [Thierry Appourchaux](#) on January 17, 2003



Outreach resources



HELAS Global Helioseismology (NA3)

Home	Outreach	Science	Events	Intranet
	Public			
	University			
	Submit			

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- NA3 - Global Helioseismology (this website)
- [NA4 - Local Helioseismology](#)
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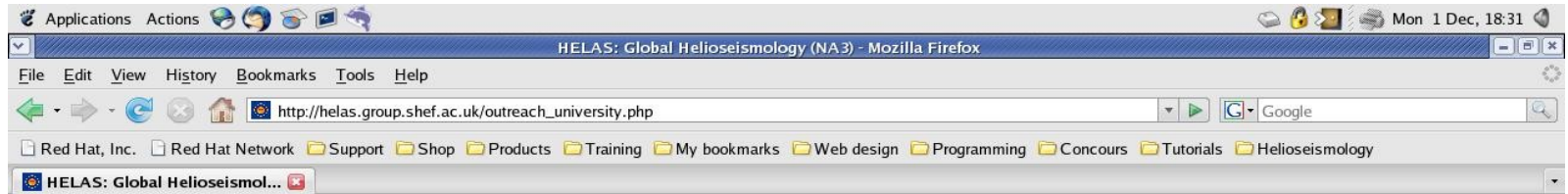


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Last update: November 21st, 2008



University outreach material



HELAS Global Helioseismology (NA3)



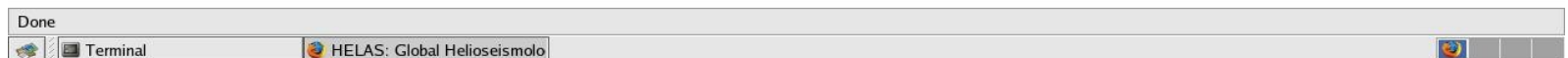
Outreach material for university students

Website	SPD Summer School on Helioseismology (Boulder, 2005)
Website	Stellar evolution on the main sequence (Richmond, 2004) , (description)
Talk	Peering into Stars (Chaplin, 2007) , (description)
Software	On-line stellar evolution simulator (Richmond, 2004)
Software	IDL helioseismic inversion program (using widgets) (Christensen-Dalsgaard et al, 1992) , (description)
Article	Lecture Notes on Stellar Oscillations (Christensen-Dalsgaard, 2003)
Article	The Internal Rotation of the Sun (Thompson et al., 2003)

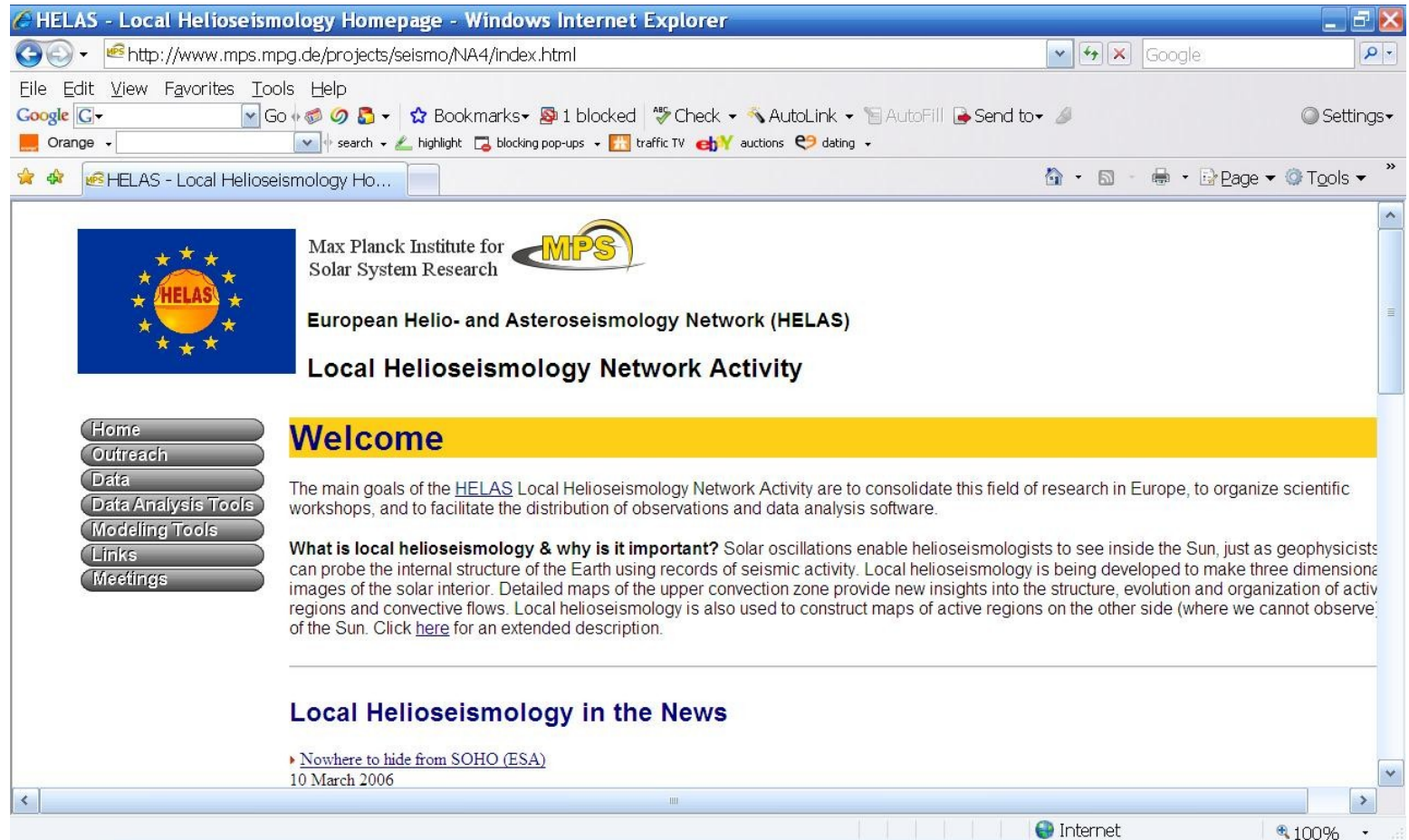


Last update: November 21st, 2008

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Local Helioseismology website



The screenshot shows a Windows Internet Explorer browser window displaying the HELAS website. The address bar shows the URL: <http://www.mps.mpg.de/projects/seismo/NA4/index.html>. The browser interface includes a menu bar (File, Edit, View, Favorites, Tools, Help), a search bar with the Google logo, and various toolbars. The website content features the HELAS logo (a blue square with a yellow circle and stars) and the text: "Max Planck Institute for Solar System Research", "European Helio- and Asteroseismology Network (HELAS)", and "Local Helioseismology Network Activity". A navigation menu on the left lists: Home, Outreach, Data, Data Analysis Tools, Modeling Tools, Links, and Meetings. The main content area has a yellow "Welcome" header, followed by a paragraph about the network's goals and a section titled "What is local helioseismology & why is it important?". At the bottom, there is a section "Local Helioseismology in the News" with a link to "Nowhere to hide from SOHO (ESA)" dated 10 March 2006. The browser's status bar at the bottom shows "Internet" and "100%".

HELAS - Local Helioseismology Homepage - Windows Internet Explorer

http://www.mps.mpg.de/projects/seismo/NA4/index.html

File Edit View Favorites Tools Help

Google G Go Bookmarks 1 blocked Check AutoLink AutoFill Send to Settings

Orange search highlight blocking pop-ups traffic TV eBay auctions dating

HELAS - Local Helioseismology Ho...

Max Planck Institute for Solar System Research

European Helio- and Asteroseismology Network (HELAS)

Local Helioseismology Network Activity

Home
Outreach
Data
Data Analysis Tools
Modeling Tools
Links
Meetings

Welcome

The main goals of the [HELAS](#) Local Helioseismology Network Activity are to consolidate this field of research in Europe, to organize scientific workshops, and to facilitate the distribution of observations and data analysis software.

What is local helioseismology & why is it important? Solar oscillations enable helioseismologists to see inside the Sun, just as geophysicists can probe the internal structure of the Earth using records of seismic activity. Local helioseismology is being developed to make three dimensional images of the solar interior. Detailed maps of the upper convection zone provide new insights into the structure, evolution and organization of active regions and convective flows. Local helioseismology is also used to construct maps of active regions on the other side (where we cannot observe) of the Sun. Click [here](#) for an extended description.

Local Helioseismology in the News

▶ [Nowhere to hide from SOHO \(ESA\)](#)
10 March 2006

Internet 100%

Data analysis tools

HELAS - software - Windows Internet Explorer

http://www.mps.mpg.de/projects/seismo/NA4/SW/index.html

File Edit View Favorites Tools Help

Google Go

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HELAS - software

Max Planck Institute for Solar System Research

European Helio- and Asteroseismology Network (HELAS)

Local Helioseismology Network Activity

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Data Analysis Tools
Modeling Tools
Links
Meetings

Data Analysis Tools

If you use any of these tools please contact us (schunker [at] mps.mpg.de).

Tools for various local helioseismic analysis:

Done Internet 100%

Modeling tools

HELAS - travel time - Windows Internet Explorer



http://www.mps.mpg.de/projects/seismo/NA4/MODEL/travel_time.html

File Edit View Favorites Tools Help

Google Go Bookmarks 1 blocked Check AutoLink AutoFill Send to Settings

Orange search highlight blocking pop-ups traffic TV eBay auctions dating

HELAS - travel time

 Max Planck Institute for Solar System Research 

European Helio- and Asteroseismology Network (HELAS)

Local Helioseismology Network Activity

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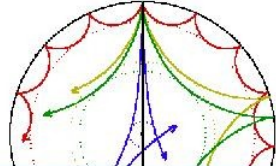
Ray Tracing

Time-distance helioseismology aims to measure and interpret the travel times of waves propagating between two points located on the solar surface. The travel times are then inverted to infer sub-surface properties that are encoded in the measurements. The trajectory of the waves generally follows that of the infinite-frequency ray path, although they are sensitive to perturbations off of this path. Finite-frequency sensitivity kernels are thus needed to give more accurate inversion results.

The following MatLab codes are written by Aaron Birch. If you use these codes please contact [schunker \[at\] mps.mpg.de](mailto:schunker[at]mps.mpg.de) for the appropriate acknowledgement.

Downloads:

[Ray Tracing Codes](#)
Codes to calculate travel time kernels for a ray. There are three main codes which calculate the group time as a function of distance, the ray paths as well as the phase and group times along the path, and the ray kernels for the sound speed squared. Documentation: [ps](#) [pdf](#)



Main HELAS website

Applications Actions Wed 26 Nov, 13:46

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HELAS IT platform - Home

European Helio- and Asteroseismology Network

HELAS

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Main Menu

- Home
 - Activities
 - Helas Consortium
 - Management
 - Poster & Handouts
- HELAS Community
- Meetings
- Requesting Support
- News
- Science Products
- Education
- HELAS Publications
- Forum
- Related Projects
- FAQs

Statistics

Visits	By country
Visits today:	13
Visits yesterday:	50
Visits month:	932
Visits total:	32317

Who is Who **Calendar** **Science Products** **Outreach**

Welcome to HELAS

It is a great pleasure to introduce a new European initiative: 'HELAS', the European Helio- and Asteroseismology Network. This initiative is funded by the European Commission since April 1st, 2006, as a 'Co-ordination Action' under its Sixth Framework Programme (FP6).

Helioseismology for the case of the Sun and asteroseismology for other stars, consists of the detailed analysis of the seismic waves observed at the stellar surfaces, which has become the prime technique probing the interior of stars during the past 30 years. HELAS was created to prepare European scientist for the advent of new exciting projects and space missions that are about to become operational, delivering overwhelming amounts of data on these waves humming in the Sun and the stars. Researchers in Europe should be in a position well prepared to process the data with high efficiency and proceed to their scientific exploitation.

HELAS offers the unique chance to advance Helio- and Asteroseismology further by coordinating the activities of researchers active in the field. These coordinating activities aim on exchanging knowledge, data and tools to proceed with the future steps in a well-prepared manner and to foster the existing synergies of the field.

As a central node making all this coordination possible, the HELAS IT platform was born as the reference site in the domain of Helio- and Asteroseismology. The common information on these research fields shall be available here. Moreover the HELAS IT will ensure coordination between groups by offering a forum for discussion and exchange of knowledge.

All European researchers interested in Helio- and Asteroseismology are invited to participate in this activity and to benefit from the information, tools and products offered here. We would like to strongly encourage you and your colleagues to participate actively in the HELAS activities and the further development of the HELAS website.

HELAS Consortium.
Last Updated (Tuesday, 03 July 2007)

Last News

Meetings	Papers	Science
Jobs	Others	AstroPh

- HELAS NAs Workshop (26/08/08)
- First CoRoT International Symposium (03/07/08)
- STFC Advanced Summer School in Solar Physics 2008 (26/05/08)
- Final Announcement of Second KASC Workshop (22/05/08)
- Third Announcement of Second KASC Workshop (09/05/08)

Login Form

Username

Password

Remember me

Lost Password? [Register](#)

No account yet? [Register](#)

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Done Terminal HELAS IT platform - Ho

Science products

The screenshot shows a Mozilla Firefox browser window displaying the HELAS IT platform website. The browser's address bar shows the URL http://www.helas-eu.org/index.php?option=com_content&task=view&id=17&Itemid=34. The website header features the text "European Helio- and Asteroseismology Network" and the "HELAS" logo, which includes a stylized sun and a globe. The navigation menu includes links for Home, Science Products, Management, Forum, Global Helioseismology, Local Helioseismology, Asteroseismology, and Public Outreach. A "Main Menu" sidebar on the left lists various site sections such as Home, HELAS Community, Meetings, Requesting Support, News, Science Products (with sub-links for Software, Data, and Useful links), Education, HELAS Publications, Forum, Related Projects, and FAQs. A "Statistics" section in the sidebar displays a table of visits:

Visits	By country
Visits today:	13
Visits yesterday:	50
Visits month:	932
Visits total:	32317

The main content area is titled "Science Products" and contains the following text:

Science Products PDF PRINT EMAIL

The objective of the Helio- and Asteroseismology Network is to co-ordinate activities among those European institutions and organisations that support Europe's major research groups in helio- and asteroseismology. The transfer of knowledge, data and tools through HELAS will attain structuring of this field of research that is essentially needed in order to prepare the European research community for important opportunities in the immediate future.

To fulfil the above objectives, HELAS IT platform provides mechanisms for the distribution of available state-of-the-art data analysis techniques and circulation of the accumulated knowledge in the field of stellar modelling and stellar oscillation physics among the active research groups in Europe, in order to maintain and strengthen the European leadership in this research field.

The following is a compilation of data sets and tools provided by the users that can be potentially useful for researchers of the community.

Below this text are four icons representing different categories: "Who is Who" (globe), "Calendar" (calendar showing MAY 20), "Science Products" (waveform), and "Outreach" (globe). Further down, three more icons represent "Software" (gears), "Data" (waveform), and "Useful links" (mouse cursor).

At the bottom of the page, there is a footer with the following information:

© 2008 HELAS IT platform ChangeLogs Disclaimer helas@iac.es Site map [RSS](#) Wednesday, 26 November 2008

The browser's status bar at the bottom shows the URL http://www.helas-eu.org/index.php?option=com_events&Itemid=93 and the page title "HELAS IT platform - Science I".

A large, vertical, red abstract graphic with a textured, flame-like or liquid-like appearance, positioned on the left side of the slide.

Sheffield website setup

The different entries are stored in a database :

- **efficient organisation and display of information**
- **possible cross-links to other entries**
- **this enables making a submission form**
- **possibility of making a search interface (if the number of entries becomes large)**

Submission form

Applications Actions Wed 26 Nov, 10:00


HELAS: Global Helioseismology (NA3) - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://helas.group.shef.ac.uk/submit_science.php Google

Red Hat, Inc. Red Hat Network Support Shop Products Training My bookmarks Web design Programming Concorsi Tutorials Helioseismology

HELAS: Global Helioseismol...



Global Helioseismology (NA3)

Home Outreach Science Events Intranet

Submit scientific material

You can submit scientific material via this web page or at the main [HELAS](#) site (which requires you to log in). Eventually, material submitted here will be transferred to the main site. Submissions will not immediately appear on line: we check each entry and reserve the right to accept or refuse it.

Title	<input type="text"/>
Author(s)	<input type="text"/>
Publication Year	<input type="text"/>
Category	<p><i>Models</i> <input type="radio"/></p> <hr/> <p><i>Pulsation codes</i> <input type="radio"/></p> <hr/> <p><i>Fitting techniques</i> <input type="radio"/> Spectral analysis <input type="radio"/> Fitting mode parameters</p> <hr/> <p><i>Data</i> <input type="radio"/> Space mission <input type="radio"/> Ground-based networks <input type="radio"/> Artificial data</p> <hr/> <p><i>Inversion tools</i> <input type="radio"/></p>
Type	Article <input type="text"/>

Done

HELAS: Global Helioseismology (NA3) - Mozilla Firefox

Scientific categories

	Categories	Types
	Models	Article
	Pulsation codes	Software
	Inversion codes	Models
		Data
Data	{ Space missions Ground networks Artificial data	
		Domain
Fitting tools	{ Spectral analysis Mode parameters	Helioseismology Asteroseimolgy

More categories or types can be added
according to what the needs are



How can you contribute?

- **submit/send material (articles, software, links to other interesting websites ...)**
 - **via the submission form**
 - **via email: d.reese@sheffield.ac.uk**
- **suggest new categories**
- **other suggestions are always welcome**