# HELAS VI / SOHO 28 / SPACEINN Helioseismology and Applications

Programme



1-5 September 2014 Göttingen, Germany Hosted by the Max Planck Institute for Solar System Research

Programme

Organizing Committee:

Matthias Ammler-von Eiff (MPS) Aaron C. Birch (MPS) Sabine Deutsch (MPS) Bernhard Fleck (ESA) Laurent Gizon (Chair, MPS/IAG) Frank Hill (NSO) Jan Langfellner (IAG) Kaori Nagashima (MPS) Markus Roth (KIS) Hannah Schunker (MPS) Michael J. Thompson (HAO)

# Ongoing and Future Projects Chair: Hannah Schunker

#### Monday morning (Sept. 1)

9:00	-	9:10	Laurent Gizon	Welcome
9:10	-	9:30	Phil Scherrer	SDO, HMI and JSOC progress and status
9:30	-	9:50	Richard Bogart	HMI local helioseismology data: status and prospects
9:50	-	10:10	Frank Hill	GONG status and results
10:10	-	10:40	Coffee and Posters	
10:40	-	11:00	Guy R. Davies	The Sun as a star: insights from BiSON, $Kepler$ and CoRoT
11:00	-	11:20	Björn Löptien	Helioseismology with Solar Orbiter
11:20	-	11:40	Sylvaine Turck-Chièze	The OPAC International Consortium
11:40	-	12:00	Markus Roth	SPRING: A new ground-based network for synoptic so- lar observations

 $12{:}00$  -  $14{:}00$  Group photo and lunch

# Convection and Dynamics

Chair: Mike Thompson

### Monday afternoon (Sept. 1)

14:00	-	14:20	Atefeh Barekat	Radial gradient of the near-surface shear layer of the Sun
14:20	-	14:40	Jesper Schou	Interaction of waves with solar convection
14:40	-	15:00	Shravan M. Hanasoge	Imaging convection in the solar interior
15:00	-	15:20	Michal Švanda	Recent results on surface flow fields from timeâdistance helioseismology
15:20	-	15:50	Coffee and Posters	
15:50	-	16:10	Jan Langfellner	Spatially resolved vorticity in supergranulation with he- lioseismology
16:10	-	16:30	Damien Fournier	Inversion of the two-point velocity correlations on the Sun's surface
16:30	-	16:50	Günther Rüdiger	The existence of the $\Lambda$ effect in the solar convection zone as indicated by SDO observations

#### Tuesday morning (Sept. 2)

## Active Regions Chair: Markus Roth

9:00	-	9:20	Hannah Schunker	Catalogue of emerging active regions observed by HMI (May $2010 - \text{Dec } 2012$ )
9:20	-	9:40	Aaron C. Birch	Near-surface flows associated with evolving active regions
9:40	-	10:00	Sushanta C. Tripathy	Horizontal flows in active regions from multi-spectral observations of SDO
10:00	-	10:40	Coffee and Posters	
10:40	-	11:00	Paul Cally	Can the seismology of active regions be decoupled from the chromosphere?
11:00	-	11:20	Axel Brandenburg	F-mode signal from localized magnetic flux concentrations
11:20	-	11:40	Hamed Moradi	What can we learn from directional time-distance prob- ing of solar magnetic regions?
11:40	-	12:00	Sergiy Shelyag	Spectropolarimetric signatures of mode conversion in simulated sunspots
12:00	_	14:00	Lunch	

# The Solar Cycle Chair: Paul Cally

#### Tuesday afternoon (Sept. 2)

14:00	-	14:20	Anne-Marie Broomhall	Insights into the solar cycle from global helioseismology
14:20	-	14:40	Timo Reinhold	Activity, rotation and stellar ages using Kepler
14:40	-	15:00	Robert H. Cameron	Observational constraints on the solar dynamo
15:00	-	15:20	Ed Rhodes	Probing the solar interior on multiple timescales using global helioseismology
15:20	-	15:50	Coffee and Posters	
15:50	-	16:10	Dean-Yi Chou	Magnetic fields at the base of solar convection zone
16:10	-	16:30	H.M. Antia	Solar rotation during cycles 23 and 24
16:30	-	16:50	Jörn Warnecke	Simulations modeling global turbulent convective dy- namos of the Sun with and without coronal envelope

# The Legacy of Irene González Hernández Wednesday morning (Sept. 3) Chair: Frank Hill

9:00	-	9:20	Frank Hill	Farside maps and space weather forecasting
9:20	-	9:40	Jesús Patrón	Pioneering work on ring diagram analysis with Irene González Hernández
9:40	-	10:00	Charles Lindsey	Seismic mapping of the Sun's far hemisphere
10:00	-	10:40	Coffee and Posters	
10:40	-	11:00	Junwei Zhao	Time-distance farside imaging using SDO/HMI data $$
11:00	-	11:20	Douglas Braun	Local helioseismic investigation of emerging active re- gions
11:20	-	11:40	Rudolf Komm	Solar-cycle variation of subsurface flows derived from GONG and SDO/HMI
11:40	-	12:00	Rachel Howe	Persistent near-surface flow structures from ring- diagram analysis of GONG and HMI data
12:00	-		Lunch	

Excursion to Kassel-Wilhelmshöhe

Wednesday afternoon (Sept. 3)

# SPACEINN Workshop: Systematics Chair: Kaori Nagashima

#### Thursday morning (Sept. 4)

9:00	-	9:30	Sylvain Korzennik	What can we learn about the solar subsurface large scale flows from accurate high-degree modes frequencies?
9:30	-	10:00	Thomas L. Duvall Jr.	A new time-distance measurement of meridional circulation that is not susceptible to center-to-limb effects
10:00	-	10:40	Coffee and Posters	
10:40	-	11:00	Timothy Larson	Medium-degree analysis of Mount Wilson data
11:00	-	11:20	Kaori Nagashima	SDO/HMI multi-height velocity measurements
11:20	-	11:40	Vincent Böning	Extension to spherical geometry: sensitivity kernels for flows in time-distance helioseismology
11:40	-	12:00	Ariane Schad	Distortion of global mode eigenfunctions
12:00	_	14:00	Lunch	

# Solar Structure / Asteroseismology Chair: Sylvaine Turck-Chièze

## Thursday afternoon (Sept. 4)

14:00	-	14:20	M. Cristina Rabello Soares	Solar structure as seen by high-degree modes
14:20	-	14:40	Sergei Vorontsov	Seismic diagnostics of the equation of state and element abundances in the solar envelope
14:40	-	15:00	Sergey Ayukov	On the possibility of constructing solar model with he- lioseismic convection zone
15:00	-	15:20	Vladimir Baturin	Evidence of early solar evolution in the tachocline and overshooting region below the present convective zone
15:20	-	15:50	Coffee and Posters	
15:50	-	16:10	Rafael A. Garcia	Low-degree and low-order global seismology of the Sun and stars
16:10	-	16:30	Takashi Sekii	Rotation of KIC 11145123
16:30	-	16:50	Warrick Ball	New parametrizations of near-surface effects in solar-like oscillators

# Ways Forward Chair: Bernhard Fleck

## Friday morning (Sept. 5)

9:00	-	9:20	Katepalli R. Sreenivasan	Turbulent convection in the laboratory
9:20	-	9:40	Hannah Schunker	Sunspot seismology
9:40	-	10:00	Manfred Küker	Modeling solar dynamics
10:00	-	10:40	Coffee and Posters	
10:40	-	11:00	Laurent Gizon	Trends in theoretical helioseismology
11:00	-	11:20	Jesper Schou	Future of observational helioseismology
11:20	-	11:40	Thierry Appourchaux	Prospects for asteroseismology of solar-type stars
11:40	-	12:00	Michael J. Thompson	Conference summary
12:00	_		Lunch	

.

## Posters

## On display every day

Jishnu Bhattacharya	Modeling surface layer induced corrections in the solar seismic spectrum through spatial homogenization
Dean-Yi Chou	Probing magnetic fields in solar interiors: solar-cycle variations of meridional flows
Bernhard Fleck	The MOTH II Experiment
Vigeesh Gangadharan	A Fourier-Legendre analysis module for the SDO Data Analysis Pipeline
Kolja Glogowski	Python bindings for NetDRMS
Frank Hill	Properties of p-mode oscillations observed in strong ${\rm H}\alpha$ flares
Rachel Howe	Helioseismology at different wavelengths using HMI and AIA
Rachel Howe	The torsional oscillation and the timing of the solar cycle
Stathis Ilonidis	Using SDO/HMI observations to detect pre-emergence signatures of large active regions
René Kiefer	Magnetic field and solar oscillations
Rudolf Komm	Current and kinetic helicity of long-lived activity complexes
Sylvain G. Korzennik	Fitting resolved modes using GONG, MDI and HMI observations
John Leibacher	Helioseismic diagnostics of solar flares
Björn Löptien	Image compression in local helioseismology
Björn Löptien Emanuele Papini	Image compression in local helioseismology Simulating acoustic waves in spotted stars
Björn Löptien Emanuele Papini Damien Przybylski	<ul><li>Image compression in local helioseismology</li><li>Simulating acoustic waves in spotted stars</li><li>Oscillatory and radiative properties of a sunspot model</li></ul>
Björn Löptien Emanuele Papini Damien Przybylski Carlos Rijs	<ul><li>Image compression in local helioseismology</li><li>Simulating acoustic waves in spotted stars</li><li>Oscillatory and radiative properties of a sunspot model</li><li>Photospheric fast wave refraction as a mechanism for the acoustic halo</li></ul>
Björn Löptien Emanuele Papini Damien Przybylski Carlos Rijs Markus Roth	<ul> <li>Image compression in local helioseismology</li> <li>Simulating acoustic waves in spotted stars</li> <li>Oscillatory and radiative properties of a sunspot model</li> <li>Photospheric fast wave refraction as a mechanism for the acoustic halo</li> <li>Exploitation of space data for innovative helio- and as- teroseismology (SPACEINN)</li> </ul>
Björn Löptien Emanuele Papini Damien Przybylski Carlos Rijs Markus Roth Jesper Schou	<ul> <li>Image compression in local helioseismology</li> <li>Simulating acoustic waves in spotted stars</li> <li>Oscillatory and radiative properties of a sunspot model</li> <li>Photospheric fast wave refraction as a mechanism for the acoustic halo</li> <li>Exploitation of space data for innovative helio- and as- teroseismology (SPACEINN)</li> <li>Earth-Affecting Solar Causes Observatory (EASCO): An L5 Mission concept for solar physics and space weather</li> </ul>
Björn Löptien Emanuele Papini Damien Przybylski Carlos Rijs Markus Roth Jesper Schou Hannah Schunker	<ul> <li>Image compression in local helioseismology</li> <li>Simulating acoustic waves in spotted stars</li> <li>Oscillatory and radiative properties of a sunspot model</li> <li>Photospheric fast wave refraction as a mechanism for the acoustic halo</li> <li>Exploitation of space data for innovative helio- and as- teroseismology (SPACEINN)</li> <li>Earth-Affecting Solar Causes Observatory (EASCO): An L5 Mission concept for solar physics and space weather</li> <li>Emerging active regions observed by SDO/HMI for he- lioseismology</li> </ul>
<ul> <li>Björn Löptien</li> <li>Emanuele Papini</li> <li>Damien Przybylski</li> <li>Carlos Rijs</li> <li>Markus Roth</li> <li>Jesper Schou</li> <li>Hannah Schunker</li> <li>Nishant K. Singh</li> </ul>	<ul> <li>Image compression in local helioseismology</li> <li>Simulating acoustic waves in spotted stars</li> <li>Oscillatory and radiative properties of a sunspot model</li> <li>Photospheric fast wave refraction as a mechanism for the acoustic halo</li> <li>Exploitation of space data for innovative helio- and as- teroseismology (SPACEINN)</li> <li>Earth-Affecting Solar Causes Observatory (EASCO): An L5 Mission concept for solar physics and space weather</li> <li>Emerging active regions observed by SDO/HMI for he- lioseismology</li> <li>Properties of p and f modes in hydromagnetic turbulence</li> </ul>
<ul> <li>Björn Löptien</li> <li>Emanuele Papini</li> <li>Damien Przybylski</li> <li>Carlos Rijs</li> <li>Markus Roth</li> <li>Jesper Schou</li> <li>Hannah Schunker</li> <li>Nishant K. Singh</li> <li>Sushanta C. Tripathy</li> </ul>	<ul> <li>Image compression in local helioseismology</li> <li>Simulating acoustic waves in spotted stars</li> <li>Oscillatory and radiative properties of a sunspot model</li> <li>Photospheric fast wave refraction as a mechanism for the acoustic halo</li> <li>Exploitation of space data for innovative helio- and as- teroseismology (SPACEINN)</li> <li>Earth-Affecting Solar Causes Observatory (EASCO): An L5 Mission concept for solar physics and space weather</li> <li>Emerging active regions observed by SDO/HMI for he- lioseismology</li> <li>Properties of p and f modes in hydromagnetic turbulence</li> <li>Cross-spectral fitting of GONG and HMI oscillation data</li> </ul>
<ul> <li>Björn Löptien</li> <li>Emanuele Papini</li> <li>Damien Przybylski</li> <li>Carlos Rijs</li> <li>Markus Roth</li> <li>Jesper Schou</li> <li>Hannah Schunker</li> <li>Nishant K. Singh</li> <li>Sushanta C. Tripathy</li> <li>Aneta Wisniewska</li> </ul>	<ul> <li>Image compression in local helioseismology</li> <li>Simulating acoustic waves in spotted stars</li> <li>Oscillatory and radiative properties of a sunspot model</li> <li>Photospheric fast wave refraction as a mechanism for the acoustic halo</li> <li>Exploitation of space data for innovative helio- and as- teroseismology (SPACEINN)</li> <li>Earth-Affecting Solar Causes Observatory (EASCO): An L5 Mission concept for solar physics and space weather</li> <li>Emerging active regions observed by SDO/HMI for he- lioseismology</li> <li>Properties of p and f modes in hydromagnetic turbulence</li> <li>Cross-spectral fitting of GONG and HMI oscillation data</li> <li>Investigation of solar oscillations with the HELLRIDE instrument</li> </ul>