

MAGNETIC FIELDS THROUGHOUT STELLAR EVOLUTION

IAU SYMPOSIUM No. 302

COVER ILLUSTRATION:

Numerical dynamo in a rapidly-rotating spherical shell that models the magnetism of an active fully convective M dwarf. Due to the ordering influence of the dominating Coriolis force, convection develops as large scale convective columns that maintain the dynamo action. The surface topology of the magnetic field is dominated by its dipolar component. At depth, the magnetic field lines show a more intricate structure. The color of the field lines scale with the amplitude of the radial component of the magnetic field (red outward, blue inward) and the surface is made transparent to highlight the magnetic field structure at depth. Credits: Thomas Gastine

Cambridge University Press
978-1-107-04498-2 — Magnetic Fields throughout Stellar Evolution (IAU S302)
Edited by Pascal Petit , Moira Jardine , Hendrik C. Spruit
Frontmatter
[More Information](#)

IAU SYMPOSIUM PROCEEDINGS SERIES

Chief Editor

THIERRY MONTMERLE, IAU General Secretary
Institut d'Astrophysique de Paris,
98bis, Bd Arago, 75014 Paris, France
montmerle@iap.fr

Editor

PIERO BENVENUTI, IAU Assistant General Secretary
University of Padua, Dept of Physics and Astronomy,
Vicolo dell'Osservatorio, 3, 35122 Padova, Italy
piero.benvenuti@unipd.it

INTERNATIONAL ASTRONOMICAL UNION
UNION ASTRONOMIQUE INTERNATIONALE

International Astronomical Union



MAGNETIC FIELDS
THROUGHOUT STELLAR
EVOLUTION

PROCEEDINGS OF THE 302nd SYMPOSIUM OF
THE INTERNATIONAL ASTRONOMICAL UNION
HELD IN BIARRITZ, FRANCE
AUGUST 25–30, 2013

Edited by

PASCAL PETIT

Institut de Recherche en Astrophysique et Planétologie, Toulouse, France

MOIRA JARDINE

*School of Physics & Astronomy, University of St Andrews, St Andrews,
Scotland, UK*

and

HENDRIK C. SPRUIT

Max-Planck-Institut für Astrophysik, Garching, Germany



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press
978-1-107-04498-2 — Magnetic Fields throughout Stellar Evolution (IAU S302)
Edited by Pascal Petit , Moira Jardine , Hendrik C. Spruit
Frontmatter
[More Information](#)

CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom
One Liberty Plaza, 20th Floor, New York, NY 10006, USA
477 Williamstown Road, Port Melbourne, VIC 3207, Australia
314-321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi - 110025, India
79 Anson Road, #06-04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781107044982

© International Astronomical Union 2014

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2014

A catalogue record for this publication is available from the British Library

Library of Congress Cataloging in Publication data

This journal issue has been printed on FSC-certified paper and cover board. FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests. Please see www.fsc.org for information.

ISBN 978-1-107-04498-2 Hardback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

Table of Contents

Foreword	xii
Scientific Organizing Committee	xiii
Conference photograph	xiv
Participants	xvi

General Introduction

Magnetic Fields in Stars: Origin and Impact	1
<i>N. Langer</i>	

Session 1: Magnetized stellar formation

The Role of Magnetic Fields in Star Formation	10
<i>R. E. Pudritz, M. Klassen, H. Kirk, D. Seifried & R. Banerjee</i>	
Magnetic field dispersion in the neighbourhood of Bok Globules	21
<i>C. V. Rodrigues, V. de S. Magalhães, J. W. Vilas-Boas, G. Racca & A. Pereyra</i>	
The role of magnetic fields in pre-main sequence stars	25
<i>G. A. J. Hussain & E. Alecian</i>	
Magnetic Fields in 7 Young Stellar Objects Observed with Nançay Radio Telescope	38
<i>O. Bayandina, A. Alakoz & I. Val'tts</i>	
Can we predict the magnetic properties of PMS stars from their H-R diagram location?	40
<i>S. G. Gregory, J.-F. Donati, J. Morin, G. A. J. Hussain, N. J. Mayne, L. A. Hillenbrand & M. Jardine</i>	
The magnetosphere of the close accreting PMS binary V4046 Sgr AB	44
<i>S. G. Gregory, V. R. Holzwarth, J.-F. Donati, G. A. J. Hussain, T. Montmerle, E. Alecian, S. H. P. Alencar, C. Argiroffi, M. Audard, J. Bouvier, F. Damiani, M. Güdel, D. P. Huenemoerder, J. H. Kastner, A. Maggio, G. G. Sacco & G. A. Wade</i>	
V4046 Sgr: X-rays from accretion shock	46
<i>C. Argiroffi, A. Maggio, T. Montmerle, D. Huenemoerder, E. Alecian, M. Audard, J. Bouvier, F. Damiani, J.-F. Donati, S. Gregory, M. Güdel, G. Hussain, J. Kastner & G. G. Sacco</i>	
X-rays from accretion shocks in classical T Tauri stars: 2D MHD modeling and the role of local absorption	48
<i>C. Argiroffi, R. Bonito, S. Orlando, M. Miceli, F. Reale, G. Peres, T. Matsakos, C. Sthel� & L. Ibgui</i>	
Analysis of star-disk interaction in young stellar systems	50
<i>N. N. J. Fonseca, S. H. P. Alencar & J. Bouvier</i>	

vi	<i>Contents</i>	
Magnetospheric Accretions and the Inner Winds of Classical T Tauri Stars		54
<i>R. Kurosawa & M. M. Romanova</i>		
Building a numerical relativistic non-ideal magnetohydrodynamics code for astro- physical applications		64
<i>S. Miranda Aranguren, M. A. Aloy & C. Aloy</i>		
3D YSO accretion shock simulations: a study of the magnetic, chromospheric and stochastic flow effects		66
<i>T. Matsakos, J.-P. Chièze, C. Stehlé, M. González, L. Ibgui, L. de Sá, T. Lanz, S. Orlando, R. Bonito, C. Argiroffi, F. Reale & G. Peres</i>		
Magnetic higher-mass stars in the early stages of their evolution		70
<i>J. H. Grunhut & E. Alecian</i>		
What do weak magnetic fields mean for magnetospheric accretion in Herbig AeBe star+disk systems?		80
<i>A. N. Aarnio, J. D. Monnier, T. J. Harries & D. M. Acreman</i>		
Searches for the new magnetic intermediate-mass stars on various stages of MS evolution		84
<i>E. A. Semenko</i>		
Chemical peculiarities in magnetic and non-magnetic pre-main sequence A and B stars		87
<i>C. P. Folsom, S. Bagnulo, G. A. Wade, J. D. Landstreet & E. Alecian</i>		
Angular momentum evolution of young stars		91
<i>S. P. Littlefair</i>		
The Effects of Magnetic Activity on Lithium-Inferred Ages of Stars		100
<i>A. J. Juarez, P. A. Cargile, D. J. James & K. G. Stassun</i>		
Activity and Rotation in the Young Cluster h Per		102
<i>C. Argiroffi, M. Caramazza, G. Micela, E. Moraux & J. Bouvier</i>		
X-ray emission regimes and rotation sequences in the M34 open cluster		106
<i>P. Gondoin</i>		
The evolution of surface magnetic fields in young solar-type stars		110
<i>C. P. Folsom, P. Petit, J. Bouvier, J.-F. Donati & J. Morin</i>		
Stellar models of rotating, pre-main sequence low-mass stars with magnetic fields		112
<i>L. T. S. Mendes, N. R. Landin & L. P. R. Vaz</i>		
Session 2: Magnetic activity in the Sun and main-sequence stars with convective outer layers		
Rotation and magnetism of solar-like stars: from scaling laws to spot-dynamos .		114
<i>A. S. Brun</i>		
Probing the structure of local magnetic field of solar features with helioseismology		126
<i>K. Daiifallah</i>		
Hanle and Zeeman effects: from solar to stellar diagnostics		130
<i>A. L. Ariste</i>		

<i>Contents</i>	vii
Coronal influence on dynamos	134
<i>J. Warnecke & A. Brandenburg</i>	
A Bcool spectropolarimetric survey of over 150 solar-type stars	138
<i>S. Marsden, P. Petit, S. Jeffers, J.-D. do Nascimento, B. Carter, C. Brown on behalf of the Bcool project team</i>	
High-resolution spectropolarimetry of κ Cet: A proxy for the young Sun.	142
<i>J. D. do Nascimento, P. Petit, M. Castro, G. F. Porto de Mello, S. V. Jeffers, S. C. Marsden, I. Ribas, E. Guinan & the Bcool Collaboration</i>	
Theoretical evolution of Rossby number for solar analog stars	144
<i>M. Castro, T. Duarte & J. D. do Nascimento Jr.</i>	
The large scale magnetic field of the G0 dwarf HD 206860 (HN Peg).	146
<i>S. B. Saikia, S. V. Jeffers, P. Petit, S. Marsden, J. Morin, A. Reiners & the Bcool project</i>	
Starspots on Young Solar-Type Stars.	148
<i>C. Brown, B. Carter, S. Marsden & I. Waite</i>	
Do Magnetic Fields Actually Inflate Low-Mass Stars?	150
<i>G. A. Feiden & B. Chaboyer</i>	
A new spectropolarimeter for the San Pedro Martir National Observatory	154
<i>E. Iñiguez-Garín, D. Hiriart, J. Ramirez-Velez, J. M. Núñez-Alfonso, J. Herrera & J. Castro-Chacón</i>	
Magnetic Fields in Low-Mass Stars: An Overview of Observational Biases	156
<i>A. Reiners</i>	
On the spectropolarimetric signature of FeH in the laboratory and in sunspots	164
<i>P. Crozet, A. J. Ross, N. Alleq, A. L. Ariste, C. Le Men & B. Gelly</i>	
What controls the large-scale magnetic fields of M dwarfs?	166
<i>T. Gastine, J. Morin, L. Duarte, A. Reiners, U. Christensen & J. Wicht</i>	
Magnetic fields in M-dwarfs from high-resolution infrared spectroscopy	170
<i>D. Shulyak, A. Reiners, U. Seemann, O. Kochukhov & N. Piskunov</i>	
Bridging planets and stars using scaling laws in anelastic spherical shell dynamos	174
<i>R. K. Yadav, T. Gastine, U. R. Christensen & L. Duarte</i>	
Age, Activity and Rotation in Mid and Late-Type M Dwarfs from MEarth	176
<i>A. A. West, K. L. Weisenburger, J. Irwin, D. Charbonneau, J. Dittmann & Z. K. Berta-Thompson</i>	
Magnetic fields of Sun-like stars	180
<i>R. Fares</i>	
Stellar Magnetic Dynamos and Activity Cycles	190
<i>N. J. Wright</i>	
Differential rotation and meridional flows in stellar convection zones	194
<i>M. Küker & G. Rüdiger</i>	
Meridional flow velocities for solar-like stars with known activity cycles	196
<i>D. Baklanova & S. Plachinda</i>	

viii	<i>Contents</i>	
On the reliability of measuring differential rotation of spotted stars		198
	<i>Z. Kóvári, J. Bartus, L. Kriskovics, K. Vida & K. Oláh</i>	
Hyper X-ray Flares on Active Stars Detected with MAXI		200
	<i>M. Higa, Y. Tsuboi, H. Negoro, S. Nakahira, H. Tomida, M. Matsuoka & The MAXI team</i>	
Modeling transiting exoplanet and spots For interferometric study		202
	<i>R. Ligi, D. Mourard, K. Perraut, P. Bério, L. Bigot, A. Chiavassa, A.-M. Lagrange & N. Nardetto</i>	
Stellar Magnetism in the Era of Space-Based Precision Photometry		206
	<i>L. M. Walkowicz</i>	
The new age of spotted star research using <i>Kepler</i> and CHARA		212
	<i>R. M. Roettenbacher, J. D. Monnier, R. O. Harmon & H. H. Korhonen</i>	
Rotation & differential rotation of the active <i>Kepler</i> stars		216
	<i>T. Reinhold, A. Reiners & G. Basri</i>	
Starspots Magnetic field by transit mapping		220
	<i>A. Válio & E. Spaggiari</i>	
Investigating magnetic activity of F stars with the <i>Kepler</i> mission		222
	<i>S. Mathur, R. A. García, J. Ballot, T. Ceillier, D. Salabert, T. S. Metcalfe, C. Régulo, A. Jiménez & S. Bloemen</i>	
Detecting activity cycles of late-type dwarfs in <i>Kepler</i> data		224
	<i>K. Vida & K. Oláh</i>	
The effects of stellar winds and magnetic fields on exoplanets		228
	<i>A. A. Vidotto</i>	
Planetary protection in the extreme environments of low-mass stars		237
	<i>A. A. Vidotto, M. Jardine, J. Morin, J.-F. Donati, P. Lang & A. J. B. Russell</i>	
Planets spinning up their host stars: a twist on the age-activity relationship. . .		239
	<i>K. Poppenhaeger & S. J. Wolk</i>	
Constraining Stellar Winds of Young Sun-like Stars		243
	<i>C. P. Johnstone, T. Lüftinger, M. Güdel & B. Fichtinger</i>	
Bow shocks and winds around HD 189733b		245
	<i>J. Llama, A. A. Vidotto, M. Jardine, K. Wood & R. Fares</i>	
Stellar Magnetism and starspots: the implications for exoplanets		247
	<i>C. Vilela, J. Southworth & C. del Burgo</i>	
On the effects of stellar winds on exoplanetary magnetospheres		251
	<i>V. See, M. Jardine, A. A. Vidotto, P. Petit, S. C. Marsden & S. V. Jeffers</i>	
Session 3: Origin and impact of magnetic fields in higher-mass stars with radiative outer layers		
The nature and origin of magnetic fields in early-type stars		255
	<i>J. Braithwaite</i>	

<i>Contents</i>		ix
The magnetic characteristics of Galactic OB stars from the MiMeS survey of magnetism in massive stars		265
<i>G. A. Wade, J. Grunhut, E. Alecian, C. Neiner, M. Aurière, D. A. Bohlender, A. David-Uraz, C. Folsom, H. F. Henrichs, O. Kochukhov, S. Mathis, S. Owocki, V. Petit & the MiMeS Collaboration</i>		
Magnetic fields of OB stars		270
<i>A. F. Kholttygin, S. Hubrig, N. A. Drake, N. Sudnik & V. Dushin</i>		
New observations of chemically peculiar stars with ESPaDOmS		272
<i>V. Khalack, B. Yameogo, C. Thibeault & F. LeBlanc</i>		
The analysis of Li I 6708Å line through the rotational period of HD166473 taking into account Paschen-Back magnetic splitting		274
<i>A. V. Shavrina, V. Khalack, Y. Glagolevskij, D. Lyashko, J. Landstreet, F. Leone & M. Giarrusso</i>		
Bp stars in Orion OB1 association		276
<i>I. I. Romanyuk & I. A. Yakunin</i>		
“Stellar Prominences” on OB stars to explain wind-line variability		280
<i>H. F. Henrichs & N. P. Sudnik</i>		
Partial Paschen-Back splitting of Si II and Si III lines in magnetic CP stars		284
<i>V. Khalack & J. Landstreet</i>		
The Dominion Astrophysical Observatory Magnetic Field Survey (DMFS)		288
<i>D. A. Bohlender & D. Monin</i>		
Modeling surface magnetic fields in stars with radiative envelopes		290
<i>O. Kochukhov</i>		
New Experiments with Zeeman Doppler Mapping		300
<i>A. J. Martin, S. Bagnulo & M. J. Stift</i>		
Combining magnetic and seismic studies to constrain processes in massive stars		302
<i>C. Neiner, P. Degroote, B. Coste, M. Briquet & S. Mathis</i>		
Magnetic fields of Ap stars from full Stokes vector spectropolarimetric observations		304
<i>N. Rusomarov, O. Kochukhov & N. Piskunov</i>		
Magnetic Doppler Imaging of He-strong star HD 184927		306
<i>I. Yakunin, G. Wade, D. Bohlender, O. Kochukhov, V. Tsymbal & MiMeS Collaborators</i>		
roAp stars: surface lithium abundance distribution and magnetic field configuration		309
<i>N. Polosukhina, D. Shulyak, A. Shavrina, D. Lyashko, N. A. Drake, Yu. Glagolevskii, D. Kudryavtsev & M. Smirnova</i>		
Roadmap on the theoretical work of BinaMIcS		311
<i>S. Mathis, C. Neiner, E. Alecian, G. Wade & the BinaMIcS collaboration</i>		
Candidate Ap stars in close binary systems		313
<i>C. P. Folsom, G. A. Wade, K. Likuski, O. Kochukhov, E. Alecian, D. Shulyak & N. M. Johnson</i>		

The unusual binary HD 83058 in the region of the Scorpius-Centaurus OB association	315
<i>M. A. Pogodin, N. A. Drake, E. G. Jilinski & C. B. Pereira</i>	
Binary and multiple magnetic Ap/Bp stars	317
<i>D. Rastegaev, Y. Balega, V. Dyachenko, A. Maksimov & E. Malogolovets</i>	
Wind channeling, magnetospheres, and spindown of magnetic massive stars	320
<i>S. P. Owocki, A. ud-Doula, R. H. D. Townsend, V. Petit, J. O. Sundqvist & D. H. Cohen</i>	
X-rays from magnetic massive OB stars	330
<i>V. Petit, D. H. Cohen, Y. Nazé, M. Gagné, R. H. D. Townsend, M. A. Leutenegger, A. ud-Doula, S. P. Owocki & G. A. Wade</i>	
Investigating the origin of cyclical spectral variations in hot, massive stars	334
<i>A. David-Uraz, G. A. Wade, V. Petit & A. ud-Doula</i>	
The dichotomy between strong and ultra-weak magnetic fields among intermediate-mass stars	338
<i>F. Lignières, P. Petit, M. Aurière, G. A. Wade & T. Böhm</i>	
UVMag: a UV and optical spectropolarimeter for stellar physics	348
<i>C. Neiner, P. Petit, L. Parès & the UVMag consortium</i>	
Session 4: Magnetic fields in the ultimate stages of stellar evolution	
Surface magnetism of cool giant and supergiant stars	350
<i>H. Korhonen</i>	
Pollux: a stable weak dipolar magnetic field but no planet?	359
<i>M. Aurière, R. Konstantinova-Antova, O. Espagnet, P. Petit, T. Roudier, C. Charbonnel, J.-F. Donati & G. A. Wade</i>	
On dynamo action in the giant star Pollux: first results	363
<i>A. Palacios & A. S. Brun</i>	
The Hertzsprung-gap giant 31 Comae in 2013: Magnetic field and activity indicators	365
<i>A. P. Borisova, R. Konstantinova-Antova, M. Aurière, P. Petit & C. Charbonnel</i>	
Magnetic Field Structure and Activity of the He-burning Giant 37 Comae	367
<i>S. Tsvetkova, P. Petit, R. Konstantinova-Antova, M. Aurière, G. A. Wade, C. Charbonnel & N. A. Drake</i>	
Strong variable linear polarization in the cool active star II Peg	369
<i>L. Rosén, O. Kochukhov & G. A. Wade</i>	
Magnetic fields in single late-type giants in the Solar vicinity: How common is magnetic activity on the giant branches?	373
<i>R. Konstantinova-Antova, M. Aurière, C. Charbonnel, N. Drake, G. Wade, S. Tsvetkova, P. Petit, K.-P. Schröder & A. Lèbre</i>	
Evolution of magnetic activity in intermediate-mass giants	377
<i>P. Gondoin</i>	

	<i>Contents</i>	xi
Surface differential rotation of IL Hya from time-series Doppler images		379
<i>Z. Kóvári, L. Kriskovics, K. Oláh, K. Vida, J. Bartus, K. G. Strassmeier & M. Weber</i>		
Magnetic field of the classical Cepheid η Aql: new results		381
<i>V. Butkovskaya, S. Plachinda, D. Baklanova & V. Butkovskiy</i>		
Activity on a Li-rich giant: DIPsc revisited.		383
<i>L. Kriskovics, Z. Kóvári, K. Vida & K. Oláh</i>		
Search for surface magnetic fields in Mira stars : first results on χ Cyg		385
<i>A. Lèbre, M. Aurière, N. Fabas, D. Gillet, F. Herpin, P. Petit & R. Konstantinova-Antova</i>		
Magnetic fields around AGB stars and Planetary Nebulae		389
<i>W. H. T. Vlemmings</i>		
Magnetic fields in Proto Planetary Nebulae		398
<i>L. Sabin, Q. Zhang, A. A. Zijlstra, N. A. Patel, R. Vázquez, B. A. Zauderer, M. E. Contreras & P. F. Guillén</i>		
Polarimetry of R Aqr and PN M2-9		400
<i>S. G. Navarro, L. Sabin, J. Ramírez & D. Hiriart</i>		
Measurements of the magnetic field in WD 1658+441		402
<i>V. J. Ramírez, D. Hiriart, G. Valyavin, J. Valdez, F. Quiroz, B. Martínez, S. Plachinda & E. Iñiguez-Garín</i>		
Hydromagnetic Equilibria and their Evolution in Neutron Stars		404
<i>A. Reisenegger</i>		
Hall Effect in Neutron Star Crusts		415
<i>K. N. Gourgouliatos & A. Cumming</i>		
Magnetohydrodynamic equilibria in barotropic stars		419
<i>C. Armaza, A. Reisenegger, J. A. Valdivia & P. Marchant</i>		
Magnetic field structures inside magnetars with strong toroidal field		423
<i>K. Fujisawa</i>		
Axisymmetric and stationary magnetic field structures in neutron star crusts under various boundary conditions		427
<i>K. Fujisawa & S. Kisaka</i>		
Magnetars: the explosive character of a small class of strongly magnetized neutron stars		429
<i>N. Rea</i>		
NSMAXG: A new magnetic neutron star spectral model in XSPEC		435
<i>W. C. G. Ho</i>		
Effects of strong magnetic fields in dense stellar matter		439
<i>A. Lavagno & F. Lingua</i>		
Search for Stable Magnetohydrodynamic Equilibria in Barotropic Stars		441
<i>J. P. Mitchell, J. Braithwaite, N. Langer, A. Reisenegger & H. Spruit</i>		
Author index		445

Foreword

All phases of stellar evolution are influenced by the presence of magnetic fields in the interior and close environment of stars. Magnetic fields play a central role in the spindown of young stars, through magnetized outflows, star-disc interaction or magnetically-driven winds. They also impact the vertical settling of chemical species, leading to abnormal surface abundances observed in stars more massive than the Sun. In the advanced phases of stellar evolution, magnetic fields influence stellar evolution through their contribution to the mass-loss of cool giants and supergiants. Finally, extreme magnetic fields are observed in a small fraction of compact stellar remnants, powering X-ray and gamma ray emission.

Although most of these points have been identified decades ago, the ability to measure stellar magnetic fields and incorporate them in stellar models is relatively new. In this young and still growing research domain, the last few years have seen the dawn of a new era, with the advent of powerful tools strengthening both observational and modelling approaches to this field, rapidly changing our view of stellar magnetism throughout stellar evolution. The aim of this symposium was to bring together colleagues from all of these research areas. The topics covered spanned all phases of evolution, from the formation of stars and their early accreting years, through main sequence evolution for both low and high mass stars, and also the final stages of stellar evolution. Much of stellar astronomy now has relevance for the new field of exoplanets, and this brought another community to the symposium.

In addition to synthesizing the expertise of many research areas, the symposium also provided a forward look to the challenges and opportunities of the forthcoming decade. With an increasing number of present or future ground-based instruments in the visible and near infrared domains, stellar spectropolarimetry is now delivering direct magnetic field measurements throughout most of the Hertzsprung-Russell diagram. Combined with tomographic modelling, spectropolarimetric data sets provide the surface distribution of the magnetic vector with increasing spatial and temporal resolution. Many indirect tracers of magnetic activity are also available from X-rays to sub-millimetric and radio wavelengths, providing us with observational clues on the effect of magnetic fields at various distances from the stellar surface (chromosphere, corona, accretion flows, winds, jets). Statistical studies based on huge samples are also obtained from space-borne observatories like KEPLER, offering a completely new view of stellar activity. They will soon be complemented by systematic activity measurements provided by the GAIA spacecraft. This wealth of observational material is progressively getting closer to the richness of solar observations, for which continuous monitoring is now available at extremely high spatial resolution and throughout most of the electromagnetic spectrum (e.g. HINODE, SDO). This symposium showed clearly that these tight observational constraints constitute a necessary guidance to numerical simulations of stellar magnetism, which now use the power of massively parallel supercomputers, enabling the investigation of stellar dynamos through global 3-D simulations of convective layers, as well as the evolution of magnetic fields in radiative zones. The future indeed promises to be a rich one for studies of stellar magnetism throughout stellar evolution.

Pascal Petit, Moira Jardine & Hendrik Spruit

SCIENTIFIC ORGANIZING COMMITTEE

- Gibor Basri (Univ. California, USA)
- Matthew Browning (Univ. Toronto, Canada)
- Corinne Charbonnel (Geneva Observatory, Switzerland)
- Jose-Dias do Nascimento (Univ. Natal, Brazil)
- Siraj Hasan (IIA, India)
- Moira Jardine (Univ. Saint Andrews, Scotland, co-chair)
- Oleg Kochukhov (Univ. Uppsala, Sweden)
- Renada Konstantinova-Antova (Bulgarian Academy of Sciences, Bulgaria)
- Hiroaki Isoe (Univ. Kyoto, Japan)
- Stephen Marsden (James Cook University, Australia)
- Pascal Petit (Univ. Toulouse, France, chair)
- Sami Solanki (MPS, Germany)
- Henk Spruit (MPA, Germany, co-chair)
- Klaus Strassmeier (AIP, Germany)
- Asif ud-Doula (Penn State, USA)
- Gregg Wade (RMC, Canada)

LOCAL ORGANIZING COMMITTEE

- Marie-Ange Albouy (UPS, Toulouse, France)
- Michel Aurière (IRAP, Tarbes, France)
- Jérôme Ballot (IRAP, Toulouse, France, co-chair)
- Boris Dintrans (IRAP, Toulouse, France)
- Maria-Eliana Escobar (IRAP, Toulouse, France)
- Dolorès Granat (IRAP, Toulouse, France)
- Fabrice Herpin (LAB, Bordeaux, France)
- Loïc Jahan (IRAP, Toulouse, France)
- Laurène Jouve (IRAP, Toulouse, France, co-chair)
- Nicole Le Gal (IRAP, Toulouse, France)
- Laura Léal (IRAP, Toulouse, France)
- Pascal Petit (IRAP, Toulouse, France)
- Pierre Vert (OMP, Toulouse, France)

EDITORS OF PROCEEDINGS

- Pascal Petit
- Moira Jardine
- Henk Spruit

Cambridge University Press

978-1-107-04498-2 — Magnetic Fields throughout Stellar Evolution (IAU S302)

Edited by Pascal Petit , Moira Jardine , Hendrik C. Spruit

Frontmatter

[More Information](#)

xiv

Conference photograph

CONFERENCE PHOTOGRAPH



Participants

a

Alicia Aarnio
 Costanza Argioffi
 Cristóbal Armaza
 Svitlana Artemenko
 Michel Aurière

b

Dilyara Baklanova
 Jérôme Ballot
 Fabienne Bastien
 Olga Bayandina
 Lionel Bigot
 David Bohlender
 Ana Borisova
 Sudeshna Boro Saikia
 Jonathan Braithwaite
 Allan Sacha Brun
 Varvara Butkovskaya

c

Matthieu Castro
 Corinne Charbonnel
 Patrick Crozet

d

Khalil Daifallah
 Alexandre David-Uraz
 José Dias do Nascimento
 Stephanie Douglas
 Natalia Drake

f

Rim Fares
 marianne faurobert
 Gregory Feiden
 Colin Folsom
 Nathalia Fonseca
 Yori Fournier
 Kotaro Fujisawa

g

Rafael Garcia
 Thomas Gastine
 Philippe Gondoin
 Konstantinos Gourgouliatos

Scott Gregory
 Jose Groh
 Jason Grunhut

h

Elodie Hébrard
 Huib Henrichs
 Fabrice Herpin
 Masaya Higa
 Wynn Ho
 Gaitee Hussain

i

Elisa Iñiguez Garin

j

Moira Jardine
 Sandra Jeffers
 Colin Johnstone
 Laurène Jouve
 Aaron Juarez

k

Viktor Khalack
 Oleg Kochukhov
 Renada Konstantinova-Antova
 Heidi Korhonen
 Zsolt Kovari
 Levente Kriskovics
 Dmitry Kudryavtsev
 Manfred Küker
 Andreas Künstler
 Ryuichi Kurosawa

l

Norbert Langer
 Andrea Lavagno
 Agnès Lèbre
 Jyri Lehtinen
 Roxanne Ligi
 François Lignières
 Stuart Littlefair
 Edward Liverts
 Joe Llama
 Arturo Lopez Ariste

Participants

xvii

m

Stephen Marsden
 Alexander Martin
 Stéphane Mathis
 Titos Matsakos
 Luiz Mendes
 Sergio Miranda Aranguren
 Joe Mitchell
 David Montes

n

Silvana Navarro
 Coralie Neiner

o

Stanley Owocki

p

Ana Palacios
 Pascal Petit
 Véronique Petit
 Nikolai Piskunov
 Mikhail Pogodin
 Katja Poppenhaeger
 Ralph Pudritz

r

Julio Ramirez
 Denis Rastegaev
 Nanda Rea
 Ansgar Reiners
 Timo Reinhold
 Andreas Reisenegger
 Claudia Rodrigues
 Rachael Roettenbacher

Iosif Romanyuk
 Lisa Rosén
 thierry Roudier
 Naum Rusomarov

s

Laurence Sabin
 Victor See
 Evgeny Semenko
 Denis Shulyak
 Aditi Sood
 Hendrik Spruit
 Deniss Stepanovs

t

Svetla Tsvetkova

v

Adriana Valio
 Krisztián Vida
 Aline Vidotto
 Conrad Vilela-Lewandowski
 Wouter Vlemmings

w

Gregg Wade
 Lucianne Walkowicz
 Joern Warnecke
 Andrew West
 Nicholas Wright

y

Rakesh Yadav
 Ilya Yakunin