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Hot chemistry and physics in the planet-forming zones of disks

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Publications

Refereed papers

1. *Exploring organic chemistry in planet-forming zones*
Jeanette E. Bast, Fred Lahuis, Ewine F. van Dishoeck & Alexander G. G. M. Tielens; Submitted to *Astronomy & Astrophysics* (Chapter 5)
2. *First detection of near-infrared line emission from organics in young circumstellar disks*
Avi M. Mandell, **Jeanette E. Bast**, Ewine F. van Dishoeck, Geoffrey A. Blake, Colette Salyk, Michael J. Mumma, M. & Geronimo Villanueva; 2012, *The Astrophysical Journal*, 747, 92 (Chapter 3)
3. *Single peaked CO emission line profiles from the inner regions of protoplanetary disks*
Jeanette E. Bast, Joanna M. Brown, Gregory J. Herczeg, Ewine van F. Dishoeck & Klaus M. Pontoppidan; 2011, *Astronomy & Astrophysics*, 527, A119 (Chapter 2)
4. *The abundance of SiS in circumstellar envelopes around AGB stars*
Fredrik L. Schöier, **Jeanette E. Bast**, Hans Olofsson & Michael Lindqvist; 2007, *Astronomy & Astrophysics*, 473, 871

Non-refereed papers

Planet-forming regions at the highest spectral and spatial resolution with VLT-CRIRES

Klaus M. Pontoppidan, Ewine F. van Dishoeck, Geoffrey A. Blake, Rachel Smith, Joanna M. Brown, Gregory J. Herczeg, **Jeanette E. Bast**, Avi M. Mandell, Alain Smette, Wing-Fai This, Edward D. Young, Mark R. Morris William Dent & Hans Ulrich Käufel; 2011, *Messenger*, 143, 32

Conference proceedings

1. *New probes of the chemistry in the inner regions of planet-forming disks*
Jeanette. E. Bast, Avi M. Mandell, Ewine F. van Dishoeck, Daniel Harsono & Simon Bruderer, 2011, in *The Molecular Universe*, IAU Symposium 280 poster proceedings
2. *SiS line emission as a probe of chemistry and grain formation in circumstellar envelopes of AGB stars*
Jeanette E. Bast, Fredrik L. Schöier & Hans Olofsson; 2007, *Molecules in Space and Laboratory*

Curriculum Vitae

I was born on the Swedish summer day of the 25th of July 1979 in Stockholm. Nineteen years later I graduated from Sjödalsgymnasiet, finishing the science program. After my studies at the gymnasium, I worked for 7 months at an asphalt and stone laboratory. During the evenings, I took an introductory course in astronomy at Stockholm University. This course started my interest in astronomy since my professor Gösta Gahm so enthusiastically shared his knowledge. However, at this time my mind was set to become a doctor in medicine. The only obstacle to do this was that I needed to upgrade my grades, since you have to have absolute top grades in all topics before can get admitted to any program in medicine in Sweden. While studying to improve my grades, I decided to take chemistry courses for one year at Stockholm University since it would be useful knowledge to have as a doctor. After a year of chemistry studies, I decided to continue with studies in physiotherapy since it would provide a job similar to a doctor but it would be easier to get accepted to. The next 6 months, I studied physiotherapy at the Karolinska Institute. While doing so, I read about a summer science school at Karolinska Institute for medicine students. I applied to this school, and I got accepted, even though I was not a student in medicine, since my chemistry studies compensated for this. For 10 weeks I worked on a pilot project doing research studying the sensitivity of insulin producing cells to a specific toxin. The project turned out very well so it resulted in a larger research project which I was offered to continue working on. I declined, since I now knew that I really wanted to go for science, but instead within astronomy, since I already fell in love with it 2 years earlier. It just took me some time to accept it and give up my original dream to study medicine. A few weeks later I started the physics program at Stockholm university and I felt directly that my choice was right. However life wanted something differently so I had to interrupt my studies after one month for family reasons and wait another year to start things over again. So that year, I worked as a kindergarten teacher instead. I started my studies again one year later and got my Masters degree in astronomy 2007 at Stockholm university.

I was very active in both the social and political student association life during my studies. My larger responsibilities were to be working as the vice president for the social student association for physics students and to be president of the

political student association for the natural sciences faculty. As their president, I was in charge of managing people within the organisation and its sub-organisations plus being the main driver of many projects or causes to maintain or improve the quality of student life and education for around 10,000 undergraduate and graduate students. I was in addition working extra as a teaching assistant for an introductory course in Astronomy. During my studies, I took part in one graduate and two master science schools in Finland, Denmark and France, within the topics of astrobiology and particle physics. I also got a scholarship to take part in a workshop, about ALMA, in Denmark. During this workshop I met graduate students from Ewine van Dishoeck's research group, which made me curious about doing a PhD with her as a supervisor. Just a few months later, still early in my diploma thesis work, a PhD position opened up in her group and I applied and got offered the position. Suddenly I was faced with the choice to leave my country for 4 years. It was not an easy decision since I had not really seriously thought about leaving my country or even my home city, but I took it, which I am very grateful for today.

I started my PhD in the spring of 2007 with Ewine van Dishoeck as my supervisor. Besides Leiden, during the next few years, I worked and lived about 5 months at Caltech in Pasadena (U.S.A.) and 8 months at the Max Planck Institute for Extraterrestrial Physics in Garching (Germany). A big dream came true when I went for a work visit to NASA Goddard Space Flight Center, Washington (U.S.A.). I have given talks at NASA GSFC (U.S.A.), ESTEC (Netherlands), at Universidad Nacional de Colombia, Bogotá (Colombia) and at a conference in Glasgow (Scotland). I have presented posters at conferences in Vienna (Austria), Paris (France), Pasadena (U.S.A.), Toledo (Spain) and Gothenburg (Sweden), I attended two graduate science schools, one in Rome (Italy) and one in Tällberg (Sweden). I have always loved to teach, so I was very happy to be a teaching assistant for three different courses; *The interstellar medium*, the bachelor thesis course in astronomy and *Detection of light*. As a fun side step to my work I was part of an art installation here in Leiden, relating childrens' thoughts about space travel to the scientists' views. During my stay in Garching I also helped out to arrange an exhibition in astronomy at the Deutsches museum in Munich.

My goal during these years has more and more developed into working towards a position where I can combine all my interests in science, management and lobbying politics both within academia and in the space industry. I therefore decided to apply for a position as a contractor at SRON with the consultancy firm Science and Technology as my employer, which offers me many opportunities in the directions I want to develop. I started this job in August, 2012, and I am so far very pleased with my new work and really looking forward to all the new challenges it offers me.

Acknowledgements

So before I start I want to warn you that this will be an unusually long acknowledgement section because I am such a lucky person that I have so many wonderful colleagues, friends and family around me that I don't want to miss out to show them all my gratefulness. So bear with me or just read sections where you are mentioned.

First of all I am very grateful that I got the opportunity to start my PhD at Leiden Observatory. With such a high concentration of very skillfull and enthusiastic scientists it is easy to gain a lot of knowledge and experience. That said, still the science would never move forward without the help of the very efficient and always friendly supporting staff. *Jeanne, Kirsten, Anita, Liesbeth, Jacqueline* and *Evelijn*, thank you for always making me feel so welcomed with my questions and for so fast solving whatever problems I had. The computer guys, as I am used to refer to you. I don't know how many times I mailed or dropped by you in utter despair that something did not work as I wanted. I must say I am very impressed with how fast you are on fixing things. *Tycho* you vanished after a few years but I always enjoyed our chats after the computer problem was solved. *Aart* I will for sure miss to hear about your latest vacation in Sweden and *David* you are just such a sweet and kind person.

During the time of my PhD I had the opportunity to work at three different places: Caltech in Pasadena, MPE in Munich and NASA Goddard in Washington. My main reason to go to Caltech was to collaborate with Geoffrey Blake's group. *Geoff*, I am very grateful for your wise advices and for welcoming me to your group and *Klaus and Colette* for all your work, help and support. Klaus, one hour learning idl next to you was worth more than one month learning it by myself! Especially thanks to the friends outside of work that I got there. *Jessica, Nouhad, Guido, Fabio, Celia, Michele, Terry, Lauren* and *Sawyer*. Our weekends and evenings in California made it an unforgettable time in my life. At MPE I met a lot of very helpful and friendly people and I want to thank you all for making my stay there so pleasant. Especially I am grateful to *Joanna, Greg* and *Simon* that helped me out so much with completing my projects and giving me so much help and advices. Greg you once told me that, I have to believe in myself before any other person can believe in me. Realising that was one of the most important turning points in

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My life in Leiden outside of the office also gave me many wonderful friends... *Eva*, that you are a true part of this thesis in the form of making my cover felt very important to me since you have been a part of my life here in the Leiden almost from the first day I came here. Thank you first all for the amazing cover and to help me make such a cool layout for my thesis!!! But most importantly thank you for being a friend that is always there for me. I am so grateful that I met you. *Iberia*, you are not here anymore but you were for almost 5 years. You leaving the Netherlands was the hardest separation I had to go through from any of my friends leaving Leiden. I miss you still everyday. Thank you for just being you!!! *Erwin*, I thank many people for their contributions to this thesis but without you this thesis would never have been finished. You picked me up when I needed to be picked up, you were my wall when I needed something to lean at and most importantly you always took the time to talk to me when I needed it the most. I feel very happy to have you in my life. *Maiki, Nic, Bas, Carmen, Marlies* and *Angelica*, you are like my little family here in the Leiden. Our weekly activities together is one of the main reasons for me to stay here in Leiden and has made these last two years here to be my most happy ones. Krams! *Dominique*, nobody is as good as you to make me totally forget about my work!!! That really helped me survive my last year of my PhD. *Eric and Anna*, thank you for always caring for me and all the fun we have together. *David Dankers*, thank you for always making see things from a new side. To all my *friends at Salsiando*, you are so great! Our salsa evenings together always bring me so much positive energy!!! To the rest

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