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Mark Booth

Brenda C. Matthews

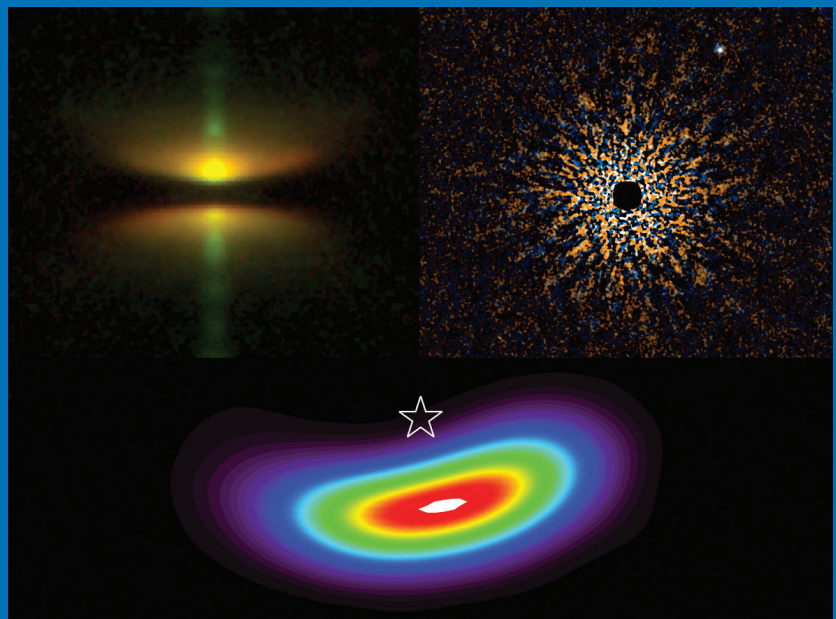
James R. Graham

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EXPLORING THE FORMATION AND EVOLUTION
OF PLANETARY SYSTEMS

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COVER ILLUSTRATION: FROM DISKS TO PLANETS

Top left: HST imaging of the protoplanetary disk SSTtau J042021+281349, remarkable for its lateral symmetry and spectacular bipolar jet, highlighted by the F606W filter of HST (Duchêne *et al.*, this work).

Bottom: ALMA image of dust trapped in a ring around the Herbig Ae star Oph IRS 48. The dust and gas cavities of this protoplanetary disk are completely resolved in this 0.2'' resolution image (van der Marel *et al.*, this work).

Top right: Subaru direct imaging of the planetary companion GJ 504b which orbits a sun-like star 18 pc from the Earth. The projected distance of the planet from the star is 44 AU (Kuzuhara, M *et al.* 2013, ApJ, 774, 11).

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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

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PROCEEDINGS OF THE 299th SYMPOSIUM OF
THE INTERNATIONAL ASTRONOMICAL UNION
HELD IN VICTORIA, CANADA
JUNE 2 – 7, 2013

Edited by

MARK BOOTH

*Instituto de Astrofísica, Pontificia Universidad Católica de Chile, Vicuña
Mackenna 4860, 7820436 Macul, Santiago, Chile*

University of Victoria, BC, Canada

National Research Council of Canada Herzberg Astronomy & Astrophysics

BRENDA C. MATTHEWS

National Research Council of Canada, Herzberg Astronomy & Astrophysics

University of Victoria, BC, Canada

and

JAMES R. GRAHAM

University of California, Berkeley, CA, U.S.A.



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Table of Contents

Preface	xvii
The Organizing Committee.....	xviii
Conference Photo.....	xix
Conference Participants.....	xx
Address from the LOC/SOC.....	xxiii

Session 1. High Contrast AO Imaging: Latest Results in Direct Exoplanet Imaging

Chair: René Doyon

Detecting and Characterizing Exoplanets with Direct Imaging: Past, Present and Future	1
<i>B. Biller</i>	
SEEDS: Strategic Explorations of Exoplanets and Disks with Subaru	12
<i>M. Tamura & the SEEDS team</i>	
Results of the NaCo Large Program: probing the occurrence of exoplanets and brown dwarfs at wide orbit	17
<i>A. Vigan, G. Chauvin, M. Bonavita, S. Desidera, M. Bonnefoy, D. Mesa, J.-L. Beuzit, J.-C. Augereau, B. Biller, A. Boccaletti, E. Brugaletta, E. Buenzli, J. Carson, E. Covino, P. Delorme, A. Eggenberger, M. Feldt, J. Hagelberg, T. Henning, A.-M. Lagrange, A. Lanza fame, F. Ménard, S. Messina, M. Meyer, G. Montagnier, C. Mordasini, D. Mouillet, C. Moutou, L. Mugnier, S. P. Quanz, M. Reggiani, D. Ségransan, C. Thalmann, R. Waters & A. Zurlo</i>	
Search for cool extrasolar giant planets combining coronagraphy, spectral and angular differential imaging.....	21
<i>A.-L. Maire, A. Boccaletti, J. Rameau, G. Chauvin, A.-M. Lagrange, M. Bonnefoy, S. Desidera, M. Sylvestre, P. Baudoz, R. Galicher & D. Mouillet</i>	
The Large Binocular Telescope Interferometer & Adaptive Optics System: On-sky Performance and Results.....	26
<i>V. Bailey, P. Hinz, V. Vaitheeswaran, A. Skemer, D. Defrère, T. Rodigas, S. Esposito, E. Pinna & A. Puglisi</i>	
Quick-MESS: A fast statistical tool for Exoplanet Imaging Surveys.....	28
<i>M. Bonavita, E. De Mooij, R. Jayawardhana & R. Gratton</i>	
Archival Legacy Investigation of Circumstellar Environments using KLIP algorithm on HST NICMOS coronagraphic data	30
<i>E. Choquet, J. B. Hagan, L. Pueyo, M. D. Perrin, D. C. Hines, C. Chen, G. Schneider, J. Debes, D. Golimowski, N. Reid, T. Mittal, M. Moerchen, M. N'Diaye, A. Rajan, S. Lonsdale & R. Soummer</i>	

Visible AO Observations at Halpha for Accreting Young Planets	32
<i>L. M. Close, K. Follette, J. R. Males, K. Morzinski, T. J. Rodigas, P. Hinz, Y.-L. Wu, D. Apai, J. Najita, A. Puglisi, S. Esposito, A. Riccardi, V. Bailey, M. Komper, R. Briguglio & A. Weinberger</i>	
SCEXAO: First Results and On-Sky Performance.	34
<i>T. Currie, O. Guyon, F. Martinache, C. Clergeon, M. McElwain, C. Thalmann, N. Jovanovic, G. Singh & T. Kudo</i>	
Young Brown Dwarfs as Giant Exoplanet Analogs	36
<i>J. K. Faherty, K. L. Cruz, E. L. Rice & A. Riedel</i>	
GRAPHIC: The Geneva Reduction and Analysis Pipeline for High-contrast Imaging of Planetary Companions	38
<i>J. Hagelberg, D. Ségransan, S. Udry & F. Wildi</i>	
Successes and Challenges of the APP Coronagraph	40
<i>M. A. Kenworthy, S. Quanz, G. Otten, T. Meshkat, J. Codona, F. Snik, M. E. Meyer, M. Kasper & J. Girard</i>	
Estimation of Contaminants for Direct Imaging of Exoplanets: Constraint on the Stellar Distribution Model with both NIR and Deep Imaging Data	42
<i>M. Konishi, H. Shibai, T. Matsuo, K. Yamamoto, J. Sudo, M. S. Samland, M. Fukagawa, T. Sumi & SEEDS team</i>	
High-fidelity photometry and astrometry of high-contrast imaged companions using LOCI processing.	44
<i>J. Maire, J. Gagné, D. Lafrenière, J. R. Graham & R. Doyon</i>	
High Contrast Imaging of an Exoplanet with the Magellan VisAO Camera.	46
<i>J. R. Males, L. M. Close, K. M. Morzinski, D. Kopon, A. Puglisi, V. Gasho, K. Follette, S. Esposito, A. Riccardi, E. Pinna, M. Komper, R. Briguglio, C. Arcidiacono, P. M. Hinz, A. Uomoto, T. Hare, F. Quiros-Pacheco, J. Argomedo, L. Busoni, T. J. Rodigas & Y.-L. Wu</i>	
TLOCI: A Fully Loaded Speckle Killing Machine.	48
<i>C. Marois, C. Correia, J.-P. Veran & T. Currie</i>	
Companion search around Beta Pictoris with the newly commissioned L'-band vector vortex coronagraph on VLT/NACO	50
<i>D. Mawet, O. Absil, J. Milli, P. Baudoz, A. Boccaletti, G. Chauvin, C. Delacroix, J. H. Girard, A. M. Lagrange, J. O'Neal, P. Bourget, P. Forsberg, F. Gontte, S. Habraken, C. Hanot, M. Karlsson, M. Kasper, J.-L. Lizon, K. Muzic, R. Olivier, E. Peña, N. Slusarenko, L. E. Tacconi-Garman & J. Surdej</i>	
Solving for the Orbital Elements of Binary Systems using MCMC Simulations.	52
<i>K. Mede & T. D. Brandt</i>	
Performance Tests on the SPHERE-IFS	54
<i>D. Mesa, R. Gratton, R. U. Claudi, S. Desidera, E. Giro, A. Zurlo, A. Costille, A. Vigan, C. Moutou, J.-L. Beuzit, K. Dohlen, M. Feldt, D. Mouillet, J.-F. Sauvage, M. Kasper & J. Antichi</i>	

Testing Optimized Principal Component Analysis on Coronagraphic Images of the Fomalhaut System	56
<i>T. Meshkat, M. Kenworthy, S. P. Quanz & A. Amara</i>	
Polarimetry with the Gemini Planet Imager: Instrument Characterization and Future Science.	58
<i>M. Millar-Blanchaer, S. J. Wiktorowicz, M. D. Perrin, J. R. Graham, S. J. Thomas, D. Dillon, M. P. Fitzgerald, J. Maire, B. Macintosh & S. J. Goodsell</i>	
The Gemini NICI Planet-Finding Campaign: The Frequency of Giant Planets around Young B and A Stars	60
<i>E. L. Nielsen, M. C. Liu, Z. Wahhaj, B. A. Biller, T. L. Hayward & The Gemini NICI Planet-Finding Campaign Team</i>	
Exploring Exoplanetary Systems beyond 1AU with WFIRST	62
<i>M. T. Penny & B. S. Gaudi</i>	
Giant Planets around AF and M stars.	64
<i>J. Rameau, G. Chauvin, A.-M. Lagrange, P. Delorme & J. Lannier</i>	
Direct Imaging Of Long Period Radial Velocity Targets With NICI.	66
<i>G. S. Salter, C. G. Tinney, R. A. Wittenmyer, J. S. Jenkins, H. R. A. Jones & S. J. O'Toole</i>	
Campaign Scheduling and Analysis for the Gemini Planet Imager	68
<i>D. Savransky, B. A. Macintosh, J. Graham, Q. M. Konopacky & the GPI science team</i>	
LEECH: A 100 Night Exoplanet Imaging Survey at the LBT	70
<i>A. Skemer, D. Apai, V. Bailey, B. Biller, M. Bonnefoy, W. Brandner, E. Buenzli, L. Close, J. Crepp, D. Defrère, S. Desidera, J. Eisner, S. Esposito, J. Fortney, T. Henning, P. Hinz, K.-H. Hofmann, J. Leisenring, J. Males, R. Millan-Gabet, K. Morzinski, A. Oza, I. Pascucci, J. Patience, G. Rieke, D. Schert, J. Schlieder, M. Skrutskie, K. Su, G. Weigelt, C. E. Woodward & N. Zimmerman</i>	
Debris Disk Science with the Palomar ExAO System : First Results	72
<i>M. Wahl, S. Metchev, R. Patel, E. Serabyn, D. Mawet, R. Dekany, J. Roberts, R. Burruss, A. Bouchez, T. Truong, C. Baranec, S. Guiwits, D. Hale, J. Angione, T. Trinh, J. Zolkower, J. C. Shelton, D. Palmer, J. Henning, E. Croner, M. Troy, D. McKenna & J. Tesch</i>	
A Direct Imaging Study to Search for and to Characterize Planetary Mass Companions	74
<i>K. Ward-Duong, J. Patience, R. J. De Rosa, A. Rajan, P. Hinz, A. Skemer, K. Morzinski, J. Males, L. M. Close, D. W. McCarthy & C. Kulesa</i>	
Resolved Scattered Light Images of the Edge-On Protoplanetary Disk ESO H α 569	76
<i>S. Wolff, M. Perrin, K. Stapelfeldt, G. Duchêne, J. Krist, F. Ménard, D. Padgett & C. Pinte</i>	

IRDIS, the Dual-band Imager Camera of SPHERE: testing the performances in laboratory	78
<i>A. Zurlo, A. Vigan, C. Moutou, D. Mesa, R. Gratton, M. Langlois, J.-L. Beuzit, A. Costille, S. Desidera, K. Dolhen, C. Gry, F. Madec, D. Le Mignant, D. Mouillet & J.-F. Sauvage</i>	
Session 2. Peering into Circumstellar Disks: Transformative Interferometry & High Resolution Imaging	
<i>Chair: Meredith Hughes</i>	
Radio Interferometry Observations of the Hallmarks of Planet Formation	80
<i>S. Andrews</i>	
Planet formation in action: resolved gas and dust images of a transitional disk and its cavity	90
<i>N. van der Marel, E. F. van Dishoeck, S. Bruderer, T. Birnstiel, P. Pinilla, C. P. Dullemond, T. A. van Kempen, M. Schmalzl, J. M. Brown, G. J. Herczeg, G. S. Mathews & V. Geers</i>	
The VLTI/PIONIER Survey of Southern T Tauri Disks	94
<i>F. Anthonioz, F. Ménard, C. Pinte, W-F. Thi, J.-B. Lebouquin, J.-P. Berger, M. Benisty, O. Absil, G. Duchêne, B. Lazareff, F. Malbet, R. Millan-Gabet, W. Traub & G. Zins</i>	
HST Imaging of New Edge-on Circumstellar Disks in Nearby Star-forming Regions	99
<i>K. R. Stapelfeldt, G. Duchêne, M. Perrin, S. Wolff, J. E. Krist, D. L. Padgett, F. Ménard & C. Pinte</i>	
TW Hydrae: Multi-wavelength Interferometry of a Transition Disk	104
<i>Jonathan Menu, R. van Boekel, T. Henning, M. Benisty, C. J. Chandler, H. Linz, C. Waelkens, S. M. Andrews, N. Calvet, J. M. Carpenter, S. A. Corder, A. T. Deller, C. P. Dullemond, J. S. Greaves, R. J. Harris, A. Isella, W. Kwon, J. Lazio, L. G. Mundy, L. M. Perez, L. Ricci, A. I. Sargent, S. Storm, L. Testi & D. J. Wilner</i>	
Probing Planet Nurseries with Rare Isotopologues of CO	109
<i>S. E. Dodson-Robinson, M. Yu & K. Willacy</i>	
Panchromatic imaging and modeling of SSTtau J042021+281349: A new prototypical edge-on protoplanetary disk	111
<i>G. Duchêne, K. Stapelfeldt, A. Isella, M. Perrin, F. Ménard, D. Padgett, C. Pinte, S. Wolff, J. Krist, A. Ghez & Q. Konopacky</i>	
Can a planet explain different cavity sizes for small & large dust grains in transition disks?	113
<i>A. Garufi, H. Avenhaus & S. P. Quanz</i>	
Planet gaps in the dust layer of 3D proto-planetary disks: Observability with ALMA	115
<i>J.-F. Gonzalez, C. Pinte, S. T. Maddison & F. Ménard</i>	

First images from the PIONIER/VLTI optical interferometry imaging survey of Herbig Ae/Be stars.	117
<i>J. Kluska, F. Malbet, J.-P. Berger, M. Benisty, B. Lazareff, J.-B. Le Bouquin, F. Baron, C. Dominik, A. Isella, A. Juhasz, S. Kraus, R. Lachaume, F. Ménard, R. Millan-Gabet, J. D. Monnier, C. Pinte, W.-F. Thi, E. Thiebaut & G. Zins</i>	
Probing Protoplanetary Disks with Aperture Masking.	119
<i>S. Lacour, P. Tuthill & S. Casassus</i>	
The Inner Disks of EXor-type Eruptive Stars	121
<i>N. Sipos & Á. Kóspál</i>	
Session 3. Building Planets in Protoplanetary Disks: Earliest Evidence	
<i>Chair: Sarah Maddison</i>	
The Story of Planets: Anchoring Numerics in Reality	123
<i>Z. M. Leinhardt</i>	
Zooming in on the Formation of Protoplanetary Disks.	131
<i>A. Nordlund, T. Haugbolle, M. Kuffmeier, P. Padoan & A. Vasileiades</i>	
Planetesimal Formation.	136
<i>E. Chiang, R. Murray-Clay & J.-M. Shi</i>	
A Herschel View of Dust Evolution in Protoplanetary Disks.	140
<i>C. Espaillat</i>	
Substructure and Signs of Planet Formation in the disk of HD 169142	145
<i>M. Osorio, G. Anglada, C. Carrasco-González, J. M. Torrelles, P. D'Alessio, L. F. Rodríguez, N. Calvet, J. F. Gómez, J. M. Mayen-Gijon & W. R. F. Dent</i>	
Simultaneous Visible and Near-Infrared Variability of Classical T Tauri Stars . .	149
<i>Y. Aimi, M. Fukagawa, T. Yasuda, T. Yamashita, K. Kawabata, M. Uemura, A. Arai, M. Sasada, T. Ohsugi, M. Yoshida & H. Shibai</i>	
A First Look at the Disk Population in the Auriga-California Molecular Cloud .	151
<i>H. Broekhoven-Fiene, B. C. Matthews, P. M. Harvey and members of the Spitzer Gould Belt Survey</i>	
Ice Lines in Circumbinary Protoplanetary Disks.	153
<i>C. D. Clanton</i>	
The Different Faces of Transitional Discs.	155
<i>M. de Juan Ovelar, M. Min, C. Dominik, C. Thalmann, P. Pinilla, M. Benisty & T. Birnstiel</i>	
Dynamics of the Inner Edge of the Dead Zone in Protoplanetary Disks.	157
<i>J. Faure, S. Fromang & H. Latter</i>	
Visible Light Adaptive Optics Imaging of the Orion 218-354 Silhouette Disk . .	159
<i>K. B. Follette, L. M. Close, J. R. Males, D. Kopon, Y.-L. Wu, K. M. Morzinski¹, P. Hinz, T. J. Rodigas, A. Puglisi, S. Esposito, A. Riccardi, E. Pinna, M. Komperó & R. Briguglio</i>	

A Gas-rich Disk Around DX Cha	161
<i>A. S. Hales, I. De Gregorio-Monsalvo, B. Montesinos, S. Casassus, W. R. F. Dent, C. Eiroa, A. M. Hughes, G. Garay, D. Mardones, F. Ménard, A. Palau, S. Pérez, N. Phillips, J. M. Torrelles & D. Wilner</i>	
The Early Era: How do protostellar discs form?	163
<i>M. Joos, P. Hennebelle, A. Ciardi & S. Fromang</i>	
Circumstellar Disks in Very Young Embedded Clusters	165
<i>N. Mariñas, E. A. Lada, P. S. Teixeira & C. J. Lada</i>	
On the Evolution of the Snow Line in Protoplanetary Discs	167
<i>R. G. Martin & M. Livio</i>	
Large Grains Can Grow in Circumstellar Discs	169
<i>F. Meru, M. Galvagni, C. Olczak & P. Garaud</i>	
LIPAD Simulations of Giant Planet Core Formation	171
<i>H. Ngo, M. J. Duncan & H. F. Levison</i>	
Inviscid and viscous flow past embedded planets: implications for planet formation	173
<i>C. W. Ormel & J.-M. Shi</i>	
Gas signatures of Herbig Ae/Be disks probed with Herschel SPIRE spectroscopy	175
<i>M. H. D. van der Wiel, D. A. Naylor, G. Aresu & G. Olofsson</i>	
Large-scale Planetesimal Formation by Streaming Instability	177
<i>C.-C. Yang & A. Johansen</i>	
Session 4. Co-evolution of Disks and Planetary Systems	
<i>Chair: Mark Booth</i>	
Planet Formation in Evolving Protoplanetary Discs	179
<i>R. Alexander</i>	
Disk Inhomogeneities and the Origins of Planetary System Architectures and Observational Properties	190
<i>Y. Hasegawa & R. E. Pudritz</i>	
The bright end of the exo-Zodi luminosity function: Disk evolution and implications for exo-Earth detectability	194
<i>G. M. Kennedy & M. C. Wyatt</i>	
Orbital Motion and Multi-Wavelength Monitoring of LkCa15 b	199
<i>M. J. Ireland & A. L. Kraus</i>	
HST/STIS imaging of Fomalhaut: New main belt structure and confirmation of Fomalhaut b's eccentric orbit	204
<i>P. Kalas, J. R. Graham, M. P. Fitzgerald & M. Clampin</i>	
The Multiple Spirals in the Disk of HD100546	208
<i>A. Boccaletti, A.-M. Lagrange, E. Pantin, J.-C. Augereau, S. P. Quanz & H. Meheut</i>	
Angular momentum evolution during star and planetary system formation	210
<i>C. L. Davies & J. S. Greaves</i>	

Planetary Systems Dynamics Eccentric patterns in debris disks & Planetary migration in binary systems.	212
<i>V. Faramaz, H. Beust, J.-C. Augereau, A. Bonsor, P. Thébault, Y. Wu, J. P. Marshall, C. del Burgo, S. Ertel, C. Eiroa, B. Montesinos, A. Mora & the DUNES team</i>	
Asymmetric dust distribution in an eccentric protoplanetary disk as a signpost of a gas giant planet.	214
<i>P.-G. Gu, H.-F. Hsieh & H.-W. Yeh</i>	
Variability of CHXR 20: accretion, extinction, spots or a companion?	216
<i>T. G. Kopytova, V. Joergens, A. Sicilia-Aguilar, M. V. Rodríguez-Ledesma & R. Mundt</i>	
Gravitational Instability of Planetary Gaps and its Effect on Orbital Migration.	218
<i>M.-K. Lin & R. Cloutier</i>	
A VLT/X-Shooter Study of Accretion and Photoevaporation in Transitional Disks	220
<i>C. F. Manara, L. Testi, A. Natta, L. Ricci, M. Benisty, G. Rosotti & B. Ercolano</i>	
A companion star in the SED modeling of the HD 142527 stellar system	222
<i>E. Nagel</i>	
The TBOSS (Taurus Boundary of Stellar/Substellar) Survey of Disk Properties	224
<i>J. Patience, J. Bulger, K. Ward-Duong, H. Bouy, C. Pinte, F. Ménard, J.-L. Monin, J. Koda & C. D. Dowell</i>	
Chasing disk dispersal indicators: the origin of the [OI] low-velocity components from young stars.	226
<i>E. Rigliaco, I. Pascucci, U. Gorti, S. Edwards & D. Hollenbach</i>	
Magnetocentrifugal Jets and Chondrule Formation in Protostellar Disks.	228
<i>R. Salmeron & T. Ireland</i>	
Astrometry in the Service of Planet Formation Studies: Disk Lifetimes in Nearby Star Forming Regions and a Planet Candidate around a Mature Brown Dwarf	230
<i>A. J. Weinberger, A. P. Boss & G. Anglada-Escudé</i>	
Session 5. Detailed Studies of Known Exoplanets and Exoplanet Systems	
<i>Chair: Matthew Kenworthy</i>	
The Debiased Kuiper Belt: Our Solar System as a Debris Disk.	232
<i>S. Lawler & the CFEPS team</i>	
Planets and Stellar Activity: Hide and Seek in the CoRoT-7 system	237
<i>R. D. Haywood, A. C. Cameron, D. Queloz, S. C. C. Barros, M. Deleuil, R. Fares, M. Gillon, A. Hatzes, A. F. Lanza, C. Lovis, C. Moutou, F. Pepe, D. Pollacco, A. Santerne, D. Ségransan & Y. Unruh</i>	
Properties of the young gas giant planet Beta Pictoris b	241
<i>M. Bonnefoy, A. Boccaletti, A.-M. Lagrange, F. Allard, C. Mordasini, H. Beust, G. Chauvin, J. H. V. Girard, D. Homeier, D. Apai, S. Lacour, D. Rouan, J. Rameau & H. Klahr</i>	

Glimpsing the Compositions of Sub-Neptune-Size Exoplanets	247
<i>L. A. Rogers</i>	
Direct imaging of Beta Pictoris b with first-light Magella Adaptive Optics	252
<i>K. M. Morzinski, L. M. Close, J. R. Males, P. M. Hinz, A. Puglisi, S. Esposito, A. Riccardi, E. Pinna, M. Xompero, R. Briguglio, K. Follette, D. Kopon, V. Gasho, A. Uomoto, T. Hare, A. Skemer, C. Arcidiacono, F. Quiros-Pacheco, J. Argomedo, L. Busoni, T. J. R. & Y.-L. Wu</i>	
Unveiling an exoplanetary Neptunian atmosphere thorough multiband transit photometry	257
<i>V. Nascimbeni, G. Piotto, I. Pagano & G. Scandariato</i>	
The Shocking Variability of Exoplanet Transits	262
<i>J. Llama, M. Jardine, A. Vidotto, K. Wood & R. Fares</i>	
Exoplanet Transit Spectroscopy of Hot Jupiters Using HST/WFC3	266
<i>K. Haynes, A. M. Mandell, E. Sinukoff, N. Madhusudhan, A. Burrows & D. Deming</i>	
The BT-Settl Model Atmospheres for Stars, Brown Dwarfs and Planets	271
<i>F. Allard</i>	
Detecting Circumbinary Exoplanets: Understanding Transit Timing	273
<i>D. Armstrong, D. V. Martin & D. Pollacco</i>	
From spectra to atmospheres: solving the underconstrained retrieval problem for exoplanets	275
<i>J. K. Barstow, S. Aigrain, P. G. J. Irwin, N. Bowles, L. N. Fletcher & J.-M. Lee</i>	
A radiative-convective equilibrium model for young giant exoplanets: Application to Beta Pictoris b	277
<i>J.-L. Baudino, B. Bézard, A. Boccaletti, M. Bonnefoy & A.-M. Lagrange</i>	
VSTAR Models of the Hot Jupiter HD 189733b	279
<i>K. Bott, L. Kedziora-Chudczek & J. Bailey</i>	
H α Absorption in Transiting Exoplanet Atmospheres	281
<i>D. Christie, P. Arras & Z.-Y. Li</i>	
Characterization of exoplanet atmospheres using future space-based infrared telescopes: challenges in detecting biomarkers	283
<i>K. Enya</i>	
The HoSTS Project: A Homogeneous Study of Transiting Systems	285
<i>Y. Gómez Maqueo Chew, F. Faedi, L. Hebb, D. Pollacco, K. Stassun, P. Cargile, B. Smalley, A. Doyle, L. Ghezzi, S. C. C. Barros & A. C. Cameron</i>	
Additional Keplerian Signals in the HARPS data for Gliese 667C: Further Analysis	287
<i>P. C. Gregory, S. M. Lawler & B. Gladman</i>	
Synthetic Modeling of the Light-travel Time Effect of Circumbinary Planets . . .	289
<i>T. C. Hinse & J. W. Lee</i>	

Using exoplanet systems with highly elliptical orbits to search for star-planet interactions	291
<i>J. R. Hodgson II, D. J. Christian, D. Bodewits & S. Hawley</i>	
Dynamical Constraints on Exoplanets	293
<i>J. Horner, R. A. Wittenmyer, C. Tinney, T. C. Hinse & J. P. Marshall</i>	
Doppler Tomographic Observations of Kepler-13b	295
<i>M. C. Johnson & W. D. Cochran</i>	
Carbon and Oxygen in the Spectrum of HR 8799c	297
<i>Q. M. Konopacky, T. S. Barman, B. A. Macintosh & C. Marois</i>	
β Pictoris b Orbital Properties	299
<i>A.-M. Lagrange, H. Gilardy, H. Beust, G. Chauvin, J. Rameau, A. Boccaletti, J. Girard, M. Bonnefoy</i>	
Searching for Photometric Variability across the L, T & Y Dwarf Sequence	301
<i>A. Rajan, P. A. Wilson, J. Patience, F. Pont & R. J. De Rosa</i>	
Cosmic Rays, UV Photons, and Haze Formation in the Upper Atmospheres of Hot Jupiters	303
<i>P. B. Rimmer, C. Walsh & C. Helling</i>	
Detection of Thermal Emission from WASP-3b	305
<i>J. W. Rostron & P. J. Wheatley</i>	
The Role of Oxygen Abundances in Exoplanet Host Star C/O Ratios: A Case Study of 55 Cnc	307
<i>J. K. Teske, K. Cunha, V. V. Smith, S. C. Schuler & C. A. Griffith</i>	
Two Giant Planets Orbiting the K Giant Star Eta Cet	309
<i>T. Trifonov, S. Reffert, X. Tan, M. H. Lee & A. Quirrenbach</i>	
Next Generation Transit Survey (NGTS)	311
<i>P. J. Wheatley, D. L. Pollacco, D. Queloz, H. Rauer, C. A. Watson, R. G. West, B. Chazelas, T. M. Louden, N. Bannister, J. Bento, M. Burleigh, J. Cabrera, P. Eigmuller, A. Erikson, L. Genolet, M. Goad, A. Grange, A. Jordan 7, K. Lawrie, J. McCormac, M. Neveu & S. Walker</i>	

Session 6. Debris Disks as Signposts of Planetary Systems

Chair: David Wilner

A Resolved Millimeter Emission Belt in the AU Mic Debris Disk	313
<i>M. MacGregor</i>	
Signposts of Multiple Planets in Debris Disks	318
<i>K. Y. L. Su & G. H. Rieke</i>	
‘DUst around Nearby Stars’ The Survey Observational Results	322
<i>J. P. Marshall on behalf of the DUNES consortium</i>	
A Trend Between Cold Debris Disk Temperature and Stellar Type: Implications for the Formation and Evolution of Wide-Orbit Planets	326
<i>N. P. Ballering, G. H. Rieke, K. Y. L. Su & E. Montiel</i>	

The Population of Debris Discs Orbiting Subgiants	328
<i>A. Bonsor, G. M. Kennedy, J. R. Crepp, J. A. Johnson, M. C. Wyatt, B. Sibthorpe & K. Y. L. Su</i>	
Locating the Dust in A Star Debris Discs	330
<i>M. Booth, G. Kennedy, B. Sibthorpe, B. C. Matthews, M. C. Wyatt, G. Duchêne, A. Koning, L. Vican, G. H. Rieke, K. Y. L. Su, A. Moro-Martín & P. Kalas</i>	
Searching for Faint Exozodiacal Disks: Keck Results and LBTI Status	332
<i>D. Defrère, P. Hinz, B. Mennesson, R. Mullan-Gabet, A. Skemer, V. Bailey & T. J. Rodigas</i>	
Debris Discs and Multiplicity within the 75pc Volume-limited A-Star (VAST) Survey	334
<i>R. J. De Rosa, B. Smith, J. Bulger, J. Patience, C. Marois, I. Song, B. Macintosh, J. Graham, R. Doyon & M. Bessell</i>	
On Lifetimes of Dusty Debris Discs around A-type Stars	336
<i>R. de la Reza & C. Chavero</i>	
Unraveling the Mystery of Exozodiacal Dust.	338
<i>S. Ertel, J.-C. Augereau, P. Thébault, O. Absil, A. Bonsor, D. Defrère, Q. Kral, J.-B. Le Bouquin, J. Lebreton & V. Coude du Foresto</i>	
A Modal Analysis of the Irradiation Instability.	340
<i>J. Fung & P. Artymowicz</i>	
Non-LTE Model Spectra for Gaseous Planetary Debris Discs around WDs.	342
<i>S. Hartmann, T. Nagel, T. Rauch & K. Werner</i>	
Light from Shattered worlds: Debris from Giant Impacts	344
<i>A. P. Jackson, M. C. Wyatt, W. R. F. Dent, A. Roberge</i>	
LIDT-DD: A New Self-Consistent Debris Disc Model Including Radiation Pressure and Coupling Dynamical and Collisional Evolution	346
<i>Q. Kral, P. Thébault & S. Charnoz</i>	
Herschel Observations of the HR 8799 Disk.	348
<i>B. C. Matthews, G. Kennedy, B. Sibthorpe, M. Booth, H. Broekhoven-Fiene, M. Wyatt, B. Macintosh & C. Marois</i>	
First High-Angular Resolution L' Images of the β Pictoris Debris Disc with the VLT/NaCo	350
<i>J. Milli, D. Mawet, O. Absil, A.-M. Lagrange, D. Mouillet, J. H. Girard & J.-C. Augereau</i>	
Finding Asteroid belt Analogues with WISE.	352
<i>R. I. Patel & S. Metchev</i>	
Newly Seen Debris Discs from the HST NICMOS Archive	354
<i>M. D. Perrin, E. Choquet, C. Chen, J. Debes, D. Golimowski, J. B. Hagan, D. C. Hines, T. Mittal, M. Moerchen, M. N'Diaye, L. Pueyo, I. N. Reid, G. Schneider, S. Wolff & R. Soummer</i>	

Abundances in Stars with Debris Disks	356
<i>A. M. Ritchey, G. Gonzalez, M. Stone & G. Wallerstein</i>	
Planet Signatures and Size Segregation in Debris Discs	358
<i>P. Thébault</i>	
Session 7. Models of Planetary Formation and Evolution	
<i>Chair: JJ Kavelaars</i>	
Making Systems of Super Earths by Inward Migration of Planetary Embryos . . .	360
<i>C. Coussou, S. Raymond & A. Pierens</i>	
Protostellar Disks, Planet Traps, and the Origins of Exoplanetary Systems	365
<i>R. E. Pudritz & Y. Hasegawa</i>	
Collision parameters governing water delivery and water loss in early planetary systems	370
<i>T. I. Maindl & R. Dvorak</i>	
Protoplanetary Disk Evolution and Influence of the Host Star	374
<i>K. Baillié & S. Charnoz</i>	
Atmospheric dynamics on tidally locked Earth-like planets in the habitable zone of an M dwarf star	376
<i>L. Carone, R. Keppens & L. Decin</i>	
Swansong Biospheres: The biosignatures of inhabited earth-like planets nearing the end of their habitable lifetimes	378
<i>J. T. O'Malley-James, J. S. Greaves, J. A. Raven & C. S. Cockell</i>	
Uneven Cooling: The influence of atmospheric dynamics on the thermal evolution of gas giants	380
<i>E. Rauscher & A. P. Showman</i>	
Ice Condensation as a Planet Formation Mechanism	382
<i>K. Ros</i>	
The Influence of Alfvén Ionization on Exoplanetary Atmospheres	384
<i>C. R. Stark, C. Helling & D. A. Diver</i>	
Session 8. Evolution of Planetary Systems	
<i>Chair: James R. Graham</i>	
Constraining Planetary Migration Mechanisms in Systems of Giant Planets	386
<i>R. I. Dawson, R. A. Murray-Clay & J. A. Johnson</i>	
A Hot Jupiter in a Nearly Polar Orbit	391
<i>B. C. Addison, C. G. Tinney, D. J. Wright, D. Bayliss, G. Zhou, J. D. Hartman, G. Á. Bakos, & B. Schmidt</i>	
Tidal Dissipation and Eccentricity Pumping: Implications for the Depth of the Secondary Eclipse of 55 Cnc e	393
<i>E. Bolmont, F. Selsis, S. N. Raymond, J. Leconte, F. Hersant, A.-S. Maurin & J. Pericaud</i>	

CARMENES: Blue Planets Orbiting Red Dwarfs	395
<i>A. Quirrenbach, P. J. Amado, J. A. Caballero, H. Mandel, R. Mundt, A. Reiners, I. Ribas, M. A. S. Carrasco, W. Seifert, M. Azzaro, D. Galadí & the CARMENES Consortium</i>	
Eccentricity Dependence on Iron Abundance	397
<i>S. F. Taylor</i>	
Spin-Orbit Angles as a Probe to Orbital Evolution	399
<i>A. H. M. J. Triaud, A. C. Cameron, D. Queloz, D. R. Anderson, D. J. A. Brown, B. Smalley, F. Bouchy, M. Lendl & M. Gillon</i>	
Author index	401

Preface

“Exploring the Formation and Evolution of Planetary Systems” is focussed on the evolution of proto-planetary disks and the formation and evolution of the planets themselves. This meeting, which is coincident with the end of observations by the Kepler space observatory, highlights a maturing view of planets detected by the transit and Doppler techniques, results from the first high-resolution imaging with ALMA, and sets the stage for the initial operations for a new generation of high contrast planet imaging instruments.

Circumstellar disks provide a unique window into the process of planet formation around young stars. Characterizing disk structure yields clues to disk evolution by determining the spatial distribution of gas and dust, probing the physical conditions in the disk, and providing snapshots of systems in the process of clearing natal material. The observational characterization of these planet-forming disks by, for example, Herschel, ALMA, and EVLA, is in an era of substantial progress. Together with ever-increasing theoretical attention and computational power, this confluence of developments promises an unusual period of rapid progress in understanding the domain of cool gas and dust in disks.

The timing of this meeting also coincides with advances in high-resolution imaging of planetary systems by interferometers on optical/IR 8-m class telescopes (LBTI and PRIMA) and direct imaging of exoplanets with dedicated high contrast adaptive optics coronagraphs (e.g., P1640, SCExAO, SPHERE, GPI). It is therefore a critical time to bring together the communities working on the earliest phases of planet formation with those studying mature planetary systems and associated debris disks.

While there is strong representation of observational work at this meeting, we solicited review talks that discuss the impact of the observations on models of planet formation and evolution in the broadest terms. No five-day meeting can address the full breadth of each field, but we hope that the legacy of the meeting is the enhanced interaction between those who study the formation of planets and those who study evolved systems.

It is especially fitting that an exoplanet meeting be held in British Columbia. Over thirty years ago, University of British Columbia astronomers Gordon Walker and Bruce Campbell pioneered gas absorption cell spectroscopy with the objective of using precision Doppler measurements to detect exoplanets. Hydrogen fluoride was selected on the advice of the Nobel prize-winning German-Canadian physical chemist Gerhard Herzberg, whose name has long been honored in the name of one of our organizers: the Herzberg Institute of Astrophysics (now NRC Herzberg Astronomy & Astrophysics Programs). By 1988 Campbell and Walker, together with UBC astronomer Stephenson Yang, had achieved a precision of 13 m/s, developed methods to remove differences in the velocity zero point between observing runs, and seen the Doppler signature of γ Cephei b. A quarter of a century later, and with Doppler measurement of orbits for 500 exoplanets in hand, their vision has been realized. The current proceedings reveal a diversity of planetary systems and an array of detection and characterization methods unimaginable twenty five years ago.

*James R. Graham, chair SOC
Berkeley, CA, USA, 9 September 2013*

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CONFERENCE PHOTOGRAPH



Participants

Brett Addison, Australia
 Yukako Aimi, Japan
 Richard Alexander, United Kingdom
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 David Anderson, United Kingdom
 Sean Andrews, USA
 Fabien Anthonioz, France
 David Armstrong, United Kingdom
 Jean-Charles Augereau, France
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 Mariangela Bonavita, Italy
 Mickaël Bonnefoy, Germany
 Amy Bonsor, France
 Mark Booth, Canada
 Kim Bott, Australia
 Brendan Bowler, USA
 Tim Brandt, USA
 Hannah Broekhoven-Fiene, Canada
 Joanna Brown, USA
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 Eugene Chiang, USA
 Elodie Choquet, USA
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 Laird Close, USA
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 Ruobing Dong, USA
 René Doyon, Canada
 Zachary H Draper, Canada
 Gaspard Duchene, USA
 Rudolf Dvorak, Austria
 Jo Barstow, United Kingdom
 Keigo Enya, Japan
 Steve Ertel, France
 Catherine Espaillet, USA
 Neal Evans, USA
 Francesca Faedi, United Kingdom
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 Jay Farihi, United Kingdom
 Julien Faure, France
 Stephen Fendyke, United Kingdom
 Debra Fischer, USA
 Mike Fitzgerald, USA
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 Wes Fraser, Canada
 Jeffrey Fung, Canada
 Boris Gaensicke, United Kingdom
 Eric Gaidos, USA
 Raphael Galicher, France
 Antonio Garufi, Switzerland
 Scott Gaudi, USA
 Yilen Gómez Maqueo Chew, United Kingdom
 Jean-Francois Gonzalez, France
 James Graham, Canada/USA
 Phil Gregory, Canada
 Pin-Gao Gu, Taiwan
 Janis Hagelberg, Switzerland
 Antonio Hales, Chile
 Stephan Hartmann, Germany
 b.addison@student.unsw.edu.au
 aimi@iral.ess.sci.osaka-u.ac.jp
 richard.alexander@leicester.ac.uk
 fallard@ens-lyon.fr
 d.r.anderson@keele.ac.uk
 sandrews@cfa.harvard.edu
 Fabien.Anthonioz@obs.ujf-grenoble.fr
 d.j.armstrong@warwick.ac.uk
 augereau@obs.ujf-grenoble.fr
 vbailey@as.arizona.edu
 kevin.baillie@univ-paris-diderot.fr
 gbakos@astro.princeton.edu
 ballerin@email.arizona.edu
 michele.t.bannister@gmail.com
 sara.d.barber@me.com
 jwbarnes@uidaho.edu
 mbarsony@seti.org
 jean-loup.baudino@obspm.fr
 daniel@mso.anu.edu.au
 tbeatty@astronomy.ohio-state.edu
 wbest@ifa.hawaii.edu
 biller@mpia.de
 anthony.boccaletti@obspm.fr
 david.bohlender@nrc-cnrc.gc.ca
 Emeline.Bolmont@obs.u-bordeaux1.fr
 mariangela.bonavita@oapd.inaf.it
 bonnefoy@mpia.de
 amy.bonsor@gmail.com
 mark.booth@nrc.ca
 k.bott@unsw.edu.au
 bpbowler@ifa.hawaii.edu
 tbrandt@astro.princeton.edu
 broekhov@uvic.ca
 joannabrown@cfa.harvard.edu
 ludmila.carone@wis.kulvenven.be
 jmc@astro.caltech.edu
 charnoz@cea.fr
 echiang@astro.berkeley.edu
 choquet@stsci.edu
 dac5zm@astro.virginia.edu
 clanton@astronomy.ohio-state.edu
 lclose@as.arizona.edu
 Christophe.Cossou@u-bordeaux1.fr
 nicolas.cuello@univ-lyon1.fr
 currie@astro.utoronto.ca
 cd54@st-andrews.ac.uk
 rdawson@cfa.harvard.edu
 mjovelar@strw.leidenuniv.nl
 delareza@on.br
 rjderosa@asu.edu
 ddefrere@email.arizona.edu
 james.difrancesco@nrc-cnrc.gc.ca
 jack.dobinson@bristol.ac.uk
 sdr@astro.as.utexas.edu
 rdong@astro.princeton.edu
 doyon@astro.umontreal.ca
 zhd@uvic.ca
 gduchene@berkeley.edu
 dvorak@astro.univie.ac.at
 j.barstow1@physics.ox.ac.uk
 enya@ir.isas.jaxa.jp
 steve.ertel@obs.ujf-grenoble.fr
 cespaillat@cfa.harvard.edu
 nje@astro.as.utexas.edu
 F.Faedi@warwick.ac.uk
 jfaherty17@gmail.com
 Virginie.Faramaz@obs.ujf-grenoble.fr
 jfarihi@ast.cam.ac.uk
 julien.y.faure@gmail.com
 s.m.fendyke@qmul.ac.uk
 debra.fischer@yale.edu
 mpfitz@ucla.edu
 kfollette@as.arizona.edu
 jfortney@ucolick.org
 wesley.fraser@nrc.ca
 fung@astro.utoronto.ca
 boris.gaensicke@warwick.ac.uk
 gaidos@hawaii.edu
 raphael.galicher@obspm.fr
 antonio.garufi@phys.ethz.ch
 gaudi@astronomy.ohio-state.edu
 y.gomez@warwick.ac.uk
 Jean-Francois.Gonzalez@ens-lyon.fr
 jrg@berkeley.edu
 gregory@phas.ubc.ca
 gu@asiaa.sinica.edu.tw
 janis.hagelberg@unige.ch
 ahales@alma.cl
 hartmann@astro.uni-tuebingen.de

Paul M. **Harvey**, USA
 Yasuhiro **Hasegawa**, Taiwan
 Korey **Haynes**, USA
 Raphaëlle **Haywood**, United Kingdom
 Sasha **Hinkle**, USA
 Tobias C. **Hinse**, South Korea
 John **Hodgson II**, USA
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 Cristobal **Petrovich**, USA
 Neil **Phillips**, Chile
 Rafael **Pinotti**, Brazil
 Giampaolo **Piotto**, Italy
 Ana-Maria **Piso**, USA
 Ralph **Pudritz**, Canada
 pmh@astro.as.utexas.edu
 yasu@asiaa.sinica.edu.tw
 korey.n.haynes@nasa.gov
 rdh4@st-andrews.ac.uk
 shinkley@astro.caltech.edu
 tchinse@gmail.com
 John.Hodgson.71@my.csun.edu
 wayne.holland@stfc.ac.uk
 derek.homeier@ens-lyon.fr
 j.a.horner@unsw.edu.au
 xuhuang@princeton.edu
 elsa.huby@obspm.fr
 amhughes@wesleyan.edu
 jasonhwang2014@u.northwestern.edu
 michael.ireland@mq.edu.au
 ajackson@ast.cam.ac.uk
 mjohnson@astro.as.utexas.edu
 daniel.s.jontof-hutter@nasa.gov
 marc.joos@cea.fr
 ajordan@astro.puc.cl
 kalas@berkeley.edu
 JJ.Kavelaars@nrc-cnrc.gc.ca
 gkennedy@ast.cam.ac.uk
 kenworthy@strw.leidenuniv.nl
 jacques.kluska@obs.ujf-grenoble.fr
 konishi@iral.ess.sci.osaka-u.ac.jp
 konopacky@di.utoronto.ca
 kopytova@mpia.de
 quentin.kral@obspm.fr
 akraus@cfa.harvard.edu
 krivov@astro.uni-jena.de
 sylvestre.lacour@obspm.fr
 lagrange@obs.ujf-grenoble.fr
 michiel@astro.lu.se
 lawler@astro.ubc.ca
 Zoe.Leinhardt@bristol.ac.uk
 mklin924@cita.utoronto.ca
 lin@ucolick.org
 y-lithwick@northwestern.edu
 mliu@ifa.hawaii.edu
 joe.llama@st-andrews.ac.uk
 tloehne@astro.uni-jena.de
 mmacgreg@cfa.harvard.edu
 macintosh1@llnl.gov
 smaddison@swin.edu.au
 thomas.maindl@univie.ac.at
 Anne-Lise.Maire@obspm.fr
 maire@di.utoronto.ca
 jrmales@email.arizona.edu
 cmnara@eso.org
 rosemary.mardling@monash.edu
 marinas@astro.ufl.edu
 christian.marois@nrc-cnrc.gc.ca
 jonathan.marshall@uam.es
 david.martin@unige.ch
 rebecca.martin@jila.colorado.edu
 brenda.matthews@nrc-cnrc.gc.ca
 dmawet@eso.org
 kylemede@astron.s.u-tokyo.ac.jp
 heloise.meheut@cfa.fr
 jonathan.menu@ster.kuleuven.be
 farzana@phys.ethz.ch
 dino.mesa@oapd.inaf.it
 meshkat@strw.leidenuniv.nl
 stanimir.metchev@stonybrook.edu
 bmetzger@phys.columbia.edu
 migaszewski@astri.umk.pl
 maxmb@astro.utoronto.ca
 julien.milli@obs.ujf-grenoble.fr
 cmorley@ucolick.org
 ktmorz@arizona.edu
 fatemeh.motalebi@unige.ch
 mmueller@aip.de
 rmurray-clay@cfa.harvard.edu
 erick@astro.ugto.mx
 valerio.nascimbeni@unipd.it
 hngo@caltech.edu
 enielsen@ifa.hawaii.edu
 aake@nbi.dk
 jto5@st-andrews.ac.uk
 ormel@astro.berkeley.edu
 osorio@iaa.es
 rahul.patel.1@stonybrook.edu
 jennifer.patience@asu.edu
 penny@astronomy.ohio-state.edu
 mperrin@stsci.edu
 cpetrovi@princeton.edu
 nphillip@alma.cl
 rpinotti@astro.ufrj.br
 giampaolo.piotto@unipd.it
 apiso@cfa.harvard.edu
 pudritz@mcmaster.ca

Chunhua **Qi**, USA
 Andreas **Quirrenbach**, Germany
 Roman **Rafikov**, USA
 Abhi **Rajan**, USA
 Julien **Rameau**, France
 Emily **Rauscher**, USA
 Francoise **Remus**, France
 Elisabetta **Rigliaco**, USA
 Paul B. **Rimmer**, United Kingdom
 Adam **Ritchey**, USA
 Timothy J. **Rodigas**, USA
 Leslie **Rogers**, USA
 Katrin **Ros**, Sweden
 Katherine **Rosenfeld**, USA
 John **Rostron**, United Kingdom
 Raquel **Salmeron**, Australia
 Graeme **Salter**, Australia
 Dmitry **Savransky**, USA
 Gerald H. M. **Schieven**, Canada
 Hilke **Schlichting**, USA
 Cory **Shankman**, Canada
 Andrew **Shannon**, United Kingdom
 Evgenya **Shkolnik**, USA
 Mar **Sierra**, Spain
 Jacob **Simon**, USA
 Niki **Sipos**, Switzerland
 Andy **Skemer**, USA
 Ian **Skillen**, Spain
 Alexis **Smith**, Poland
 Craig **Stark**, United Kingdom
 Christopher **Stark**, USA
 Elad **Steinberg**, Israel
 Kate **Su**, USA
 Motohide **Tamura**, Japan
 Stuart F. **Taylor**, Hong Kong
 Susan **Terebey**, USA
 Johanna **Teske**, USA
 Philippe **Thebault**, France
 Feng **Tian**, China
 Chris **Tinney**, Australia
 Amaury **Triaud**, Switzerland
 Trifon **Trifonov**, Germany
 Anjali **Tripathi**, USA
 Ana **Uribe**, USA
 Nienke **van der Marel**, Netherlands
 Matthijs **van der Wiel**, Canada
 Arthur **Vigan**, France
 Simon **Walker**, United Kingdom
 Kimberly **Ward-Duong**, USA
 Alycia **Weinberger**, USA
 Peter **Wheatley**, United Kingdom
 Sloane **Wiktorowicz**, USA
 David **Wilner**, USA
 Rob **Wittenmyer**, Australia
 Schuyler **Wolff**, USA
 Yanqin **Wu**, Canada
 Mark **Wyatt**, United Kingdom
 Ji-Wei **Xie**, Canada
 Chao-Chin **Yang**, Sweden
 Xiaojia **Zhang**, China
 Xiaochen **Zheng**, China
 Alice **Zurlo**, France
 cqi@cfa.harvard.edu
 A.Quirrenbach@lsw.uni-heidelberg.de
 rrr@astro.princeton.edu
 arajan6@asu.edu
 julien.rameau@obs.ujf-grenoble.fr
 rauscher@astro.princeton.edu
 francoise.remus@obspm.fr
 rigliaco@lpl.arizona.edu
 pr33@st-andrews.ac.uk
 aritchey@astro.washington.edu
 rodigas@as.arizona.edu
 larogers@caltech.edu
 katrin.ros@astro.lu.se
 krosenfeld@cfa.harvard.edu
 J.W.Rostron@warwick.ac.uk
 raquel@mso.anu.edu.au
 g.salter@unsw.edu.au
 savransky1@lnl.gov
 gerald.schieven@nrc-cnrc.gc.ca
 hilke@ucla.edu
 cshankm@uvic.ca
 shannon@ast.cam.ac.uk
 shkolnik@lowell.edu
 Mar.Sierra@sciops.esa.int
 jbsimon@jila.colorado.edu
 siposn@phys.ethz.ch
 askemer@gmail.com
 ian.skillen@gmail.com
 amss@camk.edu.pl
 crs21@st-andrews.ac.uk
 cstark@dtm.ciw.edu
 elad.steinberg@mail.huji.ac.il
 tinnin@as.arizona.edu
 motohide.tamura@nao.ac.jp
 astrostuart@gmail.com
 sterebe@calstatela.edu
 jteske@as.arizona.edu
 philippe.thebault@obspm.fr
 tianfengco@gmail.com
 c.tinney@unsw.edu.au
 amaury.triaud@unige.ch
 ttrifono@lsw.uni-heidelberg.de
 atripath@cfa.harvard.edu
 auribe@oddjib.uchicago.edu
 nmarel@strw.leidenuniv.nl
 matthijs.vanderwiel@uleth.ca
 arthur.vigan@oamp.fr
 simon.walker@warwick.ac.uk
 kwardduo@asu.edu
 weinberger@dtm.ciw.edu
 P.J.Wheatley@warwick.ac.uk
 sloanew@ucolick.org
 dwilner@cfa.harvard.edu
 rob@phys.unsw.edu.au
 swolff@pha.jhu.edu
 wu@astro.utoronto.ca
 wyatt@ast.cam.ac.uk
 jwxie@astro.utoronto.ca
 ccyang@astro.lu.se
 xiaojia.f.zhang@gmail.com
 x.c.zheng1989@gmail.com
 alice.zurlo@oamp.fr

Address from the Local & Science Organizing Committee Chairs

Dear colleagues,

When we began to plan this meeting, we anticipated approximately 200 attendees might come to Victoria, British Columbia to enjoy a joint meeting of “planet hunters” with those who study the processes that form planets in disks. We clearly underestimated the appeal such a meeting, of Victoria, or both. We had to raise the cap on the total number of registrants – twice – finally reaching 250, with interest in joining a wait list persisting until just weeks before the meeting.

The result of all our preparations was a splendid meeting with 54 science talks and 168 poster presentations. Though the delegates enjoyed a week of glorious sun in Victoria, the sessions were well attended to the very end.

This meeting would not have been the success it was without the dedicated efforts of the Science and Local Organizing Committees. The Science Organizing Committee selected invited speakers and ranked over 180 abstracts submitted for contributed talks to select 46 for the oral program. In all, 219 scientists presented reviews or their latest results at the meeting. The completed program provided a healthy balance of speakers based on science, gender, geography and professional status; 60% of the contributed talks were given by students or postdoctoral fellows. The Science Organizing Committee, along with the Local Organizing Committee, also read and provided comments to the proceedings’ contributors, which helped ensure clarity of content and consistency of format for all the articles.

The Local Organizing Committee was distributed, with major organizational effort provided in Victoria by members at NRC and in Toronto, by members at the Dunlap Institute for Astronomy & Astrophysics. Particular acknowledgement is owed to Brenda Parrish (NRC), Alice Chow (DI) and Mark Booth (U. Vic/NRC), all of whom were able to rise to the call whenever their assistance was needed. Marlene Olsen and Jason Shrivell (NRC) also provided on-site support during the meeting. Acknowledgement is also due for the efforts of Chris Sasaki (DI) who designed and maintained the webpage, registration and abstract forms and Gary Berry (NRC) who managed all the computing support during the meeting. Special thanks to Christian Marois, who recorded all the talks and made them available online, James Di Francesco who coordinated press during the meeting, and Gerald Schieven who assembled the program. JJ Kavelaars (NRC) helped organize the public talk and has created a permanent DOI for the meeting presentations and videos (10.11570/13.0003) to which we refer anyone interested in these records from the meeting.

The public talk was given by Prof. Debra Fischer (Yale U.), and presented jointly by the meeting organizers and the Royal Astronomical Society of Canada’s Victoria chapter. We gratefully acknowledge the RASC’s efforts in providing financial support and advertizing for Debra’s excellent talk, entitled “HABITABLE WORLDS: The Search Continues”.

The delegates selected their top three student talks and posters at the end of the meeting. The competition was strong, given the high quality of oral and poster presentations. The

awardees were Joe Llama (St Andrews) and Julien Faure (CEA/Saclay) for Best Student Talk and Best Student Poster, respectively.

We also wish to thank all the organizations that provided generous financial support to the meeting: the International Astronomical Union, the Dunlap Institute for Astronomy & Astrophysics, the National Research Council of Canada, the University of Victoria, Gemini Observatory and the Royal Astronomical Society of Canada's Victoria chapter.

Brenda C. Matthews (LOC Chair) & James R. Graham (SOC Chair)
Victoria, BC, Canada & Berkeley, CA, USA, 9 September 2013