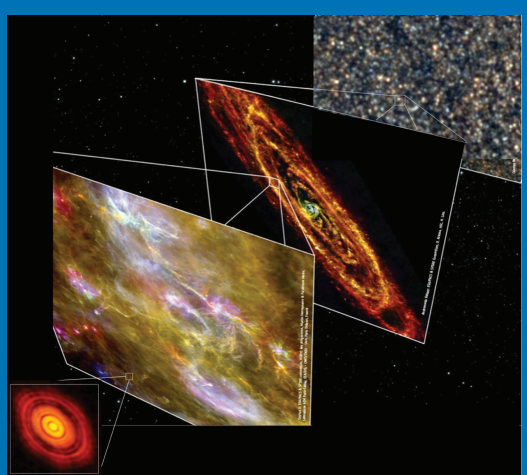
IAU Symposium
315
3–7 August 2015
Honolulu, USA

Proceedings of the International Astronomical Union

From Interstellar Clouds to Star-forming Galaxies: Universal Processes?

Edited by

Pascale Jablonka
Philippe André
Floris van der Tak



ISSN 1743-9213

International Astronomical Union

CAMBRIDGE UNIVERSITY PRESS

FROM INTERSTELLAR CLOUDS TO STAR-FORMING GALAXIES: UNIVERSAL PROCESSES?

IAU SYMPOSIUM 315

COVER ILLUSTRATION:

Overview of the star-forming structures which were discussed in Symposium 315. From top right to bottom left: High-redshift star-forming galaxies as observed by Herschel in the GOODS-N deep field (HerMES project); Andromeda galaxy as imaged by Herschel (HELGA project); structure of the Cygnus X Giant Molecular Cloud as revealed by Herschel in our own galaxy (HOBYS project); detailed substructures unveiled by ALMA in the protoplanetary disk surrounding the young star HL Tauri.

https://doi.org/10.1017/S1743921316008620 Published online by Cambridge University Press

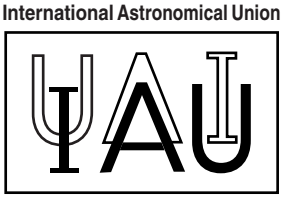
IAU SYMPOSIUM PROCEEDINGS SERIES

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



FROM INTERSTELLAR CLOUDS TO STAR-FORMING GALAXIES: UNIVERSAL PROCESSES?

PROCEEDINGS OF THE 315th SYMPOSIUM OF THE INTERNATIONAL ASTRONOMICAL UNION HELD IN HONOLULU, HAWAII, UNITED STATES AUGUST 3–7, 2015

Edited by

PASCALE JABLONKA
EPFL, Switzerland

PHILIPPE ANDRÉ
CEA - AIM Paris-Saclay, France

and

FLORIS VAN DER TAK
SRON & University of Groningen, The Netherlands

CAMBRIDGE UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS
University Printing House, Cambridge CB2 8BS, United Kingdom
32 Avenue of the Americas, New York, NY 10013, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

First published 2016

Printed in the UK by Bell & Bain, Glasgow, UK

Typeset in System LaTeX 2ε

A catalogue record for this book is available from the British Library Library of Congress Cataloguing in Publication data

This journal issue has been printed on FSC^{TM}-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 9781107135208 hardback
ISSN 1743-9213

Table of Contents

https://doi.org/10.1017/S1743921316008620 Published online by Cambridge University Press

Origin and universality of the IMF

Formation and evolution of dense cores

Formation and evolution of protostellar disks

Formation and early evolution of stellar clusters

https://doi.org/10.1017/S1743921316008620 Published online by Cambridge University Press

Comparison of low-mass and high-mass star formation

Star formation laws, rates, thresholds in galaxies

Nearby universe (dwarfs and massive systems, ellipticals, spirals)

AGN, Starbursts, Feedback

Main-sequence disks versus starburst galaxies

https://doi.org/10.1017/S1743921316008620 Published online by Cambridge University Press

Comparison of low and high redshift star formation

https://doi.org/10.1017/S1743921316008620 Published online by Cambridge University Press

Preface

The link between the structure of the interstellar medium in galaxies and the star formation process on both local and global scales is one of the fastest growing areas of astrophysical research. The availability of wide-field far-infrared and submillimeter surveys with, e.g., the *Spitzer*, *Herschel*, *Planck*, *Wise*, and *Akari* space observatories, coupled with the much improved capabilities of ground-based millimeter and submillimeter interferometers, have led to spectacular and decisive steps forward in our understanding of star formation modes from solar system scales (tens of AUs) to global (kpc) scales in galaxies.

The goal of Symposium 315 was to start building up a coherent picture of how star formation is fuelled on a wide range of scales. Our ambition was to bring together researchers working on star formation throughout the Universe from nearby clouds to local galaxies to the first star-forming galaxies at high redshift, and to make connections between the most recent observations and the most advanced numerical simulations. We wished to foster discussions around the fundamental question of whether the dominant mode of star formation is quasi-universal or environment-dependent, we encouraged debates on a number of critical issues such as the origin and universality of the stellar initial mass function, the nature of star formation 'laws', and the role of feedback.

We are grateful to the SOC members for their help, exquisite expertise and generous share of their time, and we warmly thank all the participants for the high quality of their talks and posters. May these proceedings reflect the enthousiasm we put in the organisation of this symposium that was held during the 2015 IAU general assembly.

Lausanne / Saclay / Groningen, Spring 2016,

Pascale Jablonka, Philippe André, and Floris van der Tak, co-chairs of the SOC

THE ORGANIZING COMMITTEE

The Chairs

Pascale Jablonka (EPFL, Switzerland)
Philippe André (CEA - AIM Paris-Saclay, France)
Floris van der Tak (SRON & University of Groningen, The Netherlands)

The SOC

Susanne Aalto (Chalmers University, Onsala, Sweden)
Yuri Aikawa (Kobe University, Japan)
Frank Bigiel (University of Heidelberg, Germany)
Alberto Bolatto (University of Maryland, USA)
Françoise Combes (Observatoire de Paris, France)
Steve Eales (Cardiff University, United Kingdom)
Neal Evans (University of Texas, Austin, USA)
Daisuke Iono (National Astronomical Observatory of Japan, Tokyo, Japan)
Jeremy Lim (University of Hong Kong, Hong-Kong)
Eve Ostriker (Princeton University, USA)
Monica Rubio (Universidad de Chile, Santiago, Chile)
Kazushi Sakamoto (Academia Sinica, Taipei, Taiwan)
Jonathan Williams (University of Hawaii, Honolulu, USA)

Acknowledgements

This symposium was sponsored by the Ecole Polythechnique Fédérale de Lausanne (EPFL, Switzerland), the Netherlands Institute for Space Research (SRON, The Netherlands), and Commissariat à l'énergie atomique et aux énergies alternatives (CEA, France). It was supported by the IAU Divisions J (Galaxies and Cosmology) and H (Interstellar Matter and Local Universe)