

# Vianney Taquet

Leiden Observatory, Leiden University  
P.O. Box 9513  
2300-RA Leiden, The Netherlands

Lab Phone: +31 (0)71 527 5841  
Home Phone: +31 (0)6 27 90 46 80  
Email: taquet@strw.leidenuniv.nl

## Education

- 2009 – 2012 **PhD in Astrophysics**, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), Université de Grenoble, France.
- 2008 - 2009 **Second year of Master's degree in Fundamental Physics: Astronomy and Astrophysics**, Observatoire de Paris, France, *honors*.
- 2007 - 2008 **First year of Master's degree in Fundamental Physics**, Université Paris-Sud, Orsay, France, *honors*.
- 2006 – 2007 **Licence's degree in Fundamental Physics**, Université Paris-Sud, Orsay, France, *honors*.
- 2004 – 2006 **Classes Préparatoires aux Grandes Ecoles d'Ingénieur, Option: Physics & Chemistry**, Lycée Faidherbe, Lille, France.
- 2004 **Scientific Baccalaureate**, Lycée Faidherbe, Lille, France, *honors*.

## Employment

- 01/2015 – present **Postdoctoral Research Fellow**, *Leiden Observatory, The Netherlands*
- 02/2013 – 12/2014 **NASA Postdoctoral Program Research Fellow**, *NASA Goddard Space Flight Center, Greenbelt, Maryland, USA*  
PI of research programme entitled *Deuterium fractionation of interstellar organic molecules: a clue for the origin of meteoritic amino-acids*
- 10/2012 – 12/2012 **Postdoctoral Research Fellow**, *Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), France*
- 09/2009 – 09/2012 **PhD student**, *Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), France*  
Thesis title: *Grain surface chemistry in low-mass star-forming regions.*  
Advisors: Cecilia Ceccarelli and Claudine Kahane (IPAG)
- 04/2009 – 07/2009 **MSc Internship**, *Laboratoire d'Etudes du Rayonnement et de la Matière (LERMA), Paris, France*  
Subject: *Molecular Signatures of Protostellar Jets*  
Advisors: Sylvie Cabrit (LERMA) and Guillaume Pineau-des-Forets (IAS)
- 04/2008 – 07/2008 **MSc Internship**, *Center of Astrophysics and Supercomputing, Swinburne University, Melbourne, Australia*  
Subject: *Physical Chemistry of Protoplanetary Dust Formation*  
Advisors: Sarah Maddison and Geoff Brooks (Swinburne University)
- 05/2007 – 08/2007 **BSc Internship**, *Laboratoire d'Etudes Spatiales et d'Instrumentation en Astrophysique (LESIA), Meudon, France*  
Subject: *Relationships between the Magnetic Field of the Sun and its Flares*  
Advisors: Nicole Vilmer and Véronique Bommier (LESIA)

## References

Dr. Steven Charnley  
Astrochemistry Laboratory  
NASA Goddard Space Flight Center, USA  
Phone: +1 650-302-7159  
Email: Steven.B.Charnley@nasa.gov

Pr. Cecilia Ceccarelli  
Institut de Planétologie et d'Astrophysique  
Université de Grenoble, France  
Phone: +33 4 76 51 42 01  
Email: Cecilia.Ceccarelli@obs.ujf-grenoble.fr

Pr. Ewine van Dishoeck  
Leiden Observatory  
Leiden University, NL  
Phone: +31 71 527 5814  
Email: ewine@strw.leidenuniv.nl

Pr. Eric Herbst  
Department of Chemistry  
University of Virginia, USA  
Phone: +1 434-243-0535  
eh2ef@virginia.edu

## Research Interests

- Chemical evolution in the early stages of star formation
- Formation, chemical composition and evaporation of interstellar ices
- Formation and evolution of complex organics
- Molecular deuteration

## Technical Skills

- **Astrophysics** Gas-grain astrochemical modelling, sub-mm observations, dynamics of low-mass star formation
- **Chemistry** Physical and chemical processes of heterogeneous ices, chemical networks, modelling of ice analogs
- **Programming** Fortran, C, Python, basics in shell
- **Softwares** IDL, GILDAS, L<sup>A</sup>T<sub>E</sub>X, Office, Open Office, Adobe suite, Gnuplot, Gimp

## Awards and Professional Activities

- **Awards**  
09/2012 NASA Postdoctoral Program fellowship  
01/2012 Best press release article awarded at the "SASP 2012" conference
- **Referee for scientific journals**  
2013 - present Astronomy and Astrophysics, The Astrophysical Journal, Monthly Notices of the Royal Astronomical Society
- **Teaching**  
2010 - 2011 Introductory programming with Maple : 1<sup>st</sup> year university level, 30 hours.  
2009 - 2012 Seminars of Molecular Astrophysics to College and Master classes.
- **Student Mentoring**  
2015 Supervisor of the LEAPS student, Kerry Ballantine, for her research project entitled *Understanding the formation of complex organics in star-forming regions*
- **Conference and Seminar Organisation**  
2015 - present Organisation of the astrochem seminars of the Leiden Observatory  
2010 Webmaster for the "COST Action Annual" conference  
2011 Webmaster for the "SASP 2012" conference

## Complementary Information

- **Languages** French (mother tongue), English (good level), Spanish (scholar level)
- **Leisure activities** Running, mountain-biking, skiing, soccer, cinema, traveling

## List of publications

- [18] **V. Taquet**, S. B. Charnley, E. Wirstrom 2015, *Formation and recondensation of complex organics during protostellar luminosity outbursts*, to be submitted to ApJ
- [17] N. Balucani, C. Ceccarelli, **V. Taquet** 2015, *New routes of gas-phase formation of complex organic molecules in cold gas*, MNRAS, 449, L16 [\[URL\]](#)
- [16] **V. Taquet**, A. Lopez-Sepulcre, C. Ceccarelli, R. Neri, C. Kahane, S. B. Charnley 2015, *Constraining the abundances of complex organics in the inner regions of solar-type protostars*, ApJ, 804, 81 [\[URL\]](#)
- [15] A. Rimola, **V. Taquet**, P. Ugliengo, N. Balucani, C. Ceccarelli, 2014, *A combined quantum chemical and modelling study of CO hydrogenation on water ice*, A&A 572, A70 [\[URL\]](#)
- [14] A. Coutens, J. Jørgensen, M. Persson, E. van Dishoeck, C. Vastel, **V. Taquet** 2014, *High D<sub>2</sub>O/HDO ratio in the inner regions of the low-mass protostar NGC1333 IRAS2A*, A&A, 792, L5 [\[URL\]](#)
- [13] **V. Taquet**, S. B. Charnley, O. Sipilä 2014, *Multilayer Formation and Evaporation of Deuterated Ices in Prestellar and Protostellar Cores*, ApJ, 791, 1 [\[URL\]](#)
- [12] N. Sakai, T. Sakai, T. Hirota, Y. Watanabe, C. Ceccarelli, C. Kahane, S. Bottinelli, E. Caux, K. Demyk, C. Vastel, A. Coutens, **V. Taquet**, N. Ohashi, S. Takakuwa, Y. Shigehisa, H-W. Yen, Y. Aikawa, S. Yamamoto 2013, *Change in the chemical composition of infalling gas forming a disk around a protostar*, Nature, 507, 7490 [\[URL\]](#)
- [11] A. Coutens, C. Vastel, S. Cabrit, C. Codella, L. E. Kristensen, C. Ceccarelli, E. van Dishoeck, A. C. A. Boogert, S. Bottinelli, A. Castets, E. Caux, C. Comito, K. Demyk, F. Herpin, B. Lefloch, C. McCoey, J. C. Mottram, B. Parise, **V. Taquet**, F. F. S. van der Tak, R. Visser, U. A. Yildiz 2013, *Deuterated water in the solar-type protostars NGC 1333 IRAS 4A and IRAS 4B*, A&A, 560, A39 [\[URL\]](#)
- [10] A. López-Sepulcre, **V. Taquet**, A. Sánchez-Monge, C. Ceccarelli, C. Dominik, F. Fontani, P.T.P. Ho, C. Kahane, M. Kama, R. Neri 2013, *High angular resolution observations towards OMC-2 FIR 4: Dissecting an intermediate-mass protocluster*, A&A, 556, A62 [\[URL\]](#)
- [9] **V. Taquet**, A. Lopez-Sepulcre, C. Ceccarelli, R. Neri, C. Kahane, A. Coutens, C. Vastel 2013, *Water deuterium fractionation in the inner regions of two low-mass protostars*, ApJL, 768, L29 [\[URL\]](#)
- [8] A. Coutens, C. Vastel, S. Cazaux, S. Bottinelli, E. Caux, C. Ceccarelli, K. Demyk, **V. Taquet**, V. Wakelam 2013, *Heavy water stratification in a low-mass protostar*, A&A, 553, A75 [\[URL\]](#)
- [7] **V. Taquet**, P. Peters, C. Kahane, C. Ceccarelli, D. Duflo, C. Toubin, A. Faure, L. Wiesenfeld 2013, *Modelling of deuterated water ice formation*, A&A, 550, A127 [\[URL\]](#)
- [6] C. Codella, C. Ceccarelli, B. Lefloch, F. Fontani, G. Busquet, P. Caselli, C. Kahane, **V. Taquet**, M. Vasta, S. Viti, L. Wiesenfeld 2012, *Fossil deuteration in the protostellar shock L1157-B1*, ApJL, 757, L9 [\[URL\]](#)
- [5] A. Bacmann, **V. Taquet**, A. Faure, C. Kahane, C. Ceccarelli 2012, *Detection of complex organic molecules in a prestellar core: a new challenge for astrochemical models*, A&A, 541, L12 [\[URL\]](#)
- [4] **V. Taquet**, C. Ceccarelli, C. Kahane 2012, *Formaldehyde and methanol deuteration in protostars: fossils from a past fast high density pre-collapse phase*, ApJL, 748, L3 [\[URL\]](#)
- [3] **V. Taquet**, C. Ceccarelli, C. Kahane 2012, *Multilayer modeling of grain porous surface chemistry I. The GRAINOBLE code*, A&A, 538, 42 [\[URL\]](#)
- [2] A. Ratajczak, **V. Taquet**, C. Kahane, C. Ceccarelli, A. Faure, E. Quirico 2011, *The puzzling deuteration of methanol in low- to high- mass protostars*, A&A, 528, 13 [\[URL\]](#)
- [1] F. Pignatale, S. Maddison, **V. Taquet**, G. Brooks, K. Liffman 2011, *The effect of the regular solution model in the condensation of protoplanetary dust*, MNRAS, 506 [\[URL\]](#)

## Conference talks

- 05/2015 *Formation and recondensation of complex organics during luminosity outbursts*, Contributed talk, "KIDA 2015 Workshop" (CNES, Paris, France)
- 08/2014 *Multiphase models*, Invited talk, "Grain Surface Networks and Data for Astrochemistry" (Lorentz Center, Leiden, The Netherlands)
- 04/2013 *Ice deuteration: models and observations to interpret the protostar history*, "From Stars to Life 2013" (Gainesville, FL, USA)
- 11/2012 *Ice deuteration: models and observations to interpret the protostar history*, "Physique et Chimie du Milieu Interstellaire" (Paris, France)
- 10/2012 *Ice deuteration: models and observations to interpret the protostar history*, Invited talk, "Workshop on Interstellar Matter 2012" (Sapporo, Japan)
- 10/2012 *Ice deuteration: models and observations to interpret the protostar history*, "COST Action Annual Conference 2012" (Catania, Italy)
- 07/2012 *The GRAINOBLE model interpretation of deuterated water observed by Herschel*, "EWASS 2012: The astrochemical universe unveiled with Herschel" (Rome, Italy)

## Conference posters

- 04/2014 *Multilayer formation and evaporation of deuterated ices from prestellar cores to protostellar envelopes*, Faraday Discussion 168 (Leiden, The Netherlands)
- 04/2014 *Complex organics and deuteration in the inner regions of low-mass protostars*, Faraday Discussion 168 (Leiden, The Netherlands)
- 10/2013 *Modelling the evolution of ice deuteration during the formation of low-mass protostars*, "The Universe explored by Herschel" (ESTEC, Noordwijk, The Netherlands)
- 07/2013 *Modelling the evolution of ice deuteration during the formation of low-mass protostars*, "Protostars and Planets VI" (Heidelberg, Germany)
- 06/2013 *Modelling the evolution of ice deuteration during the formation of low-mass protostars*, "Gordon Conference 2013: Origins of Solar System" (Mount Holyoke, MA, USA)
- 03/2012 *Herschel CHESS search of ozone and deuterated water: the GRAINOBLE model interpretation*, "Herschel's view on Star and Planet formation" (Grenoble, France)
- 01/2012 *Multiparameter and multilayer grain surface chemistry modeling in prestellar cores and in hot corinos*, "SASP: Atomic, Cluster and Surface Physics" 2012 (Alpe d'Huez, France)
- 05/2011 *A new model for the formation of grain mantles in Prestellar-Cores*, "IAU Symposium 280: The Molecular Universe" (Toledo, Spain)

## Seminars

- 02/2015 *Chemical complexity at the early stages of star formation*, Astrochem seminar series (Leiden Observatory, The Netherlands)
- 02/2015 *Chemical complexity at the early stages of star formation*, The University of Tokyo (Japan)
- 10/2014 *Interferometric observations and astrochemical modelling of complex organics around low-mass protostars*, IR/submm/mm Sack Lunch Series (Caltech, Pasadena, USA)
- 12/2013 *Chemical evolution at the early stages of low-mass star formation: deuteration and chemical complexity*, UVa / NRAO Astronomy (TUNA) Lunch Talks (Charlottesville, USA)
- 11/2013 *Water and organics around low-mass protostars: deuteration and chemical complexity*, Department of Astronomy, The University of Maryland (College Park, USA)
- 04/2013 *Ice deuteration: models and observations to interpret the protostar history*, Solar System Exploration Seminar, NASA Goddard Space Flight Center (Greenbelt, USA)

## Accepted proposals for observations

- 03/2015 - IRAM 30m *Chemical signatures of episodic luminosity outbursts in embedded protostars*
- 09/2014 - IRAM 30m *Deuteration and chemical complexity induced by efficient ice evaporation in Barnard 5*
- 07/2014 - NRO 45m *Deuteration and chemical complexity induced by efficient ice evaporation in Barnard 5*
- 04/2014 - APEX *Probing the molecular content of southern FUor sources*
- 03/2014 - IRAM 30m *Spatial distribution and physical properties of a low-mass protostellar outflow*
- 03/2010 - IRAM PdBi *Methyl formate and methanol: two key complex organic molecules*