

Table of Contents

Preface	xi
Organizing Committee.....	xii
Address by the Local and Scientific Organizing Committees.....	xiii
Conference Photograph	xiv
Conference Participants.....	xvii

PART I. OVERALL PROPERTIES OF THE DIFFUSE INTERSTELLAR BANDS

Chairs: Nick Cox, Gazinur Galazutdinov, Pascale Ehrenfreund, Jan Cami

Diffuse Interstellar Bands: Past and Present	3
<i>T. P. Snow</i>	
Modern DIB Surveys and DIB Environmental Behavior	13
<i>P. Sonnentrucker</i>	
Diffuse Interstellar Bands: Families and Correlations	23
<i>J. Krelowski</i>	
Diffuse Interstellar Band Profiles	34
<i>P. J. Sarre</i>	
Extragalactic Diffuse Interstellar Bands: A Universal Problem	41
<i>M. A. Cordiner</i>	
Exploring the Limits to Observational Diffuse Interstellar Band Studies	51
<i>B. H. Foing</i>	
A Sensitive Spectral Survey of Interstellar Features in the Near-UV [3040-3700Å]	58
<i>N. H. Bhatt & J. Cami</i>	
New Infrared Diffuse Interstellar Bands in the Galactic Center and Elsewhere ..	64
<i>T. R. Geballe</i>	
Near-IR Diffuse Interstellar Bands in SDSS-III APOGEE Spectra	68
<i>G. Zasowski & B. Ménard</i>	
Diffuse Interstellar Bands in M33	74
<i>K. T. Smith, M. A. Cordiner, C. J. Evans, N. L. J. Cox & P. J. Sarre</i>	
Putting the Diffuse Interstellar Bands on the Map – Literally!	79
<i>J. Th. van Loon</i>	
Probing the Local Bubble with Diffuse Interstellar Bands	84
<i>A. Farhang, H. G. Khosroshahi, A. Javadi & J. van Loon</i>	

Anomalously Broad Diffuse Interstellar Bands and Excited CH ⁺ Absorption in the Spectrum of Herschel 36	89
<i>D. G. York, J. Dahlstrom, D. E. Welty, T. Oka, L. M. Hobbs, S. Johnson, S. D. Friedman, Z. Jiang, B. L. Rachford, T. P. Snow, R. Sherman & P. Sonnentrucker</i>	
Analysis of Anomalous Diffuse Interstellar Bands in the Spectrum of Herschel 36	94
<i>T. Oka, D. E. Welty, S. Johnson, D. G. York, J. Dahlstrom & L. M. Hobbs</i>	
The Properties of Near-Infrared Diffuse Interstellar Bands	100
<i>M. G. Rawlings, A. J. Adamson, B. J. McCall & T. H. Kerr</i>	
X-Shooter Survey of Near-Infrared DIBs	103
<i>N. L. J. Cox, J. Cami, L. Kaper, B. H. Foing, P. Ehrenfreund, B. B. Ochsendorf, S. H. M. van Hooff & F. Salama</i>	
Type Ia Supernovae as Probes of the Interstellar Medium in Galaxies	106
<i>N. L. J. Cox & F. Patat</i>	
Automated Extraction of DIBs from Cool Star Spectra.....	110
<i>H.-Ch. Chen, R. Lallement, L. Puspitarini, P. Bonifacio, C. Babusiaux & V. Hill</i>	
Towards Extraction of Massive DIB Datasets from Stellar Spectroscopic Surveys	113
<i>R. Lallement, H. C. Chen, L. Puspitarini, P. Bonifacio, C. Babusiaux & V. Hill</i>	
First Results from a Study of DIBs with Thousands of High-Quality Massive-Star Spectra	117
<i>J. Maíz Apellániz, A. Sota, R. H. Barbá, N. I. Morrell, A. Pellerin, E. J. Alfaro & S. Simón-Díaz</i>	
C ₂ and Diffuse Interstellar Bands.....	121
<i>M. Kaźmierczak, M. Schmidt, T. Weselak, G. Galazutdinov & J. Krelowski</i>	
DIBs Broadening with Increased Abundance of Vibrationally Excited H ₂ Molecules	125
<i>P. Gnaciński & J. Krelowski</i>	
Spatial Correlations of Selected DIBs to the CH and CH ⁺ Molecules.....	128
<i>T. Weselak & J. Krelowski</i>	
Relating Diffuse Interstellar Band Strengths to Line of Sight Properties	132
<i>H. Rashedi, J. Cami, N. L. J. Cox & H. van Winckel</i>	
A Possible New Sequence of DIBs	135
<i>A. Bondar & J. Krelowski</i>	
Behaviour of the Broadest DIBs as a Function of E(B–V)	138
<i>B. York, P. Sonnentrucker, L. M. Hobbs, D. G. York, S. D. Friedman, J. Dahlstrom, D. E. Welty, T. P. Snow & B. L. Rachford</i>	
Diffuse Interstellar Bands as Probes of Small-Scale Interstellar Structure	141
<i>K. T. Smith, M. A. Cordiner & P. J. Sarre</i>	

PART II. DIBS AND THEIR RELATION TO THE OTHER INTERSTELLAR COMPONENTS AND ASTRONOMICAL PHENOMENA

Chairs: Jacek Krętowski, Sun Kwok

DIBs, Interstellar Dust, and Extinction	147
<i>G. C. Clayton</i>	
Diffuse Interstellar Bands: How are They Related to Known Gas-Phase Constituents of the ISM?	153
<i>D. E. Welty</i>	
What Microwave Astronomical Spectroscopy can Tell You about the Carriers of the DIBs	163
<i>H. Liszt, R. Lucas, J. Pety & M. Gerin</i>	
Blue Luminescence and Extended Red Emission: Possible Connections to the Diffuse Interstellar Bands	173
<i>A. N. Witt</i>	
Why is the Red Rectangle Unique?	180
<i>H. Van Winckel</i>	
The Infrared Emission Bands	187
<i>E. Peeters</i>	
Herschel/HIFI Discovery of a Far-Infrared DIB Analog	197
<i>H. S. P. Müller, P. Schilke, M. Gerin, D. C. Lis, E. A. Bergin, J. C. Pearson, M. De Luca & J. H. Black</i>	
Detection of the Buckminsterfullerene Cation (C_{60}^+) in Space	203
<i>O. Berné, G. Mulas & C. Joblin</i>	
Diffuse Interstellar Bands in (Proto-) Fullerene-Rich Environments	208
<i>D. A. García-Hernández</i>	
Organic Nanoparticles as a Component of the Interstellar Medium	213
<i>S. Kwok</i>	
$\lambda 4430$ Emission by Comet Hyakutake	216
<i>M. F. A'Hearn, D. D. Wellnitz & R. Meier</i>	
Unidentified Species in Envelopes Around Carbon Stars	219
<i>B. W. Jiang, A. Li, K. Zhang, J. M. Liu, J. Gao & A. Mishra</i>	
A Catalog of Diffuse Interstellar Bands in Fullerene-Containing Planetary Nebulae	223
<i>A. Manchado, J. J. Díaz-Luís, D. A. García-Hernández & F. Cataldo</i>	
Search for DIBs in Emission: MWC 922 - The Red Square Nebula	226
<i>N. Wehres, B. Ochsendorf, J. Bally, T. Snow, V. Bierbaum, N. L. J. Cox, L. Kaper & A. G. G. M. Tielens</i>	
Two GeV-TeV Supernova Remnants without Associated Neutral and Molecular Clouds	229
<i>W. Tian, D. Leahy, H. Zhu & H. Su</i>	

Kinematic Distance of Galactic Radio Objects	232
<i>H. Zhu, W. Tian, H. Su & D. Wu</i>	

PART III. LABORATORY ASTROPHYSICS STUDIES OF DIB CARRIER (RELATED) CANDIDATES

Chairs: Harold Linnartz, Thomas Pino, Wim Ubachs

Laboratory Electronic Spectra of Carbon Chains and Rings	237
<i>L. N. Zack & J. P. Maier</i>	
Laboratory Spectroscopy of PAHs	247
<i>T. Pino, G. Féraud, Ph. Bréchnignac, E. J. Bieske & T. W. Schmidt</i>	
Laboratory Studies of Ion Chemistry in the Interstellar Medium	258
<i>V. M. Bierbaum</i>	
Laboratory Studies on the Role of PAHs as DIB Carriers	265
<i>F. Huiskens, G. Rouillé, M. Steglich, Y. Carpentier, C. Jäger & Th. Henning</i>	
Polyynyl-Substituted PAH Molecules and DIB Carriers	276
<i>G. Rouillé, C. Jäger, F. Huiskens & T. Henning</i>	
Broadband Cavity Enhanced Absorption Spectroscopy: A New Approach to Search for DIB Carriers	281
<i>A. J. Walsh, D. Zhao, W. Ubachs & H. Linnartz</i>	
A Novel Approach to the Detection and Characterization of PAH Cations and PAH-Photoproducts	286
<i>D. L. Kokkin, A. Simon, C. Marshall, A. Bonnamy & C. Joblin</i>	
Developments of Optical Spectrometers as Approaches to Diffuse Interstellar Bands	291
<i>M. Araki, S. Uchida, N. Kondo, Y. Matsushita, K. Abe, K. Ito & K. Tsukiyama</i>	
Spectroscopy of Fullerenes, Fulleranes and PAHs in the UV, Visible and Near Infrared Spectral Range	294
<i>F. Cataldo, D. A. García-Hernández, A. Manchado & S. Iglesias-Groth</i>	
The 4051 Å Comet Band of $^{13}C_3$	297
<i>M. A. Haddad, D. Zhao, H. Linnartz & W. Ubachs</i>	

PART IV. THEORETICAL MODELING APPROACHES

Chairs: Don York, Bruce Draine

Carbon Interstellar Chemistry: Theory Versus Observations	303
<i>V. Wakelam</i>	
Diffuse Cloud Models: Successes and Challenges	311
<i>E. Roueff, M. Ruaud, F. Le Petit, B. Godard & J. Le Bourlot</i>	
Observational Constraints for Modeling Diffuse Molecular Clouds	321
<i>S. R. Federman</i>	

Spectra of Hot Molecules of Astrophysical Importance: an Update on the ExoMol Project	330
<i>J. Tennyson & S. N. Yurchenko</i>	
The Stability of Cosmic Fullerenes and Fullerenic Aggregates	339
<i>E. R. Micelotta, J. Cami, E. Peeters, H. Zettergren, H. T. Schmidt, H. Cederquist, A. P. Jones & A. G. G. M. Tielens</i>	
Theoretical Electronic and Rovibrational Studies for Anions of Interest to the DIBs	344
<i>R. C. Fortenberry</i>	
Theoretical Investigation of PAHs: Implications to Diffuse Interstellar Bands . . .	349
<i>A. Pathak, M. Buragohain, M. Hammonds & P. J. Sarre</i>	
Dynamics of Synthesis of Large Carbon Structures in the Interstellar Medium . .	353
<i>N. Patra & H. R. Sadeghpour</i>	

PART V. THE DIB CARRIER CANDIDATES

Chair: Peter Sarre

Solid State DIBs	359
<i>H. Linnartz</i>	
A Critical Review of PAHs as DIB Carriers - Progress and Open Questions	364
<i>F. Salama & P. Ehrenfreund</i>	
Can Fullerene Analogues be the Carriers of the Diffuse Interstellar Bands?	370
<i>J. Cami</i>	
H ₂ as a Possible Carrier of the DIBs?	375
<i>W. Ubachs</i>	
Dirty H ₂ Molecular Clusters as the DIB Sources: Spectroscopic and Physical Properties	378
<i>L. S. Bernstein, F. O. Clark & D. K. Lynch</i>	
Formation, Evolution and Destruction of Possible DIB Carriers: Dirty Molecular Hydrogen Ice Clusters	381
<i>D. K. Lynch, L. S. Bernstein & F. O. Clark</i>	
Composite Grains: Carriers of the Diffuse Interstellar Bands	384
<i>D. B. Vaidya & R. Gupta</i>	

PART VI. FUTURE DIRECTIONS IN DIB RESEARCH

Chair: Martin Cordiner

The Promise of Recent and Future Observatories and Instruments	389
<i>L. Kaper</i>	
Diffuse Interstellar Bands: The Way Forward	399
<i>A. G. G. M. Tielens</i>	
A Road Map for the Identification of the Diffuse Interstellar Band Carriers	412
<i>N. L. J. Cox & J. Cami</i>	
Author index	416