ber of such objects are currently known to permit statistical analysis, and possibly to postulate these objects as constituting a class of magnetic hot stars. Many of these newly found magnetic stars were provided by the MiMeS survey, summarised by G. Wade, which finds a magnetic field incidence of typically 10% in massive stars, very similar to lower-mass (but still non-convective) stars. The only striking exception are the Be stars, a class for which not a single magnetic member has been found. This result has the potential to settle another longstanding debate, namely what role, if any, magnetic fields play in the formation of discs around Be stars.

Closing talks

The final talk of the meeting was given by D. Baade, summarising the contributions, reminding the participants of the progress made and presented at the meeting, but putting emphasis as well on the work left to be done.

A public talk by D. Baade, translated simultaneously from English into Portuguese, on ESO's Extremely Large Telescope and the quest for extraterrestrial life was attended by members of the Pólo Astronômico, a large and active group of amateur astronomers, as well as the conference participants. A Star Party, prepared by the Pólo Astronômico for after that talk unfortunately could not be held due to bad weather. The excursions to the Brazilian and Argentinean sides of the Iguaçu waterfalls were as spectacular as expected for a visit to one of the new seven wonders of nature[1].

The generous sponsorship not only by ESO but also by Brazilian agencies enables us to publish printed proceedings in full colour, which will appear in the conference series of the Astronomical Society of the Pacific, edited by A. Carciofi and T. Rivinius.

Acknowledgements

We are very grateful for the enthusiastic work of both the scientific and local organising committees. The meeting benefitted greatly from the organising support of Maria Eugenia Gomez and Marketka Šteflova. We thank the Pólo Astronômico for their enthusiasm and the staff of the Rafain Palace Hotel for their assistance.

Links

[1] New seven wonders of nature: http://www.n7w.com

Report on the Workshop

Observing Planetary Systems II

held at ESO, Vitacura, Chile, 5–8 March 2012

Christophe Dumas[1]
Michael Sterzik[1]
Claudio Melo[1]
Ralf Siebenmorgen[1]
Julien Girard[1]
David Mouillet[2]

[1] ESO
[2] Observatoire de Grenoble, Switzerland

This second edition of the Observing Planetary Systems workshop was aimed at bringing together the two communities of Solar System and exoplanetary system scientists to review the recent progress made in our understanding of the formation of the Solar System and its early chemistry, and how this picture fits with our current knowledge of the formation and evolution of planetary systems in general.

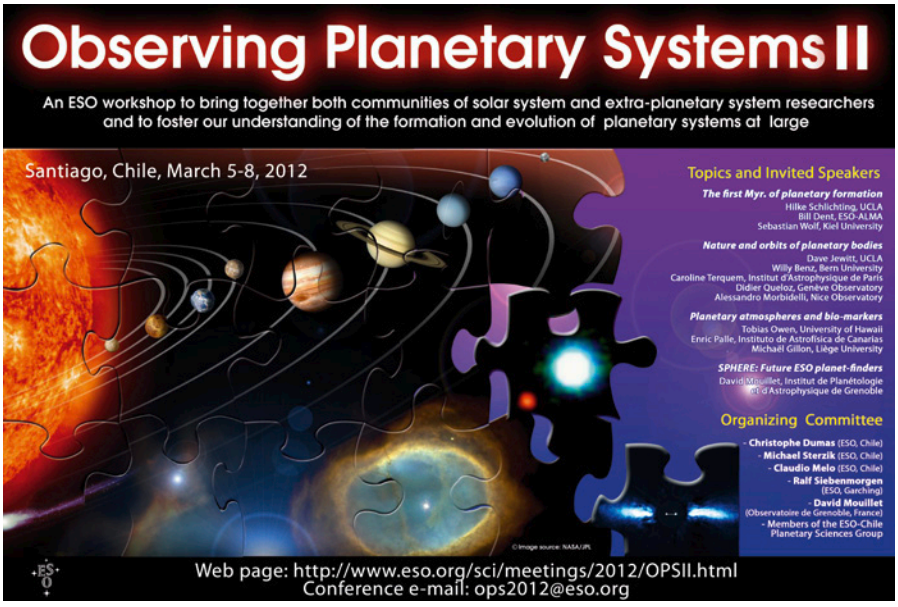

Figure 1. The workshop poster.

Motivation

Exactly five years after our successful Observing Planetary Systems workshop held in March 2007 (see Sterzik & Dumas, 2007), we again brought the two communities of Solar System and extraplanetary system scientists together at the ESO/Vitacura headquarters in Santiago de Chile for the second edition of this conference (OPS II). The focus was similar to five years ago, i.e. to review, from an observational standpoint, our progress in understanding the processes involved in planetary formation and the application of the knowledge of the Solar System to help constrain our picture of extrasolar systems in general (see the meeting poster in Figure 1).

The conference was very well attended, with more than 100 registered participants, and the limited capacity of our meeting room unfortunately forced us to decline some interesting contributions. Participants to this workshop represented 15 countries: Brazil, Argentina and Chile in South America, Canada and USA in North America, and the rest of the participants coming from ten different European countries, with a significant representation from Spain, United Kingdom, France and Germany. Out of 107 participants, 27 were graduate students, which provided a great opportunity to update our young researchers on the latest developments in this highly dynamic field. The meeting was held over four full days, covering the main aspects of planetary formation and characterisation within four distinct sessions: "Planetary discs and the first Myrs of planetary formation", "Nature and orbits of planetary bodies: Models and Observations", "Planetary atmospheres and bio-markers", and "Future planet-finders and novel technologies". Contributions were made by a combination of invited talks (11 different invited speakers), contributed presentations (44) and posters (38 in total).

We opted again for a prompt release of the presentation material rather than having printed proceedings at a later stage. The oral contributions were also filmed with the consent of each author and all this material (PDF and videos) is available on the conference website[1]. One of the innovations made during this second edition was to provide a real-time video link of the presentations in a separate location, adjacent to the main conference room. People (registered and non-registered participants) could thus follow the discussions while working in groups, in the nice and comfortable environment of the ESO-Chile library. This service was highly appreciated by the meeting participants.

In order to take advantage of the presence and interest of many international experts, the conference was immediately followed by a single-day workshop focused on high-contrast imaging and spectroscopy of planetary systems, to review the latest progress made in observing techniques, technology and data-reduction. More information about this workshop can be found on its website[2] and it is briefly described at the end of this report.

Scientific highlights

The linear progression offered over the four days of this workshop, from the study of the early stages of planetary accretion to the formation of planetary bodies, their dynamical interaction and physical composition, paved the way for the final sessions. Here observing programmes aimed at characterising the atmospheres of exoplanets, demonstrating techniques to search for biomarkers and describing the potential breakthroughs expected from the latest/future ground- and space-based planet-finding machines were all discussed.

The morning of the first day was dedicated to far-infrared and submillimetre observations of stars surrounded by discs in their various stages of formation, from directly after collapse to photo-evaporating and debris discs. The early results of Herschel programmes to study disc properties, and the distribution and evolution of the dust/gas ratio were described (by W. Dent and G. Meeus), emphasising the need for improved evolutionary models and access to high-resolution images (as presented by L. Testi). Some objects like TCha (talks by N. Evans and N. Huelamo) are exciting targets to further constrain planet formation models as they are a clear example of how massive planets create gaps within the disc, impacting the evolution of the disc/gas material as well as the formation of other planetary embryos within the same system. The signature of forsterite at 69 μm turns out to be another powerful tracer of gaps in discs, and hence a tracer of planet formation history.

Competing processes of accretion were described (talk by H. Schlichting) throughout their evolution from small-scale bodies to planetesimals and planets. Runaway growth explains well the current mass and distribution within the Kuiper Belt of the Solar System, as well as the measured mass ratio for Kuiper-Belt binaries. The rest of the first afternoon was used to discuss: the crucial role of multi-wavelength observations of discs; and the need for higher spatial resolution to improve the current models of disc evolution and planetary formation (presentation by S. Wolf).

The second and third days were dedicated to models and observations of exoplanetary systems. It contained an interesting series of presentations on how early planetary dynamics (e.g., through planet resonances and inclined orbits) is able to shape the final distribution (in distance, and mass) of exoplanets seen today in mature systems (talks by C. Terquem, Y. Alibert, and A. Morbidelli). Interestingly, planets accessible to direct imaging are still hard to find. This is a consistent result of all ongoing major adaptive optics (AO) surveys, even after the tremendous progress made over the past few years in lowering the detection limits via improved observing techniques (as exemplified by presentations by B. Biller, R. Galicher, E. Nielsen, M. Bonavita and J. Rameau).

Precision radial velocity surveys in combination with transit observing campaigns remain the main sources for harvesting the population of inner planets efficiently, allowing derivation of robust physical and statistical properties (talks by D. Queloz and M. Gillon). The β Pic system is a showcase of how ESO's top-class instrumentation has led to the characterisation of disc morphology and the first image of the giant planet embedded within it (presentation by

A.-M. Lagrange). Early (and already abundant) results of the TRAPPIST experiment were provided (by E. Jehin), both on the study of comets (the most primordial objects in the Solar System) and in the search and characterisation, via transits, of exoplanets. The role of water in planetary formation was also presented (talk by D. Jewitt), not only regarding its ability to develop life, but also from the perspective of what we can learn from the study of comets, and other pristine objects like Trans-Neptunian Objects, on the early thermo-chemical processes undergone since the formation of the Solar System.

The last day of the meeting was first dedicated to astrobiology, and how the study of Earthshine can provide a benchmark when searching for signatures of life elsewhere in the Universe (presentation by E. Palle and M. Sterzik). The scientific promise of future planet-finding instruments soon to be installed on large ground-based telescopes is considerable, but the technological challenges still significant (as presented by D. Mouillet). The ground-based effort will be complemented by space missions like EchO and Plato to push even further the limits of our understanding on how planets form, why they are so diverse in size, orbit and composition, and ultimately what fraction of planets harbouring life could be detected from their atmospheric signatures.

Prospects

The five-year period observed between the two first editions of this meeting appears to be an adequate frequency to keep the community up to date on the latest developments made in the discovery of exoplanetary systems and our understanding of their extraordinary diversity (with respect to their dynamical aspects, the nature of their bodies and the mechanisms involved in their formation).

In the same way that this second edition saw a surge in results presented from transit observations and very encouraging prospects from a future astrobiological characterisation of exoplanets, we can expect the next and third edition to contain an increased number of contributions coming from ALMA and the first extreme-AO planet finders (e.g., SPHERE). These future facilities, added to the continuous improvements made by radial velocity and other techniques, will no doubt dramatically shake up our vision and understanding of the formation of exoplanetary systems, their diversity and suitability to develop extraterrestrial life, while contributing to a deeper understanding of the particular place held by the Solar System.

High Contrast Imaging and Spectroscopy Workshop (HConIS)

Immediately following the Observing Planetary Systems II conference, this one-day workshop focused on high contrast imaging and spectroscopy techniques. ESO experts Julien Girard and Dimitri Mawet moderated no less than 15 talks, which covered many aspects of this exciting field. The morning session started with a science-oriented talk about the spectral properties of β Pictoris b (by M. Bonnefoy), followed by back-to-back presentations on the development status and schedule of planet-finders: the ESO SPHERE instrument (by D. Mouillet) and the Gemini Planet Imager (GPI), by M. Hartung. Additional contributions followed on novel data-processing concepts making extensive use of focal plane wavefront sensing in order to suppress quasi-static aberrations (talks by R. Galicher and M. Kenworthy). Coronagraphic techniques for ground and space missions were also reviewed extensively (by D. Mawet, F.-Y. Bourget and A. Boccaletti), as well as new spectroscopic follow-up applications (in talks by A. Vigan and J. Girard). Finally, several presentations were given on interferometric techniques based on diluted facilities (by J.-P. Berge and D. Rouan) or Fizeau-like (from P. Tuthill and F. Patru).

The very friendly and informal atmosphere of this workshop favoured constructive discussions among the 70 attendees (most of whom were also OPSII participants). We thank the ESO Office for Science, who provided the lunch in the park and all the coffee and cheese breaks! This first edition of HConIS, extended further the last session of the OPSII meeting and was in a way complementary to the "In the Spirit of Lyot" conferences held in 2007 and 2010, bringing together high-contrast observers and instrumentation specialists. All presentations and video streaming of the presentations can be found online[2].

Acknowledgements

We would like to thank ESO for allocating the financial support for this workshop, and all the people who made this venue so pleasant, in particular Maria-Eugenia Gomez, our librarian who acted as workshop secretary, Paulina Jiron from the Office for Science, and the ESO-Chile administration for the excellent logistic support received.

References

Sterzik, M. & Dumas, C. 2007, The Messenger, 128, 72

Links

[1] OPSII conference web site: http://www.eso.org/sci/meetings/2012/OPSII.html
[2] HConIS workshop webpage: http://www.sc.eso.org/~jgirard/hconis