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The Diffuse Interstellar Bands

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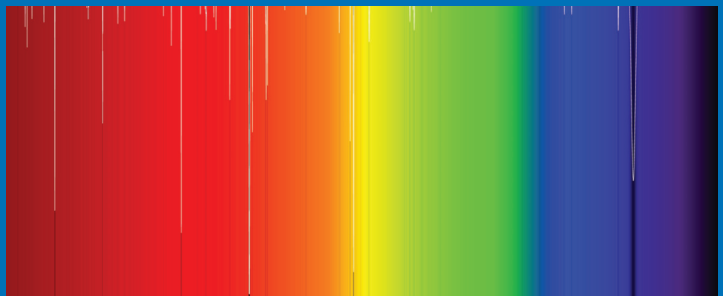
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THE DIFFUSE INTERSTELLAR BANDS

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COVER ILLUSTRATION:

A colorful representation of the enigmatic diffuse interstellar band spectrum. Figure by J. Cami based on the DIB survey by Hobbs *et al.* (2009) for the well-known DIB target HD 183143.

IAU SYMPOSIUM PROCEEDINGS SERIES

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THE DIFFUSE INTERSTELLAR BANDS

PROCEEDINGS OF THE 297th SYMPOSIUM OF
THE INTERNATIONAL ASTRONOMICAL UNION
HELD IN NOORDWIJKERHOUT,
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MAY 20–24, 2013

Edited by

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These proceedings are dedicated to George H. Herbig, a pioneer in the study of the diffuse interstellar bands.



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Preface

The first symposium on the Diffuse Interstellar Bands (DIBs) was organized in Boulder, Colorado in 1994. Its proceedings, edited by Ted Snow and Xander Tielens, have been seminal in summarizing the status of DIB research and introducing novel concepts for further development. After almost two decades of progress in the field of DIBs and related sciences, ranging from astronomical observations and laboratory astrophysics to theoretical quantum chemistry, it became time to draw up progress again and to mark new milestones towards future endeavors.

The first whispers for a follow up Symposium fully devoted to DIBs were uttered at very informal gatherings during IAU Symposium No. 280 “The Molecular Universe” on Astrochemistry, in Toledo, Spain, May 2011. The first official steps to organize this IAU DIB symposium were taken in the fall of 2011, with the submission of a Letter of Intent and later a Full Proposal to the IAU to organize a five days symposium in the Netherlands in May 2013.

The Scientific Organization Committee strove to embed the discussion of DIBs and their carriers within a broad scientific scope, covering many related fields, ranging from astronomical observations, and laboratory based research to chemical modeling and theoretical computations, and to link DIBs to other spectroscopic phenomena and future facilities. The ambition for this Symposium has been to bring together the world leading specialists in DIB research and to stimulate interactions between complementary fields of expertise. Following endorsement and sponsoring by IAU Commissions and Divisions and subsequent approval by the IAU Executive Committee in April 2012, speakers were invited and the community at large informed. The latter responded with great enthusiasm and in Noordwijkerhout we could welcome over 100 astronomers from 21 countries. The program revolved around 28 invited reviews papers and 17 oral contributions and some 40 poster papers. A scientific summary of the science presented during IAU Symposium 297 is presented in these Proceedings.

This Symposium would not have been possible without the financial support of our sponsors, who we gratefully acknowledge on page xii. We also wish to specifically express our gratitude to all members of the SOC and LOC, for realizing the numerous details associated with the organization of an IAU symposium.

*Jan Cami, Nick Cox, and Harold Linnartz,
co-chairs SOC, Noordwijkerhout, May 20, 2013*



THE ORGANIZING COMMITTEE

Scientific

Jan Cami (co-chair, Canada)	Harold Linnartz (co-chair, NL)
Martin Cordiner (USA)	Farid Salama (USA)
Nick Cox (co-chair, Belgium)	Peter Sarre (UK)
Pascale Ehrenfreund (NL)	Timothy Schmidt (Australia)
Gazinur Galazutdinov (Chile)	Ted Snow (USA)
Cornelia Jäger (Germany)	Paule Sonnentrucker (USA)
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Local

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Lex Kaper	Liesbeth van der Veld
Harold Linnartz (chair)	Anton Walsh
Xander Tielens	Dongfeng Zhao

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 NWO (Nederlandse Organisatie voor Wetenschappelijk Onderzoek),
 Sackler Laboratory for Astrophysics,
 Sterrewacht Leiden,
 Stichting Physica,
 and Western University (Physics & Astronomy)
 is gratefully acknowledged.

Address by the Local and Scientific Organizing Committee (adapted from the book of abstracts)

Dear colleagues,

Welcome to the Netherlands, welcome to the 297th Symposium of the International Astronomical Union, fully dedicated to the long-standing problem associated with the identification of the diffuse interstellar bands. This week more than 100 scientists, active in observational astronomy, laboratory astrophysics, molecular spectroscopy, and interstellar chemistry will discuss the state-of-the-art in DIB research. And there is much to discuss. There has been substantial progress in each of these individual fields since the last (and only) DIB conference nearly 20 years ago in Boulder, and the present meeting will provide a much needed update on the current status on DIB research from very different points of view.

Our goal is to encourage interactions between researchers that continue to improve our understanding of the diffuse interstellar medium and provide a roadmap for future research possibly leading to the identification of DIB carriers. At the same time, this interdisciplinary meeting will provide a stimulus to the many new and young researchers that entered the field in the last years. With IAU support it has been possible to allow many of them to attend.

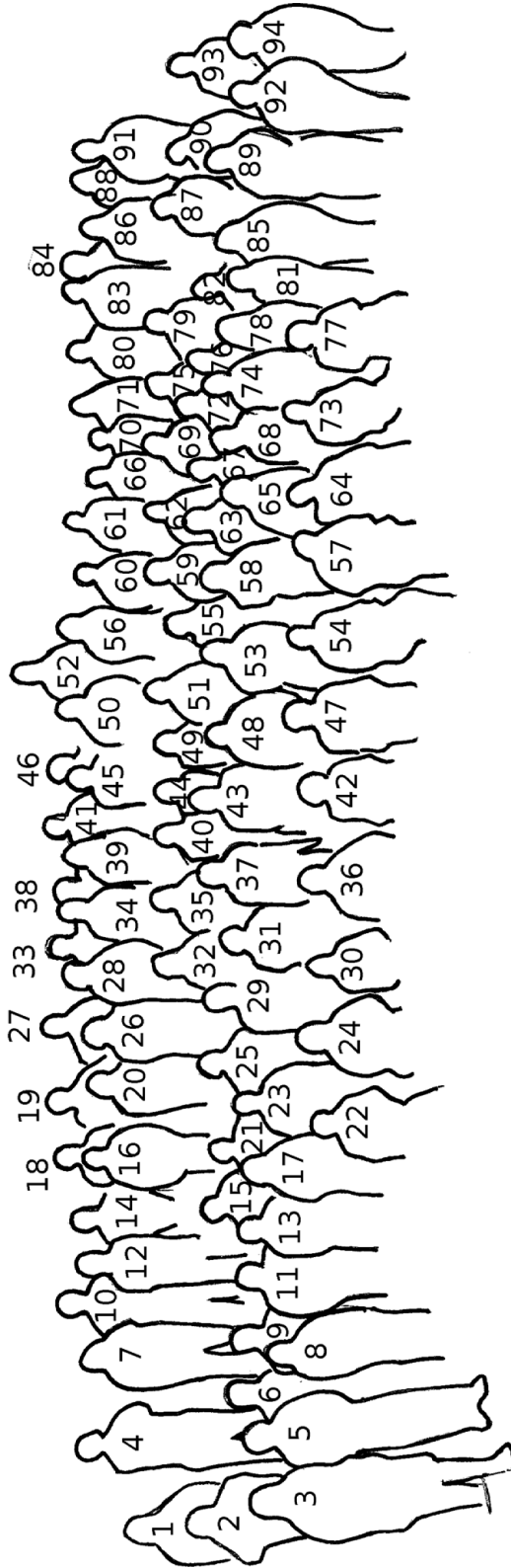
The meeting is organized along six topics. With more than 40 talks and nearly 50 posters (available from Tuesday through Thursday) we look forward to an intense and interesting program. However, we also have reserved ample time for discussions, during the breaks, the poster session on Tuesday, the social event on Wednesday and in the evenings.

We are deeply grateful to several institutions for their financial and organizing support: the International Astronomical Union, ANDOR Technology, FOM, KNAW, KU Leuven, LKBF, LOT Quantum Design, NOVA, NWO (astrochemistry program), Sackler Laboratory Astrophysics, Sterrewacht Leiden, Stichting Physica, and Western University.

Thank you very much, and welcome on behalf of the LOC and SOC.

*Harold Linnartz, Jan Cami, Nick Cox
Noordwijkerhout, The Netherlands, May 20th 2013.*





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|---------------------|-----------------------|-------------------------|
| 1. J. Hu | 33. B. Draine | 65. S. Kwok |
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| 17. P. Jensen | 49. V. Wakelam | 81. K. Doney |
| 18. H. Khosroshahi | 50. H. Linnartz | 82. P. Mehta |
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| 30. N. Wehres | 62. G. Rouillé | 94. T. Weselak |
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| 32. A. Farhang | 64. F. Huisken | |

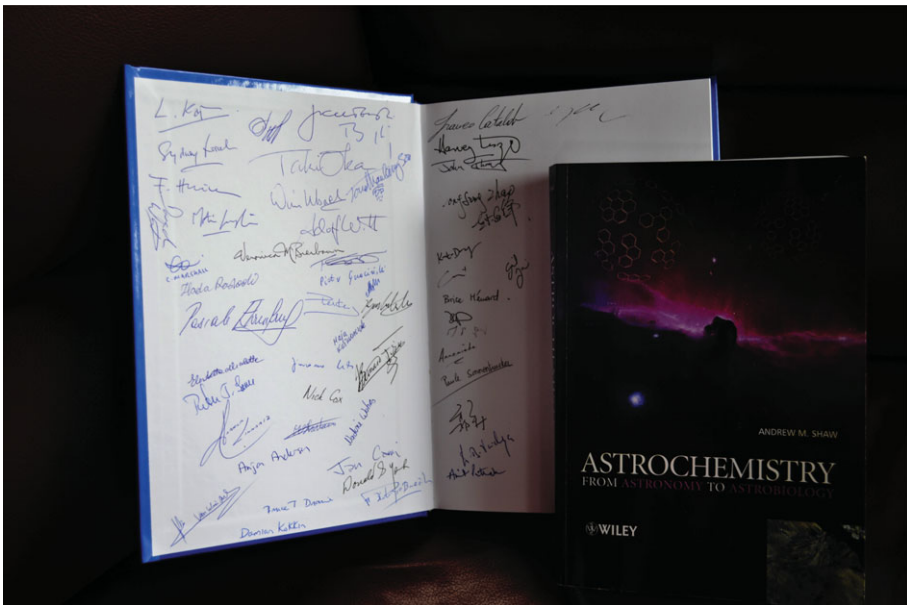
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 Holger S.P. **Müller**, Physikalisches Institut, Universität zu Köln, Germany
 Pablo C. **Nash**, Leiden Observatory, The Netherlands
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 Amit **Pathak**, Tezpur University, India
 Els **Peeters**, The University of Western Ontario, Canada, and SETI institute, USA
 Annemieke **Petrignani**, Leiden Observatory & FOM Institute Rijnhuizen, The Netherlands
 Thomas **Pino**, ISMO - CNRS, France
 Dovi **Poznanski**, Tel Aviv University, Israel
 Lucky **Puspitarini**, GEPI, Observatoire de Paris, France
 Hoda **Rashedi**, The University of Western Ontario, Canada
 Mark G. **Rawlings**, National Radio Astronomy Observatory, USA
 Evelyne **Roueff**, LUTH, Observatoire de Paris, Meudon, France
 G ael **Rouille**, MPI for Astronomy, Friedrich Schiller University Jena, Germany
 Hossein R. **Sadeghpour**, Harvard-Smithsonian Center for Astrophysics, USA
 Peter **Sarre**, The University of Nottingham, UK
 Daan **Schram**, Eindhoven University Technology, The Netherlands
 Keith T. **Smith**, Royal Astronomical Society, UK
 Ted **Snow**, University of Boulder, USA
 Paule **Sonnentrucker**, Space Telescope Science Institute, USA
 Mathias **Steglich**, Department of Chemistry, University of Basel, Switzerland
 Johnathan **Tenysson**, Department of Physics and Astronomy, University College London, UK
 John **Thrower**, Aarhus University, Denmark
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 Deepak **Vaidya**, ICCSIR, India
 Jacco **van Loon**, Keele University, UK
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 Anton **Walsh**, Leiden Observatory, the Netherlands
 Darach **Watson**, Dark Cosmology Centre, Niels Bohr Institute, University of Copenhagen, Denmark
 Nadine **Wehres**, University of Colorado, Boulder, USA
 Dan **Welty**, University of Chicago, USA
 Tomasz **Weselak**, Institute of Physics, Kazimierz Wielki University, Poland
 Adolf **Witt**, University of Toledo, USA
 Donald G. **York**, University of Chicago, USA
 Brian **York**, Space Telescope Science Institute, USA
 Miroslaw **Zachwieja**, Atomic and Molecular Physics Laboratory, University of Rzesz w, Poland
 Gail **Zasowski**, The Ohio State University, USA
 Dongfeng **Zhao**, Leiden Observatory, the Netherlands
 Hui **Zhu**, National Astronomical Observatories, CAS, China

Poster Prizes



Poster Prize Winners:

Dovi Poznanski *et al.*

“A new view of DIBs and dust extinction from low resolution SDSS spectra”

Hoda Rashedi *et al.*

“Relating diffuse interstellar band strengths to line of sight properties”