

Eric Quirico
Curriculum Vitae

Professor
University Grenoble Alpes / CNRS
Institut de Planétologie et Astrophysique de Grenoble
Domaine Universitaire - BP 53
38041 Grenoble Cedex 9 - France
E-mail : eric.quirico@univ-grenoble-alpes.fr

Education

- 1992-95** : Ph. D. Thesis : Spectroscopic studies of molecular solids. Application to the study of the surfaces of Triton and Pluto. (University Joseph Fourier)
- 1990-91** : Master Degree in Material Sciences (Université Joseph Fourier)
- 1987-90** : Ecole Nationale Supérieure de Physique de Marseille (now Ecole Centrale Marseille)
- 1985-87** : Classes Préparatoires aux Grandes Ecoles CPGE Sup/P' (Lycée Berthollet, Annecy - France)

Employment

- 2010-...** : Professor - University Joseph Fourier, Institut de Planétologie et Astrophysique de Grenoble.
- 2002-10** : Associate Professor - University Joseph Fourier, Laboratoire de Planétologie de Grenoble.
- 1997-01** : Associate Professor - University Paris XI, Institut d'Astrophysique Spatiale
- 1996-97** : Assistant Professor Laboratoire de Planétologie et Géodynamique, University of Nantes - France

Research activities

Organics in Early Solar System

- Pre-accretion origin of organics, and ISM Heritage
- Organics, water and minerals co-evolution in primitive asteroids
- Carbon-based tracers of parent body thermal metamorphism

Surface composition and evolution of small bodies, satellites

- Analysis of VNIR reflectance observations
- Optical properties of planetary materials and their analogs
- Space weathering and surface processes

My activities are essentially based on **experiments** and **cosmomaterials analysis** in the laboratory :

- Micro-analysis of meteorites and dust particles : μ -FTIR, AFM-IR, μ -Raman, XANES, organics acid extraction
- VNIR Reflectance spectroscopy of planetary materials
- Spectroscopy of ices, optical constants measurements
- Experimental simulations : shocks, ion irradiation, heating processes under controlled conditions

Planetary missions involvement :

Rosetta (co-I); New Horizons (European Scientist); Hayabusa 2 (Board member of the LSS-IDS committee (Landing Site Science - Integrated Sciences). Board member of the Hayabusa 2 joint Science Team (HJST); Member of the Preliminary Examination Team on Insoluble Organic Matter); MMX/MIRS (Associated Scientist); JUICE/MAJIS (Associated Scientist).

Research Projects :

- ANR PRESS [2022-2026] - (70000 €). co-Investigator. *PREparing Jupiter's System Exploration with JWST* (PI : T. Fouchet LESIA)
- ANR CLASSY [2018-2022] - (620000 €). Principal Investigator. *Composition of Low Albedo Solar System surfaces*. Partnership : IPAG/LESIA (Meudon)/IAS (Orsay)/UMET (Lille)/MNHN (Paris)
- ANR COSMISME [2011-2013] (420000 €) Scientific Responsible for IPAG. *Matériaux du Milieu Interstellaire au Système solaire : Multi-diagnostics Expérimentaux*. Partnership IAS/IPAG/CSNSM
- ANR FORCOM [2008-2011] - Scientific Responsible for LPG. *Formation de Molécules Organiques Complexes dans l'Espace*. Partnership LAOG/LPG/IRAP
- ISSI international team (University of Berne) : Surface spectroscopy (2017-2019) (PI : M. Ciarniello INAF Rome)

Professional societies :

- Meteoritical Society (MetSoc)
- European Geochemical Society (EGU)
- International Astronomical Union (IAU)

Service

- 2014-... Member of the Working Group "Exobiology" - CNES (Centre National d'Etudes Spatiales)
- 2012-... Member of the Scientific Council of Labex LIO (University of Lyon)
- 2018-18 Groupe Prospective INSU : Astrophysique de laboratoire (analyse matière extraterrestre)
- 2015-17 Head of the Team "Planetary Sciences" (IPAG Grenoble)
- 2012-17 Member of the "Habilitation à Diriger des Recherches" (HDR) Committee of the Doctoral School TUE - Université Grenoble Alpes (Grenoble)
- 2011-15 Elected member of the National Council of Universities (Astronomy and Planetary Sciences department)
- 2014-16 "Chargé de mission" for Industrial and Advice to public policy at Observatoire des Sciences de l'Univers de Grenoble (OSUG)
- 2010-14 Deputy Director of Observatoire des Sciences de l'Univers de Grenoble (OSUG)

- 2008-10 Member of the committee of the TUNES department (University Grenoble 1)

Outside reviewing, Editorial board, Conference Convener

- 2021-... Associate Editor for *Planetary and Space Sciences*
- 2014-... Associate Editor for *Geochimica Cosmochimica Acta*
- Reviewer for peer-reviewed journals : Icarus, Meteoritics and Planetary Science, Meteorites, Geochimica Cosmochimica Acta, Organic Geochemistry, Astrophysics Journal, Astronomy and Astrophysics, Lithos, International Journal of Coal Geology, Ore Geology
- Conference convener : Goldschmidt Conference 2015, co-chair of theme "Cosmochemistry and astrophysics" (7 sessions); EPSC 2017 (Chair), 2018-2022 (co-Chair). Scientific committee of the 2022 Meteoritical Society Conference, Glasgow August 2022.
- Review of research proposals : NASA, ERC, National programs in France (DIM, COFECUB), Finland Academy of Sciences, Germany (DFG), Italy (PRIN-CINECA), Switzerland (ETH).
- Review panelist : Academy of Finland, 12/02/2019, Helsinki Finland ; NASA SPIRES, 28/07-02/08/ 2019 Miami USA.
- Participation to thesis comitee (12x reviewer, 5x examiner, 5x president) and Habilitation à Diriger des Recherches comitee (4x as reviewer, 1x as president)

Awards

- 2000-2021 Prime d'Encadrement Doctoral et de Recherche
- 2016 Outstanding contribution to the ESA Rosetta Mission
- 2021 Honor Award for contribution to the Hayabusa 2 Mission

Teaching

Service

- 2020-... Responsible of Bachelor degree Geosciences (Mention Licence Sciences Terre Environnement)
- 2005-07 Responsible of the second year "Earth Sciences" Bachelor degree.
- 2007-09 Responsible of first and second year of the "Geophysics" Bachelor degree.

Lectures

- Planetary sciences : Surface spectroscopy. Meteoritics. Cosmochemistry. Solar system formation. (M2-D)
- Physics : Physics of waves (L2). Heat transferts. Fluid mechanics. Electromagnetism. Optics. Crystallography. (L3-M1). Vibrational spectroscopy (D).
- Geosciences : Basics (L1). Gravimetry. Heat transferts in Earth and planets (L3).

Public outreach

Articles and Books

- "Missions de Retour", article pour la revue "L'astronomie", 2017.
- "Les origines" in "Le système solaire revisité", ouvrage coordonné par Jean Liliensten. Ed. Eyrolles, 2006.
- "Les surfaces de Triton et Pluton.", Schmitt, B., E. Quirico and C. de Bergh 1993. Dans Images de la physique 1993, Presses du CNRS, 126-133

Cours grand public et Formation continue

- Formation continue - Rectorat de Grenoble (2019-22) : "Les cristaux en Sciences de la Vie et de la terre". Mise en place ab initio d'un cours de formation en cristallographie et applications SVT, pour répondre au nouveaux programmes du lycée. mise à disposition d'une e-boîte à outils pour les enseignants de l'académie.
- Formation continue - Rectorat de Grenoble (2017-18) : Mars et Petits corps. Volume horaire 18h.
- Cours de Diffusion des Savoirs, Université Joseph Fourier (2004-2016) : "Planètes, comètes et astéroïdes". Responsable, Intervenant. Cours ouvert au grand public et aux formations initiales.

Conférences

- Accueil de Lycéens du Lycée de Lamballe (Côte d'Armor) : visite et mini-conférence sur les météorites. 5 février 2020 ; 2 mars 2022.
- Conférence à l'Université du Grésivaudan (6 février 2017) : " Les mondes de glace".
- Conférence à l'Université Inter-Age (UIAD - 6 avril 2016) : " Nouvelles de la mission Rosetta".
- Intervention Ecole primaire Don Bosco, Gières, classe de CM2 : "Le Système Solaire, berceau de la Terre".
- Conférence Centre Culturel Etoile sur Rhône (17 novembre 2016) : " La comète 67P/Churyumov-Gerasimenko à l'heure de la mission Rosetta".
- Conférence à l'Université du Grésivaudan (Juin 2013) : " Les astéroïdes".
- Conférence à l'Université Inter-Age (UIAD - 2012) : " Les comètes : de Ptolémée à la mission Rosetta".
- Conférence Club Astronomie Lyon-Ampère - 10 mars 2010 : "Le carbone extraterrestre dans tous ses états".
- Conférence au Club Dauphinois de Minéralogie et Paléontologie - 5 février 2010 : "Les minéraux des météorites".
- Conférence-Débat à l'occasion de la Fête de la Science - 21 novembre 2009 : Débat autour du film "L'imposture de la lune : L'homme a-t-il vraiment marché sur la lune?"
- Conférence-Débat à l'occasion des Tribulations Savantes (Université Joseph Fourier) - 1er avril 2009 : Débat autour du film "Le lien cosmique" sur la question de l'origine de la vie, avec Bruno Franzetti, chargé de recherche au CNRS, biologiste au laboratoire de biophysique moléculaire (LBM/IBS/UJF/CNRS).
- Conférence Université Stendhal Grenoble 3 - 20 mars 2009 : "Poésie de l'histoire naturelle", avec la participation de Isabelle Cogitore et Aurélie Deny (Enseignant-chercheurs à l'Université Stendhal).
- Conférence Club Astronomie Lyon-Ampère - 12 mars 2008 : "Dernières nouvelles des petits corps du système solaire : astronomie et micro-géologie"
- Conférence à l'Université Inter-Age (UIAD 16 janvier 2008) : " La mission HAYABUSA sur l'astéroïde Itokawa"
- Conférence campus universitaire - (2005 - Fête de la science) : " Comment les

- météorites racontent les astéroïdes...”
- Conférence campus universitaire - (2005 - Fête de la science) : ” Comment les météorites racontent les astéroïdes...”
 - Conférence au Musée de la chimie de Jarrie (novembre 2004 – Fête de la Science) : ”Le satellite Titan et la mission CASSINI-HUYGENS”
 - Conférence à l’Association des Professeurs de Biologie et Géologie de Grenoble (18 décembre 2003) : ”Astéroïdes et météorites : l’apport de la mission NEAR”

Invited presentation, seminars and lectures

International conferences and workshops

- 2017 Multi-scale planetary science Workshop. 21-22 Juin. Observatoire de Paris.
- 2017 The composition of comet 67P/Churyumov-Gerasimenko. AOGS Conference, Singapore August 7-11
- 2015 Composition of 67P/CG refractory crust as inferred from VIRTIS/Rosetta. Goldschmidt conference, Pragues 16-21 August.
- 2009 From interstellar to cometary ices : some experimental aspects. AGU Fall Meeting, San Francisco. 14-18 december 2009.
- 2009 Volatiles in Early Solar System : Astronomical observations and experimental simulations. In Cosmochemistry Workshop, Meteoritical Society Meeting, Nancy, July 2009.
- 2008 Tholins and their relevance for astrophysical issues. In IAU Symposium, volume 251 of IAU Symposium, pages 409–416, February 2008.

National workshop and schools

- 2020 Raman spectroscopy of meteoritic organic matter. In ”L’école WURM de spectrométrie Raman”, Ecole Normale Supérieure de Lyon 3-6 March 2020
- 2017 Workshop « Processus physico-chimiques d’intérêt astrophysique : les molécules complexes ». St Florent 12-15 Juin 2017
- 2017 Composition of comet 67P/Churyumov-Gerasimenko. CNES, Workshop May 18.
- 2016 The ISM heritage in comet 67P/Churyumov-Gerasimenko. PCMI conference, Lille, 24-28 October.
- 2015 Composition of 67P/CG refractory crust as inferred from VIRTIS/Rosetta. SF2A conference, Rosetta Workshop, Toulouse 4-5 June.
- 2014 Raman spectroscopy of natural synthetic carbons for planetary sciences applications. In ”L’école WURM de spectrométrie Raman”, Ecole Thématique du CNRS Ecole Normale Supérieure de Lyon 3-7 november 2014
- 2014 Spectroscopie Raman des chondrites carbonées. In ”CarboRaman”, Ecole Thématique du CNRS, Nouan le Fuzelier, 12-17 octobre 2014
- 2014 Caractérisation physique et chimique des poussières extraterrestres. In ”Les poussières : de la troposphère au milieu interstellaire.”, Ecole de Physique des Houches, 23-28 mars 2014

Invited seminars

- 30/04/2015 Centre de Recherche Pétrologiques et Géochimiques - Nancy.
- 15/12/2013 Konkoly Observatory - Budapest.
- 12/07/2012 Helmholtz Zentrum - München.

- 30/04/2010 Origins Laboratory, The University of Chicago (USA)
- 18/12/2009. Space Science Laboratory - University of California (Berkeley, USA).
- 30/09/2008. Open University (Milton Keynes, England).
- 17/03/2008. LISA, Université Paris XII.
- 31/01/2008. APEX seminars of University College of London (UCL London, England).
- 09/02/2007. HIGP (University of Hawaii at Manoa, Hawaii, USA).
- 10/06/2006. LEME, Muséum National d'Histoire Naturelle, Paris.
- 16/05/2005. IAS, Rome, Italie.
- 17/03/2005. LAOG, UJF Grenoble.
- 07/05/2004. LISA Université Paris XII.

Other invitations

- 6-10/06/2020 Invitation at Tohoku University - GPEES program. Panelist for the review of 9 Master students. Two master lectures 2x1.5h on "Organic Matter in Solar System".

Supervision

Post-doctorate researchers :

- 2017-...** : V. Phan (co-supervised with P. Beck - ERC SOLARYS)
- 2017-19** : O. Poch (CNES)
- 2007-09** : G. Montes-Hernandez (UGA)
- 2005-07** : J-M Bernard (CNES)

Ph. D. Students supervision :

- 2020-23** : Thibault Launois (supervised with Aurore Bacmann) University Grenoble Alpes
- 2018-21** : Hong-Van Hoang (supervised with S. Fornasier) University Grenoble Alpes
- 2016-19** : I. Istiqomah (supervised with P. Theulé). University Grenoble Alpes
- 2013-16** : M. Faure (supervised with A. Faure). University Grenoble Alpes
- 2008-12** : A. Ratajczak (supervised with A. Faure). University Grenoble 1
- 2008-12** : J-Y Bonnet (supervised with R. Thissen). University Grenoble 1
- 2007-11** : F-R Orthous-Daunay. University Grenoble 1
- 2003-06** : L. Bonal. University Grenoble 1
- 1998-03** : P-I Raynal (supervised with Janet Borg). University Paris VI

Contribution to the supervision of three thesis¹ :

- 2020-23** : Kana Amano (Sup. T. Nakamura, Tohoku University Japan)
- 2014-17** : B. Rousseau (Sup. S. Erard LESIA)
- 2007-10** : G. Briani (Sup. M. Gounelle/E. Pace) MNHN and Università di Firenze
- 2006-09** : E. Dobrica (Sup. Cécile Engrand) Université Paris XI

Doctors employment :

1. The first includes a chapter on spectroscopic reflectance experiments, the second and third include a chapter on characterization of carbonaceous phases by Raman micro-spectroscopy.

Pierre-Ivan Raynal : Research Engineer - Université de Tours
 Lydie Bonal : Astronome Adjoint - IPAG Grenoble
 François-Régis Orthous-Daunay : Associate Professor - Université Grenoble Alpes
 Alexandre Ratajczak : Teacher
 Jean-Yves Bonnet : Research Engineer - LATMOS Guyancourt
 Mathilde Faure : Professeur agrégé
 Istiqomah Istiqomah : Engineer Patent Office at Djakarta Indonesia

M2 Internships supervision :

- 2022** : Lilian Meunier. M2R Astrophysique Strasbourg. En co-tutelle avec O. Poch. Propriétés optiques de résidus chondritiques ultra-poreux.
- 2012** : M. Faure. M2R Astrophysique Planétologie Plasmas. En co-tutelle avec A. Faure (LAOG)
- 2008** : A. Ratajczak, M2R Physico-Chimie (UJF-Grenoble). Etude des échanges D-H dans des glaces interstellaires. En co-tutelle avec A. Faure (LAOG)
- 2008** : S.Gros, M2R Sciences Terre Environnement (UJF-Grenoble). Etude de thermodégradation de matériaux modèles d'organiques cométaires.
- 2007** : C. Robin, M2R Terre, Univers, Environnement (UJF-Grenoble). Phases carbonées dans les chondrites à enstatite.
- 2007** : C. Marcaillou, M2R Terre Univers Environnement (UJF-Grenoble). Histoire temps- température de deux chondres. Interdiffusion Mg-Fe chondre-matrice. En cotutelle avec E. Lewin (LGCA - UJF).
- 2007** : F-R Orthous-Daunay, M2R Physique et Chimie de la Terre et des Planètes (ENS-Lyon). Caractérisation structurale de la matière organique macromoléculaire dans des poussières interplanétaires stratosphériques.
- 2006** : A. Boucherle, M2R Physique et Chimie de la Terre et des Planètes (ENS-Lyon). Spéciation de l'azote organique dans les poussières interplanétaires stratosphériques.
- 2004** : H. Santerne, M2R Terre Univers Environnement (UJF-Grenoble). Caractérisation de matière organique naturelle par Fluorescence Induite par Laser.
- 2003** : L. Bonal, DEA Astrophysique et Méthodes associées - ParisVII. Etude du métamorphisme thermique des chondrites CV.
- 1998** : P-I Raynal, DEA Méthodes instrumentales en astrophysique et leurs applications spatiales - Paris VI. Caractérisation de grains extraterrestres par microscopie infrarouge.

M1-L3 Internships supervision :

- 2021** : E. Gabiot, L2 PSTE UGA. Reflectance MIR spectroscopy of chondrites
- 2020** : N. El Yandouzi, IUT Chimie UGA. Spatial distribution of organics in Murchison (CM2)
- 2019** : E. Caminiti et A. Bernard, L3 STPE Universite Grenoble Alpes. Microspectroscopie FTIR de chondrites C2 métamorphisées.
- 2018** : I. Dahel, M1 STPE Universite Grenoble Alpes. Caractérisation chimique de charbons et IOMs par spectroscopie FTIR.
- 2018** : M. Chambe, M1 Ecole Centrale Nantes. Etude de la ceinture de Cthulhu à partir des données MVIC/LEISA/New Horizons.
- 2018** : A. Dop L3 ENS Cachan. Etude de l'harmonique 0-2 du CO solide.
- 2017** : A. Joyeux. L1 Géosciences UGA. Protocoles de production de poudres submicrométriques par broyage colloïdal.
- 2016** : J. Prestgard, L2 Géosciences UGA. Mesures de réflectance VNIR d'analogues cométaires.
- 2016** : C. César et N. Fleury, L3 Géosciences UGA. Sensibilité au vide de la signature à 3 μm des chondrites carbonées.
- 2011** : A. Guillot, L3 Géosciences UJF. Micro-extraction de matière organique chondritique.
- 2009** : J. Bollard, L3 Géosciences UJF. Minéralogie hydratée des chondrites CI et CM caractérisée par microscopie IR en cellule environnementale.
- 2004** : A. Boronkay, L3 Physique fondamentale UJF. Métamorphisme thermique dans les chondrites carbonées CO.
- 2003** : A. Robert, M1 Physique Applications UJF. Mise au point d'une cellule de maturation de la matière organique météoritique.
- 2001** : L. Bonal, L3 Physique Paris XI. Microscopie infrarouge des matrices hydratées de chondrites CI et CM.
- 2000** : D. Aubert et T. Aiouaz, L3 Physique Paris XI. Spectroscopie Infrarouge d'analogues organiques météoritiques.

TABLE 1 – Publications per journal

Icarus (37)	Geoch. Cosm. Acta (13)	Astron. Astrophys. (11)	Met Plan. Sci. (10)
Science (7)	MNRAS (6)	Plan. Spa. Sci. (4)	The J. Astronomy (3)
EarthPlan.Sci. Lett. (3)	PNAS (2)	Spec. Acta A (2)	Nature (2)
ESA Pub (1)	Nat. Astronomy (1)	Astrop. J. (1)	J. Mass Spect. (1)
J. Haz. Mat. (1)	J. Sol. State Chem. (1)	J. Phys. Chem. (1)	Faraday Disc. (1)
CEJ (1)	Cryst. Growth (1)	J. Asian Earth Sci. (1)	Astrobiology (1)

Publications

- 114 publications in peer-reviewed international journals (29 as 1st or student/post-doc as 1st; 7 as 2nd author)
- 4 book chapters
- ISI-WOK : 5513 citations ; h-index=45 (as to 2021/10/12).

Chapter Books

- 4 **Quirico**, E. and L. Bonal (2017) Organic materials in extraterrestrial samples. in Biosignatures for exobiology, eds B. Cavalazzi and F. Westall, Springer-Germany.
- 3 De Bergh, C., B. Schmitt, L. Moroz, E. **Quirico** D. P. Cruikshank (2008). Data on ices, carbonaceous materials and minerals relevant to the study of the surfaces of transneptunian objects and centaurs. In Kuiper Belt, The University of Arizona Space Science Series, eds. A. Barucci, H. Boehnhardt, D.P. Cruikshank and A. Morbidelli.
- 2 Cruikshank, D. P., T. L. Roush, T. C. Owen, E. **Quirico**, and C. de Bergh (1997). The surface compositions of Triton, Pluto and Charon. in Solar System Ices, (B. Schmitt, C. de Bergh, and M. Festou eds.), Kluwer Academic Publ., Dordrecht, Astrophys. Space sci. Lib.
- 1 Schmitt, B., E. **Quirico**, F. Trotta, W. Grundy and R. Khanna (1997). Optical properties from the UV to the infrared range, (B. Schmitt, C. de Bergh, and M. Festou eds.), Kluwer Academic Publ., Dordrecht, Astrophys. Space sci. Lib.

Articles in peer-reviewed journals

- 118 Phan V. T.H., Rebois R., Beck P., **Quirico** E., Bonal L., Noguchi T. (2022) Nanoscale mineralogy and organic structure in Orgueil (CI) and EET 92042 (CR) carbonaceous chondrites studied with AFM-IR spectroscopy. *Meteoritics Planetary Science*, Volume 57, Issue 1, pp. 3-21
- 117 Vernazza, P. ; Beck, P. ; Ruesch, O. ; Bischoff, A. ; Bonal, L. ; Brennecka, G. ; Brunetto, R. ; Busemann, H. ; Carter, J. ; Carli, C. ; Cartier, C. ; Ciarniello, M. ; Debaille, V. ; Delsanti, A. ; D’Hendecourt, L. ; Füre, E. ; Groussin, O. ; Guilbert-Lepoutre, A. ; Helbert, J. ; Hoppe, P. ; Jehin, E. ; Jorda, L. ; King, A. ; Kleine, T. ; Lamy, P. ; Lasue, J. ; Le Guillou, C. ; Leroux, H. ; Leya, I. ; Magna, T. ; Marrocchi, Y. ; Morlok, A. ; Mousis, O. ; Palomba, E. ; Piani, L. ; Quirico, E. ; Remusat, L. ; Roskosz, M. ;

- Rubin, M. ; Russell, S. ; Schönbächler, M. ; Thomas, N. ; Villeneuve, J. ; Vinogradoff, V. ; Wurz, P. ; Zanda, B. (2021) Sample return of primitive matter from the outer Solar System. *Experimental Astronomy*, Online First. 10.1007/s10686-021-09811-y
- 116 Bertrand T., Lellouch E., Holler B. J., Young L.A., Schmitt B., Marques Oliveira J., Sicardy B., Forget F., Grundy W. M., Merlin F., Vangvichith M., Millour, E., Schenk P. M., Hansen C. J., White O. L., Moore J. M., Stansberry J. A., Oza A. V., Dubois D., **Quirico** E. and Cruikshank, D. P.(2022) Volatile transport modeling on Triton with new observational constraints. *Icarus* 373, 114764. doi :10.1016/j.icarus.2021.114764
- 115 Ciarniello M., Moroz L. V., Poch O., Vinogradoff V., Beck P., Rousseau B., Istiqomah I., Sultana R., Raponi A., Filacchione G., Kappel D., Pommerol A., Schröder S.E., Pilorget C., Quirico E., Mennella V. and Schmitt B. (2021) *Minerals* vol 11, 1222
- 114 Chauviré B., M. Pineau, E. **Quirico** and P. Beck Near infrared signature of opaline silica at Mars-relevant pressure and temperature. *Earth Plan. Sci. Lett.* In press.
- 113 Matzka M., M. Lucio, B. Kanawati, E. **Quirico**, L. Bonal, S. Löhle, P. Schmitt-Kopplin. Thermal history of asteroid parent bodies is reflected in their metalorganic chemistry. *The Astrophysical Journal* 915 :L7
- 112 **Fayolle** M., E. **Quirico**, B. Schmitt, L. Jovanovic, T. Gautier, N. Carrasco, W. Grundy, V. Vuitton, O. Poch, S. Protopapa, L. Young, D. Cruikshank, C. Dalle Ore, T. Bertrand, A. Stern, the New Horizons Surface Composition Science Theme Team. Testing tholins as analogues of the dark reddish material covering Pluto’s Cthulhu region. *Icarus* 367, 114574
- 111 **Phan** Van T.H, E. **Quirico**, Pierre Beck, Yann Le Brech, Lora Jovanovic, Corentin Le Guillou, Sylvain Bernard, Lydie Bonal, Nathalie Carrasco, Thomas Gautier, Jesus Raya. Infrared spectroscopy quantification of functional carbon groups in kerogens and coals : A calibration procedure. *Spectrochimica Cosmochimica Acta A* 259, 119853
- 110 **Faure** M., **Quirico**, Alexandre Faure, Philippe Boduch, Hermann Rothard, Emmanuel Balanzat, Donia Baklouti, Rosario Brunetto, Lydie Bonal, Pierre Beck and Bernard Schmitt. a radiolytic origin of organic matter in primitive chondrites and trans-neptunian objects? new clues from ion irradiation experiments. *Icarus* 364, 114462.
- 109 Jovanovic L., T. Gautier, L. Broch, S. Protopapa, T. Bertrand, P. Rannou, M. Fayolle, E. **Quirico**, L. Johann, A. En Naciri and N. Carrasco (2021) Optical constants of Pluto aerosol analogues from UV to near-IR. *Icarus* 362, 114398.
- 108 Sultana R., Poch, O., Beck P., Schmitt B. and **Quirico** E. (2021) Visible and near-infrared reflectance of hyperfine and hyperporous particulate surfaces. *Icarus* 357, 114141
- 107 Beck, Pierre and Eschrig, Jolantha and Potin, Sandra and Prestgard, Trygve and Bonal, Lydie and **Quirico**, Eric and Schmitt, Bernard (2021) “Water” abundance at the surface of C-complex main-belt asteroids. *Icarus* 357, 114125
- 106 Potin, S. ; Beck, P. ; Bonal, L. ; Schmitt, B. ; Garenne, A. ; Moynier, F. ; Agranier, A. ; Schmitt-Kopplin, P. ; Malik, A. K. ; **Quirico**, E.(2020) Mineralogy, chemistry, and composition of organic compounds in the fresh carbonaceous chondrite Mukundpura : CM1 or CM2? *Meteoritics and Planetary Science* 55, 1681-1696

- 105 Hoang, Hong Van ; Fornasier, S. ; **Quirico**, E. ; Hasselmann, P. H. ; Barucci, M. A. ; Sierks, H. ; Tubiana, C. ; Güttler (2020) Spectrophotometric characterization of the Philae landing site and surroundings with the Rosetta/OSIRIS cameras. *Monthly Notices of the Royal Astronomical Society* **498**, 1221-1238
- 104 **Quirico**, E., L. Bonal, G. Montagnac, P. Beck and B. Reynard. Precursor memory and maturation grade of coals, biotic and abiotic kerogens, as rated by UV 244 nm Raman spectroscopy. *Geo. Cosmochim. Acta* **282**, 156-176
- 103 Grundy, W. M. ; Bird, M. K. ; Britt, D. T. ; Cook, J. C. ; Cruikshank, D. P. ; Howett, C. J. A. ; Krijt, S. ; Linscott, I. R. ; Olkin, C. B. ; Parker, A. H. ; Protopapa, S. ; Ruaud, M. ; Umurhan, O. M. ; Young, L. A. ; Dalle Ore, C. M. ; Kavelaars, J. J. ; Keane, J. T. ; Pendleton, Y. J. ; Porter, S. B. ; Scipioni, F. Spencer, J. R. ; Stern, S. A. ; Verbiscer, A. J. ; Weaver, H. A. ; Binzel, R. P. ; Buie, M. W. ; Buratti, B. J. ; Cheng, A. ; Earle, A. M. ; Elliott, H. A. ; Gabasova, L. ; Gladstone, G. R. ; Hill, M. E. ; Horanyi, M. ; Jennings, D. E. ; Lunsford, A. W. ; McComas, D. J. ; McKinnon, W. B. ; McNutt, R. L. ; Moore, J. M. ; Parker, J. W. ; **Quirico**, E. ; Reuter, D. C. ; Schenk, P. M. ; Schmitt, B. ; Showalter, M. R. ; Singer, K. N. ; Weigle, G. E. ; Zangari, A. M. (2020) Color, composition, and thermal environment of Kuiper Belt object (486958) Arrokoth. *Science* 367, aay3705
- 102 Poch O., I. Istiqomah, E. **Quirico**, Pierre Beck, Bernard Schmitt, Patrice Theulé, Alexandre Faure, Pierre Hily-Blant, Batiste Rousseau, Sandra Potin, Olivier Brisaud, Laurène Flandinet, Lydie Bonal, Andrea Raponi, Mauro Ciarniello, Gianrico Filacchione, Antoine Pommerol, Nicolas Thomas, David Kappel, Vito Mennella, Lyuba Moroz, Vassilissa Vinogradoff, Gabriele Arnold, Dominique Bockelée-Morvan, Fabrizio Capaccioni, Maria Cristina De Sanctis, Stéphane Erard, Cédric Leyrat, Andrea Longobardo, Francesca Mancarella, Ernesto Palomba, Federico Tosi. First detection of ammonium salts on a cometary nucleus, revealing a new reservoir of nitrogen. *Science* Vol. 367, Issue 6483, eaaw7462
- 101 Raponi A., M. Ciarniello, F. Capaccioni, V. Mennella, G. Filacchione, V. Vinogradoff, O. Poch, P. Beck, E. **Quirico**, M. C. De Sanctis, L. Moroz, D. Kappel, S. Erard, D. Bockelée-Morvan, A. Longobardo, F. Tosi, E. Palomba, J.-P. Combe, B. Rousseau, G. Arnold, R. W. Carlson, A. Pommerol, C. Pilorget, S. Fornasier, F. Mancarella, G. Rinaldi, I. Istiqomah, C. Leyrat (2020) Aliphatic organics on comet 67P/Churyumov-Gerasimenko : from interstellar dust to pristine solar system. *Nature Astronomy* <https://doi.org/10.1038/s41550-019-0992-8>
- 100 Silvia Protopapa, Cathy B. Olkin, Will M. Grundy, Jian-Yang Li, Anne Verbiscer, Dale P. Cruikshank, Thomas Gautier, Eric **Quirico**, Jason C. Cook, Dennis Reuter, Carly J.A. Howett, Alan Stern, Ross A. Beyer, Simon Porter, Leslie A. Young, Hal A. Weaver, Kim Ennico, Cristina M. Dalle Ore, Francesca Scipioni and Kelsi Singer (2020). Disk-resolved photometric properties of Pluto and the coloring materials across its surface. *The Astronomical Journal*, 159, Issue 2, id.74, 15 pp
- 99 Stern S.A., H. A. Weaver, J. R. Spencer, C. B. Olkin, G. R. Gladstone, W. M. Grundy, J. M. Moore, D. P. Cruikshank, H. A. Elliott, W. B. McKinnon, J. Wm. Parker, A. J. Verbiscer, L. A. Young, D. A. Aguilar, J. M. Albers, T. Andert, J. P. Andrews, F. Bagenal, M. E. Banks, B. A. Bauer, J. A. Bauman, K. E. Bechtold, C. B. Beddingfield, N. Behrooz, K. B. Beisser, S. D. Benecchi, E. Bernardoni, R. A. Beyer, S. Bhaskaran, C. J. Bierson, R. P. Binzel, E. M. Birath¹, M. K. Bird, D. R. Boone, A. F. Bowman, V. J. Bray, D. T. Britt, L. E. Brown, M. R. Buckley, M. W. Buie, B. J. Buratti, L. M. Burke, S. S. Bushman, B. Carcich, A. L. Chaikin,

- C. L. Chavez, A. F. Cheng, E. J. Colwell, S. J. Conard, M. P. Conner, C. A. Conrad, J. C. Cook, S. B. Cooper, O. S. Custodio, C. M. Dalle Ore, C. C. Deboy, P. Dharmavaram, R. D. Dhingra, G. F. Dunn, A. M. Earle, A. F. Egan, J. Eising, M. R. El-Maarry, C. Engelbrecht, B. L. Enke, C. J. Ercol, E. D. Fattig, C. L. Ferrell, T. J. Finley, J. Firer, J. Fischetti, W. M. Folkner, M. N. Fosbury, G. H. Fountain, J. M. Freeze, L. Gabasova, L. S. Glaze, J. L. Green, G. A. Griffith, Y. Guo, M. Hahn, D. W. Hals, D. P. Hamilton, S. A. Hamilton, J. J. Hanley, A. Harch, K. A. Harmon, H. M. Hart, J. Hayes, C. B. Hersman, M. E. Hill, T. A. Hill, J. D. Hofgartner, M. E. Holdridge, M. Horányi, A. Hosadurga, A. D. Howard, C. J. A. Howett, S. E. Jaskulek, D. E. Jennings, J. R. Jensen, M. R. Jones, H. K. Kang, D. J. Katz, D. E. Kaufmann, J. J. Kavelaars, J. T. Keane, G. P. Keleher, M. Kinczyk, M. C. Kochte, P. Kollmann, S. M. Krimigis, G. L. Kruizinga, D. Y. Kusnierkiewicz, M. S. Lahr, T. R. Lauer, G. B. Lawrence, J. E. Lee, E. J. Lessac-Chenen, I. R. Linscott, C. M. Lisse, A. W. Lunsford, D. M. Mages, V. A. Mallder, N. P. Martin, B. H. May, D. J. McComas, R. L. McNutt Jr., D. S. Mehoke, T. S. Mehoke, D. S. Nelson, H. D. Nguyen, J. I. Núñez, A. C. Ocampo, W. M. Owen, G. K. Oxtton, A. H. Parker, M. Pätzold, J. Y. Pelgrift, F. J. Pelletier, J. P. Pineau, M. R. Piquette, S. B. Porter, S. Protopapa, E. **Quirico**, J. A. Redfern, A. L. Regiec, H. J. Reitsema, D. C. Reuter, D. C. Richardson, J. E. Riedel, M. A. Ritterbush, S. J. Robbins, D. J. Rodgers, G. D. Rogers, D. M. Rose, P. E. Rosendall, K. D. Runyon, M. G. Ryschkewitsch, M. M. Saina, M. J. Salinas, P. M. Schenk, J. R. Scherrer, W. R. Schlei, B. Schmitt, D. J. Schultz², D. C. Schurr²⁹, F. Scipioni^{5,14}, R. L. Sepan², R. G. Shelton², M. R. Showalter¹⁴, M. Simon², K. N. Singer¹, E. W. Stahlheber², D. R. Stanbridge¹³, J. A. Stansberry⁴⁴, A. J. Steffl, D. F. Strobel, M. M. Stothoff, T. Stryk, J. R. Stuart, M. E. Summers, M. B. Tapley, A. Taylor, H. W. Taylor, R. M. Tedford, H. B. Throop, L. S. Turner, O. M. Umurhan, J. Van Eck, D. Velez, M. H. Versteeg, M. A. Vincent, R. W. Webbert, S. E. Weidner, G. E. Weigle II, J. R. Wendel, O. L. White, K. E. Whittenburg, B. G. Williams, K. E. Williams, S. P. Williams, H. L. Winters, A. M. Zangari, T. H. Zurbuchen (2019) Initial results from the New Horizons exploration of 2014 MU69, a small Kuiper Belt object. *Science* 364, Issue 6441, eaaw9771
- 98 Tegler S.C., T.D. Stufflebeam, W.M. Grundy, J.Hanley, S. Dustrud, G.E. Lindberg, A. Engle, T. R. Dillingham, D. Matthew, D. Trilling, H. Roe, J.Llama and E. **Quirico** (2019) A New Two-Molecule Combination Band as Diagnostic of Carbon Monoxide Diluted in Nitrogen Ice On Triton . *Astrophys. Journal* 158, 1
- 97 Garenne A., P. Beck, G. Montes-Hernandez, L. Bonal, E. **Quirico**, O. Proux, J.L. Hazemann (2019) The iron record of asteroidal processes in carbonaceous chondrites. *Met. Plan. Sci.* 54, 2652-2665
- 96 Rémusat L., J-Y Bonnet, S. Bernard, A. Buch and E. **Quirico** (2019) Molecular and isotopic behavior of Insoluble Organic Matter of the Orgueil meteorite upon heating. *Geochim. Cosmo. Acta* 263, 235-247
- 95 **Quirico** E., Bonal L., Beck P., Alexander C. M.O'D., Nakamura T., Yabuta H., Nakato A., L. Flandinet, Montagnac G. and Schmitt-Kopplin P. (2018) Post-accretional effects on Insoluble Organic Matter in CM and C2-ungrouped chondrites, *Geochim. Cosmo. Acta* 241 : 17-37
- 94 Beck P., A. Maturilli, A. Garenne, P. Vernazza, J. Helbert, **E. Quirico** and B. Schmitt (2018) What is controlling the reflectance spectra (0.35- 150 μm) of hydrated (and dehydrated) carbonaceous chondrites? *Icarus* in press

- 93 Merlin F., E. Lellouch, E. **Quirico** and B. Schmitt (2018) New constraints on the Triton surface. *Icarus* 314, 274-293
- 92 Grundy W. M., T. Bertrand, R.P. Binzel, M.W. Buie, B.J. Buratti, A.F. Cheng, J.C. Cook, 5 D.P. Cruikshank, S.L. Devins, C.M. Dalle Ore, A.M. Earle, K. Ennico, F. Forget, P. Gao, G.R. Gladstone, C.J.A. Howett, D.E. Jennings, J.A. Kammer, T.R. Lauer, I.R. Linscott, C.M. Lisse, A.W. Lunsford, W.B. McKinnon, C.B. Olkin, A.H. Parker, S. Protopapa, **E. Quirico**, D.C. Reuter, B. Schmitt, K.N. Singer, J.A. Spencer, S.A. Stern, D.F. Strobel, M.E. Summers, H.A. Weaver, G.E. Weigle II, M.L. Wong, E.F. Young, L.A. Young, and X. Zhang (2018) Pluto's Haze as a Surface Material. *Icarus* 314, 232-245
- 91 Rousseau B., Erard S., Beck P., **Quirico** E., Bernard Schmitt, Olivier Brissaud, German Montes-Hernandez, Fabrizio Capaccioni, Gianrico Filacchione, Dominique Bockelée-Morvan, Cédric Leyrat, Mauro Ciarniello, Andrea Raponi, David Kappel, Gabriele Arnold, Ljuba V. Moroz, Ernesto Palomba, Federico Tosi and the VIRTIS Team (2017) Laboratory simulations of the Vis-NIR spectra of comet 67P using sub- μm sized cosmochemical analogues. *Icarus* 306, 306-318
- 90 Battandier M., Bonal L., **Quirico** E., Beck P., Engrand C. Duprat J. and Dartois E. (2017) Characterization of the organic matter and hydration state of Antarctic micrometeorites : a reservoir distinct from carbonaceous chondrites. *Icarus*, 306, 74-93
- 89 Longobardo, A. ; Palomba, E. ; Capaccioni, F. ; Ciarniello, M. ; Tosi, F. ; Mottola, S. ; Moroz, L. V. ; Filacchione, G. ; Raponi, A. ; **Quirico**, E. ; Zinzi, A. ; Capria, M. T. ; Bockelee-Morvan, D. ; Erard, S. ; Leyrat, C. ; Rinaldi, G. ; Dirri, F. (2017) Photometric behaviour of 67P/Churyumov-Gerasimenko and analysis of its pre-perihelion diurnal variations. *MNRAS* 349, S346-S356
- 88 Bockelée-Morvan D., G. Rinaldi, S. Erard, C. Leyrat, F. Capaccioni, G. Filacchione, P. Drossart, A. Migliorini, E. **Quirico**, G. Tozzi N. Biver, J. Crovisier, G. Arnold, M.-T. Capria, M. Combes, M. Combi, M.-C. de Sanctis, T. Encrenaz, U. Fink, W. Ip, G. Piccioni, B. Schmitt (2017) Comet 67P outbursts and quiescent coma at 1.3 AU from the Sun : dust properties from Rosetta/VIRTIS-H observations. *MNRAS* 469, S443-S458
- 87 Howett C. J. A., Parker A. H., Olkin C. B., Reuter D. C., Ennico K., Grundy W. M., Graps A. L., Harrison K. P., Throop H. B., Buie M. W., Lovering J. R., Porter S. B., Weaver H. A., Young L. A., Stern S. A., Beyer R. A., Binzel R. P., Buratti B. J., Cheng A. F., Cook J. C., Cruikshank D. P., Dalle Ore C. M., Earle A. M., Jennings D. E., Linscott I. R., Lunsford A. W., Parker J. W. m., Phillippe S., Protopapa S., **Quirico** E., Schenk P. M., Schmitt B., Singer K. N., Spencer J. R., Stansberry J. A., Tsang C. C. C., Weigle G. E., Verbiscer A. J. (2017) Inflight radiometric calibration of New Horizons' Multispectral Visible Imaging Camera (MVIC). *Icarus* 287, 140-151
- 86 Schmitt B., Phillippe S., Grundy W. M., Reuter D. C., Côte R., **Quirico** E., Protopapa S., Young L. A., Binzel R. P., Cook J. C., Cruikshank D. P., Dalle Ore C. M., Earle A. M., Ennico K., Howett C. J. A., Jennings D. E., Linscott I. R., Lunsford A. W., Olkin C. B., Parker A. H., Parker J. W., Singer K. N., Spencer J. R., Stansberry J. A., Stern S. A., Tsang C. C. C., Verbiscer A. J. and Weaver H. A. (2017) Physical state and distribution of materials at the surface of Pluto from New Horizons LEISA imaging spectrometer. *Icarus* 287, 229-260

- 85 Protopapa S., Grundy W. M., Reuter D. C., Hamilton D. P., Dalle Ore C. M., Cook J. C., Cruikshank D. P., Schmitt B., Philippe S., **Quirico** E., Binzel R. P., Earle A. M., Ennico K., Howett C. J. A., Lunsford A. W., Olkin C. B., Parker A., Singer K. N., Stern A., Verbiscer A. J., Weaver H. A. and Young L. A. (2017) Pluto's global surface composition through pixel-by-pixel Hapke modeling of New Horizons Ralph/LEISA data. *Icarus* **287**, 218-228
- 84 Herique A. Kofman W., Beck P., Bonal L., Buttarazzi I., Heggy E., Lasue J., Levasseur-Regourd A. C., **Quirico** E. and Zine S. (2017) Cosmochemical implications of CONSERT permittivity characterization of 67P/CG. *MNRAS* **462**, 516-532
- 83 Ruf A., B. Kanawati, N. Hertkorn, Q-Z Yin, F. Moritz, M. Harira, M. Lucio, B. Michalke, J. Wimpenny, S. Shilobreeva, B. Bronsky, V. Saraykind, Z. Gabelica, R. D. Gougeon, E. **Quirico**, S. Ralew, T. Jakubowski, H. Haack, M. Gonsior, P. Jenniskens, N. W. Hinman, and P. Schmitt-Kopplin (2017). Previously unknown class of metalorganic compounds revealed in meteorites. *Proceedings of National American Society*
- 82 Ciarniello M., A. Raponi F. Capaccioni G. Filacchione F. Tosi M. C. De Sanctis D. Kappel B. Rousseau G. Arnold M. T. Capria M. A. Barucci E. **Quirico** A. Longobardo E. Kuehrt S. Mottola S. Erard D. Bockelée-Morvan C. Leyrat A. Migliorini A. Zinzi E. Palomba B. Schmitt G. Piccioni P. Cerroni W.-H. Ip G. Rinaldi M. Salatti (2016) The global surface composition of 67P/Churyumov–Gerasimenko nucleus by Rosetta/VIRTIS. II) Diurnal and seasonal variability. *MNRAS* **462**, 443-458
- 81 Raponi A., M. Ciarniello F. Capaccioni G. Filacchione F. Tosi M. C. De Sanctis M. T. Capria M. A. Barucci A. Longobardo E. Palomba D. Kappel G. Arnold S. Mottola B. Rousseau E. **Quirico** G. Rinaldi S. Erard D. Bockelee-Morvan C. Leyrat (2016) The temporal evolution of exposed water ice-rich areas on the surface of 67P/Churyumov–Gerasimenko : spectral analysis. *MNRAS* **462**, 476-490
- 80 Filacchione, G. ; Raponi, A. ; Capaccioni, F. ; Ciarniello, M. ; Tosi, F. ; Capria, M. T. ; De Sanctis, M. C. ; Migliorini, A. ; Piccioni, G. ; Cerroni, P. ; Barucci, M. A. ; Fornasier, S. ; Schmitt, B. ; **Quirico**, E. ; Erard, S. ; Bockelee-Morvan, D. ; Leyrat, C. ; Arnold, G. ; Mennella, V. ; Ammannito, E. ; Bellucci, G. ; Benkhoff, J. ; Bibring, J. P. ; Blanco, A. ; Blecka, M. I. ; Carlson, R. ; Carsenty, U. ; Colangeli, L. ; Combes, M. ; Combi, M. ; Crovisier, J. ; Drossart, P. ; Encrenaz, T. ; Federico, C. ; Fink, U. ; Fonti, S. ; Fulchignoni, M. ; Ip, W.-H. ; Irwin, P. ; Jaumann, R. ; Kuehrt, E. ; Langevin, Y. ; Magni, G. ; McCord, T. ; Moroz, L. ; Mottola, S. ; Palomba, E. ; Schade, U. ; Stephan, K. ; Taylor, F. ; Tiphene, D. ; Tozzi, G. P. ; Beck, P. ; Biver, N. ; Bonal, L. ; Combe, J.-Ph. ; Despan, D. ; Flamini, E. ; Formisano, M. ; Frigeri, A. ; Grassi, D. ; Gudipati, M. S. ; Kappel, D. ; Longobardo, A. ; Mancarella, F. ; Markus, K. ; Merlin, F. ; Orosei, R. ; Rinaldi, G. ; Cartacci, M. ; Cicchetti, A. ; Hello, Y. ; Henry, F. ; Jacquino, S. ; Reess, J. M. ; Noschese, R. ; Politi, R. ; Peter, G (2016). Seasonal exposure of carbon dioxide ice on the nucleus of comet 67P/Churyumov-Gerasimenko. *Science* 354, 1563-1566
- 79 Barucci, M. A. ; Filacchione, G. ; Fornasier, S. ; Raponi, A. ; Deshapriya, J. D. P. ; Tosi, F. ; Feller, C. ; Ciarniello, M. ; Sierks, H. ; Capaccioni, F. ; Pommerol, A. ; Massironi, M. ; Oklay, N. ; Merlin, F. ; Vincent, J.-B. ; Fulchignoni, M. ; Guilbert-Lepoutre, A. ; Perna, D. ; Capria, M. T. ; Hasselmann, P. H. ; Rousseau, B. ; Barbieri, C. ; Bockelée-Morvan, D. ; Lamy, P. L. ; De Sanctis, C. ; Rodrigo, R. ; Erard, S. ; Koschny, D. ; Leyrat, C. ; Rickman, H. ; Drossart, P. ; Keller, H. U. ; A'Hearn, M.

- F. ; Arnold, G. ; Bertaux, J.-L. ; Bertini, I. ; Cerroni, P. ; Cremonese, G. ; Da Deppo, V. ; Davidsson, B. J. R. ; El-Maarry, M. R. ; Fonti, S. ; Fulle, M. ; Groussin, O. ; Güttler, C. ; Hviid, S. F. ; Ip, W. ; Jorda, L. ; Kappel, D. ; Knollenberg, J. ; Kramm, J.-R. ; Kührt, E. ; Küppers, M. ; Lara, L. ; Lazzarin, M. ; Lopez Moreno, J. J. ; Mancarella, F. ; Marzari, F. ; Mottola, S. ; Naletto, G. ; Pajola, M. ; Palomba, E. ; **Quirico**, E. ; Schmitt, B. ; Thomas, N. ; Tubiana, C (2016). Detection of exposed H₂O ice on the nucleus of comet 67P/Churyumov-Gerasimenko. as observed by Rosetta OSIRIS and VIRTIS instruments. *Astron. Astrophys.* 595, A102
- 78 Grundy, W. M. ; Binzel, R. P. ; Buratti, B. J. ; Cook, J. C. ; Cruikshank, D. P. ; Dalle Ore, C. M. ; Earle, A. M. ; Ennico, K. ; Howett, C. J. A. ; Lunsford, A. W. ; Olkin, C. B. ; Parker, A. H. ; Philippe, S. ; Protopapa, S. ; **Quirico**, E. ; Reuter, D. C. ; Schmitt, B. ; Singer, K. N. ; Verbiscer, A. J. ; Beyer, R. A. ; Buie, M. W. ; Cheng, A. F. ; Jennings, D. E. ; Linscott, I. R. ; Parker, J. Wm. ; Schenk, P. M. ; Spencer, J. R. ; Stansberry, J. A. ; Stern, S. A. ; Throop, H. B. ; Tsang, C. C. C. ; Weaver, H. A. ; Weigle, G. E. ; Young, L. A. and the New Horizon team (2016) Surface compositions across Pluto and Charon. *Science* 351
- 77 Fillachione G., Capaccioni F., Ciarniello M., Raponi A., Tosi F., De Sanctis MC, Erard S., Bockelee-Morvan D., Leyrat C., Arnold G., Schmitt B., **Quirico** E., Piccioni G., Migliorini A., Capria M-T, Palomba E., Cerroni P., Longobardo A., Barucci A., Fornasier S., Carlson R.W., Jaumann R, Stephan K., Moroz L.V., Kappel, Rousseau B., Fonti S., Mancarella F., Despan D. and **Faure** M. (2016) The global surface composition of 67P/CG nucleus by Rosetta/VIRTIS. I) Prelanding mission phase. *Icarus* 274, 334-349
- 76 **Quirico** E., L. V. Moroz, B. Schmitt, G. Arnold, M. **Faure**, P. Beck, L. Bonal, M. Ciarniello, A. Zinzi, E. Palomba, F. Capaccioni, G. Filacchione, S. Erard, C. Leyrat, D. Bockelée-Morvan, P. Drossart, F. Tosi, M. T. Capria, M. C. De Sanctis, A. Raponi, S. Fonti, F. Mancarella, V. Orofino, A. Barucci, M. I. Blecka, B. Carlson, A. Faure, Fornasier, S., M. S. Gudipati, A. Longobardo, K. Markus, V. Menella, G. Piccioni, B. Rousseau, F. Taylor and the Rosetta VIRTIS team. Refractory and semi-volatiles organics at the surface of comet 67P/Churyumov-Gerasimenko : insights from the VIRTIS/ROSETTA imaging spectrometer. *Icarus* 272, 32-47.
- 75 Bonal, L., E. **Quirico**, L. Flandinet and G. Montagnac (2016) Thermal history of type 3 chondrites determined by Raman spectroscopy of their carbonaceous matter : methodological aspects and application to the Antarctic meteorite collection *Geochim. Cosmo. Acta* 189, 312-337
- 74 De Sanctis M-C, F. Capaccioni, M. Ciarniello, G.Filacchione, M. Formisano, S. Mottola, A. Raponi, F. Tosi, D. Bockelée-Morvan, S. Erard, C. Leyrat, B. Schmitt, E. Ammannito, G.Arnold, M.A. Barucci, M. Combi, M.T. Capria, P. Cerroni, W.-H. Ip, E. Kuehrt, T. B. McCord, E. Palomba, P. Beck, E. **Quirico** and VIRTIS team (2015) *Nature* **525**, 500-503
- 73 Filacchione G., M. C. De Sanctis, F. Capaccioni, A. Raponi, F. Tosi, M. Ciarniello, P. Cerroni, G. Piccioni, M. T. Capria, E. Palomba, G. Bellucci, S. Erard, D. Bockelee-Morvan, C. Leyrat, G. Arnold, M. A. Barucci, M. Fulchignoni, B. Schmitt, E. **Quirico** , R. Jaumann, K. Stephan, A. Longobardo, V. Mennella, A. Migliorini, E. Ammannito, J. Benkhoff, J. P. Bibring, A. Blanco, M. I. Blecka, R. Carlson, U. Carsenty, L. Colangeli, M. Combes, M. Combi, J. Crovisier, P. Drossart, T. Encrenaz, C. Federico, U. Fink, S. Fonti, W. H. Ip, P. Irwin, E. Kuehrt, Y. Langevin, G. Magni, T. McCord, L. Moroz, S. Mottola, V. Orofino, U. Schade,

- F. Taylor, D. Tiphene, G. P. Tozzi, P. Beck, N. Biver, L. Bonal, J-Ph. Combe, D. Despan, E. Flamini, M. Formisano, S. Fornasier, A. Frigeri, D. Grassi, M. S. Gudipati, D. Kappel, F. Mancarella, K. Markus, F. Merlin, R. Orosei, G. Rinaldi, M. Cartacci, A. Cicchetti, S. Giuppi, Y. Hello, F. Henry, S. Jacquino, J. M. Reess, R. Noschese, R. Politi, G. Peter (2015) Exposed water ice on the nucleus of comet 67P/Churyumov-Gerasimenko. *Nature* 529, 368.
- 72 Ciarniello M., F. Capaccioni, G. Filacchione, A. Raponi, F. Tosia, M-C De Sanctis, M-T Capria, S. Erard, D. Bockelee-Morvan, C. Leyrat, G. Arnold, A. Barucci, P. Beck, G. Bellucci, C. De Sanctis, S. Fornasier, A. Longobardo, S. Mottola, E. Palomba, E. **Quirico** and B. Schmitt (2015). Photometric properties of comet 67P/Churyumov-Gerasimenko from VIRTIS-M aboard Rosetta. *Astron. Astroph.*, **583**, A31
- 71 Garenne A., P. Beck, G. Montes-Hernandez, , O. Brissaud, B. Schmitt, E. **Quirico**, L. Bonal, C. Beck, K.T. Howard (2015). Bidirectional reflectance spectroscopy of carbonaceous chondrites : Implications for water quantification and primary composition. *Icarus* **264**, 172-183
- 70 Faure A., M. **Faure**, P. Theulé, E. **Quirico**, and B. Schmitt (2015). Hydrogen isotope exchanges between water and methanol in interstellar ices. *Astron. Astroph.* **584**, A98
- 69 Beck P., A. Pommerol, , B. Zanda, L. Remusat, JP Lorand, C. Göpel, R. Hewins, S. Pont, E. Lewin, E. **Quirico**, B. Schmitt, G. Montes-Hernandez, A. Garenne, L. Bonal, O. Proux, JL Hazemann, V.C.F. Chevrier (2015). A Noachian source region for the “Black Beauty” meteorite, and a source lithology for Mars surface hydrated dust? *Earth Planet. Sci. Lett.* **427**, 104-111
- 68 **Faure** M., E. **Quirico**, A. Faure, B. Schmitt and P. Theulé (2015). Kinetics of hydrogen-deuterium exchanges in cometary ices. *Icarus*, **261**, 14-30
- 67 Bonal L., Brunetto R., Beck P., Dartois E., Dionnet Z., Djouadi Z., Duprat J., Füre E., Kakazu Y., Montagnac G., Oudayer P., **Quirico** E., and Engrand C. (2015). Visible-IR and Raman micro-spectroscopic investigation of three Itokawa particles collected by Hayabusa : mineralogy and degree of space weathering based on non-destructive analyses. *Met. Plan. Sci.*, **50**, 1562-1576
- 66 Lantz, C., Brunetto R., Barucci M. A., Dartois E., Duprat J., Engrand C., Godard M., Ledu D. and **Quirico** E. (2015). Ion irradiation of the Murchison meteorite : VIS-MIR spectroscopic results. *Astron. Astroph.*, 577, A41
- 65 F. Capaccioni, A. Coradini , G. Filacchione, S. Erard, G. Arnold, M.C. De Sanctis, M.T. Capria, F. Tosi, P. Cerroni, D. Bockelee-Morvan, C. Leyrat, B. Schmitt, E. **Quirico**, V. Mennella, A. Raponi, M. Ciarniello, T.McCord, P. Drossart, L. Moroz, E. Palomba, E. Ammannito, A. Barucci G. Bellucci, J. Benkhoff, J. P. Bibring, A. Blanco, M. Blecka, R. Carlson, U. Carsenty, L. Colangeli, M. Combes, M. Combi, J. Crovisier, T. Encrenaz, C. Federico, U. Fink, S. Fonti, W. H. Ip, P. Irwin, R. Jaumann, E. Kuehrt, Y. Langevin, G. Magni, S. Mottola, V.Orofino, P. Palumbo, G. Piccioni, U. Schade, F. Taylor, D. Tiphene, G. Tozzi, P. Beck, N.Biver, L. Bonal, J-Ph. Combe, SD. Despan, E. Flamini, S. Fornasier, A. Frigeri, D. Grassi, M. Gudipati, A. Longobardo, K. Markus, F. Merlin, L. Moroz, R. Orosei, G. Rinaldi, K. Stephan, R. Noschese, M. Cartacci, A. Cicchetti, S. Giuppi, R. Politi, F. Henry, S. Jacquino, J.M. Reess, Y. Hello, A. Semery, G. Peter (2014). 67P/Churyumov-Gerasimenko : The Organic-rich surface of a Kuiper Belt comet as seen by VIRTIS/Rosetta. *Science* 347, 628-1-4

- 64 Bonnet J-Y, Quirico E., Buch A., Thissen R., Szopa C., Carrasco N., Cernogora G., Fray N., Cottin H., Le Roy L., Montagnac G., Dartois E., Brunetto R., Engrand C. and Jean Duprat (2015). Formation of analogs of cometary nitrogen-rich refractory organics from thermal degradation of tholin and HCN polymer. *Icarus*, 250, 53-63
- 63 Brunetto R., Lantz C., Ledu D., Baklouti D., Barucci M.A., Beck P., Delauche L., Dionnet Z., Dumas P., Duprat J., ENgrand C., Jamme F., Oudayer P., Quirico E., Sandt C. and Dartois E (2014). Ion irradiation of Allende meteorite probed by visible, IR and Raman spectroscopies. *Icarus* **237**, 278-292
- 62 Garenne A., P. Beck, G. Montes-Hernandez, R. Chiriac, F. Toche, E. Quirico, L. Bonal and B. Schmitt. The abundance and stability of « water » in type 1 and 2 carbonaceous chondrites (CI, CM, CR) from thermogravimetric analysis. *Geochim. Cosmochim. Acta* **137**, 93-112
- 61 Quirico E., F-R Orthous-Daunay, P. Beck, L. Bonal, R. Brunetto, E. Dartois, T. Pino, G. Montagnac, J-N Rouzaud, C. Engrand and J. Duprat Origin of insoluble organic matter in type 1 and 2 chondrites : new clues, new questions. *Geochimica Cosmochimica Acta*, 136, 80-99
- 60 Beck P., E. Quirico, A. Garenne, Q-Z Yin, L. Bonal, B. Schmitt, G. Montes-Hernandez, G. Montagnac, R. Chiriac and F. Toche. Thermal history of Sutter's Mill CM carbonaceous chondrite fall from water abundance and structure of its organic matter. *Met Plan. Sci.* 229, 263-277
- 59 Beck P., A. Garenne, E. Quirico, L. Bonal, G. Montes-Hernandez, F. Moynier, B. Schmitt Transmission infrared spectra (2-25 microns) of carbonaceous chondrites : mineralogy, water ad asteroidal processes. *Icarus* 229, 263-277
- 58 Briani, G, E. Quirico, M. Gounelle, Paulhiac-Pison, G. Montagnac, P. Beck, F-R Orthous-Daunay, L. Bonal, E. Jacquet, Kearsley and S.R. Russell. Short duration thermal metamorphism in CR chondrites. *Geochim. Cosm. Acta* 122, 267-279
- 57 Bonnet J-Y, R. Thissen, M. Frisari, V. Vuitton, E. Quirico, F-R Orthous-Daunay, O. Dutuit, L. Leroy, N. Fray, H. Cottin, S.M. Hörst and R.V. Yelle (2013) Compositional and structural investigation of HCN polymer through high resolution mass spectrometry. *J. Mass Spec* 354-355, 193-203
- 56 Dartois E., C. Engrand, R. Brunetto, J. Duprat, Th. Pino, E. Quirico, L. Remusat, N. Bar-din, G. Briani, S. Mostefaoui, G. Morinaud, B. Crane, N. Szwe, L. Delauche, F. Jamme, Ch. Sandt, P. Dumas (2013) UltraCarbonaceous Antarctic micrometeorites, probing the solar system beyond the nitrogen snow-line. *Icarus* 224, 243-252
- 55 Orthous-Daunay F-R, E. Quirico, P. Beck, O. Brissaud, E. Dartois, T. Pino and B. Schmitt (2013) Proto-solar disk heterogeneity and the impact of parent body processes on the Insoluble Organic Matter (IOM) from primitive meteorites. *Icarus* 223, 534-543
- 54 Hily-Blant P., Bonal L., A. Faure and E. Quirico (2013) The ¹⁵N-enrichment in dark clouds and Solar System objects *Icarus* 223, 582-590
- 53 Bonal L., C.M.O'D Alexander, G.R. Huss, K. Nagashima, E. Quirico and P. Beck. Hydrogen isotopic composition of the water in CR chondrites 2013. *Geochim. Cosmochim. Acta* 106, 111-133
- 52 Horst, S. M., R.V. Yelle, A. Buch, N. Carrasco, G. Cernogora, O. Dutuit, E. Quirico, E. Sciamma-O'Brien, M.A. Smith, A. Somogyi, C. Szopa, R. Thissen and V.

- Vuitton 2012. Formation of Amino Acids and Nucleotide Bases in a Titan Atmosphere Simulation Experiment. *Astrobiology* 12, 809-817
- 51 Merlin F., E. [Quirico](#), M. A. Barucci and C. de Bergh. Methanol ice on the surface of solar system minor bodies. *AA* 544, A20
- 50 Orberger B., C. Wagner, R. Wirth, E. [Quirico](#), J-P Gallien, C. Derré, G. Montagnac, A. Noret, M. Jayananda, M. Massault and V. Rouchon 2012. Origin of iron oxides spherules in the banded iron formation of the Bababudan Group, Dharwar Craton, Southern India. *J. Asian Earth Sci.* In press.
- 49 Beck P., V. De Andrade, F.R. Orthous-Daunay, G. Veronesi, M. Cotte, E. [Quirico](#) and B. Schmitt. The redox state of iron in the matrix of CI, CM and metamorphosed CM chondrites by XANES spectroscopy. *Geochim. Cosmochim. Acta* 99, 305-316
- 48 Derenne S., C. Coelho, C. Anquetil, C. Szopa, A.S. Rahman, P.F. McMillan, F. Cora, C.J. Pickard, E. [Quirico](#) and C. Bonhomme 2012. New insights into the structure and chemistry of Titan's tholins via ¹³C and ¹⁵N solid state nuclear magnetic resonance spectroscopy. *Icarus* 221, 844-853.
- 47 Yokochi R., U. Marboeuf, E. [Quirico](#) and B. Schmitt. Pressure dependent trace gas trapping in amorphous water ice at 77K : Implications for determining the conditions of comets formation. *Icarus* 218, 760-770
- 46 Le Guillou C., J-N Rouzaud, L. Bonal, E. [Quirico](#), S. Derenne and L. Remusat. High resolution TEM of chondritic carbonaceous matter : Metamorphic evolution and heterogeneity 2012. *Met. Plan. Sci.* 47, 345-362
- 45 Sciamma-O'Brien E., P.-R. Dahoo, E. Hadamcik , N. Carrasco, E. [Quirico](#), C. Szopa, G. Cernogora 2012. Optical constants from 370 nm to 900 nm of Titan tholins produced in a low pressure RF plasma discharge. *Icarus* 218, 356–363
- 44 [Quirico](#), E., M. Bourot-Denise, C. Robin, G. Montagnac, G. Montgnac and P. Beck. A reappraisal of the thermal history of EH3 and EL3 enstatite chondrites 2011. *Geochimica Cosmochimica Acta* 75, 3088-3102
- 43 [Ratajczak](#), V. Taquet, C. Kahane, C. Ceccarelli, A. Faure, and E. [Quirico](#) 2011. The puzzling deuteration of methanol in low- to high-mass protostars. *Astron. Astroph.* 528, L13
- 42 [Dobrica](#), E., C. Engrand, E. [Quirico](#), G. Montagnac, and C. J. Duprat. Raman characterization of carbonaceous matter in concordia antarctic micrometeorites. *Meteoritics and Planetary Sciences* 46, 1363-1375
- 41 Beck P., J-A Barrat, E. [Quirico](#), F. Grisolle, F. Moynier, B. Schmitt P. Gillet, and C. Beck NIR Spectral Trends of HED Meteorites : Can we Discriminate Between the Magmatic Evolution, Mechanical Mixing and Observation Geometry Effects? *Icarus* 216, 560-571.
- 40 Morea Dalle Ore, C., C. M. Fulchignoni, D.P. Cruikshank, M.A. Barucci, R. Brunetto, H. Campins, C. de Bergh, J.H. Debes, E. Dotto, J.P. Emery, W.M. Grundy, A.P. Jones, V. Mennella, F.R. Orthous-Daunay, T.C. Owen, I. Pascucci, Y.J. Pendleton, N. Pinilla-Alonso, E. [Quirico](#), and G. Strazzulla. Organic materials in planetary and protoplanetary systems : Nature or nurture? *Astronomy Astrophysics* 533, A98.
- 39 Montes-Hernandez, G., P. Beck, F. Renard, E. [Quirico](#), B. Lanson, and N. Findling. Fast precipitation of acicular goethite from ferric hydroxide gel under moderate temperature (30 and 70 ?c) 2011. *Crystal Growth and Design*, 11(11) :2264–2272

- 38 Beck, P., E. [Quirico](#), D. Sevestre, G. Montes-Hernandez, A. Pommerol, and B. Schmitt. Goethite as an alternative origin for the 3.1 μm band on dark asteroids 2010. *Astronomy and Astrophysics* 526.
- 37 [Orthous-Daunay](#), F-R, E. [Quirico](#), L. Lemelle, P. Beck, V. deAndrade, A. Simionovici, and S. Derenne. Sulfur speciation in the insoluble organic matter from carbonaceous chondrites by XANES spectroscopy 2010. *Earth and Planetary Sciences Letter* 300, 321-328
- 36 Montes-Hernandez, G., A. Pommerol, F. Renard, P. Beck, E. [Quirico](#), O. Brissaud 2010. In-situ kinetic measurements of gas-solid carbonation of $\text{Ca}(\text{OH})_2$ by using an infrared microscope coupled to a reaction cell. *Chemical Engineering Journal* 161, 250-256
- 35 Burgdorf, M.J., D. P. Cruikshank, C. M. Dalle Ore, T. Sekiguchi, R. Nakamura, G. Orton, E. [Quirico](#), and B. Schmitt. Detection of HCN ice on Triton 2010. *Astrophysical Journal*, 718, L53-L57
- 34 Vuitton, V., J-Y Bonnet, M. Frisari, R. Thissen, E. [Quirico](#), O. Dutuit, B. Schmitt, L. Le Roy, N. Fray, H. Cottin, E. Sciamma O'Brien, N. Carrasco and C. Szopa 2010. Ultra high resolution mass spectrometry of HCN polymers and Titan's tholins. *Faraday discussions*, 10.1039/C003758C
- 33 Beck, P., E. [Quirico](#), G. Montes-Hernandez, L. Bonal, J. Bollard, F-R Orthous-Daunay, K. Howard, B. Schmitt, O. Brissaud, F. Deschamps, B. Wunder, and S. Guillot 2010. Hydrous mineralogy of cm and ci chondrites from infrared spectroscopy and their relationship with low albedo asteroids. *geochimica cosmochimica acta*. *Geochimica Cosmochimica Acta*, 74, 4881-4892
- 32 Carrasco, N., I. Schmitz-Afonso, J-Y. Bonnet, E. [Quirico](#), R. Thissen, Odile Dutuit, A. Bagag, O. Lapr evote, A. Buch, A. Giulani, Gilles Adand e, F. Ouni, E. Hadamcik, C. Szopa, G. Cernogora 2009. Chemical Characterization of Titan's Tholins : Solubility, Morphology and Molecular Structure Revisited. *J. Phys. Chem.* 42, 11195-11203
- 31 [Quirico](#), E., G. Montagnac, J-N Rouzaud, L. Bonal, M. Bourot-Denise, S. Duber, B. Reynard 2009. Precursor and metamorphic conditions effects on Raman spectra of poorly ordered carbonaceous matter in chondrites and coals. *Earth and Planetary Sciences Letters* 287, 185-193
- 30 McMillan, P.F., Victoria Lees, Eric [Quirico](#), Gilles Montagnac, Andrea Sella, Bruno Reynard, Patrick Simon, Edward Bailey, Malek Deifallah, Furio Cor 2009. Graphitic carbonnitride $\text{C}_6\text{N}_9\text{H}_3$ HCl : Characterisation by UV and near-IRFT Raman spectroscopy *Journal of Solid State Chemistry* 182, 2670-2677
- 29 Dobrica, E., C. Engrand, J. Duprat, M. Gounelle, H. Leroux, E. [Quirico](#) and J-N Rouzaud 2009. Connection between micrometeorites and Wild 2 particles from Antarctic snow to cometary ices. *Meteoritics and Planetary Sciences* 44, 1643-1661
- 28 Briani, G., M. Gounelle, Y. Marrocchi, S. Mostefaoui, H. Leroux, E. [Quirico](#) and A. Meibom 2009. Ultra-Pristine Extra-Terrestrial Material with Unprecedented Nitrogen Isotopic Variation. *Proceedings of the National Academy of Sciences* 106, 10522-10527
- 27 [Ratajczak](#), A., E. [Quirico](#), A. Faure, B. Schmitt, C. Ceccarelli. Hydrogen/deuterium spontaneous exchange in interstellar ice analogues 2009. *Astronomy and Astrophysics*. 496, 21-24

- 26 Merlin, F., A. Alvarez-Candal, A. Delsanti, S. Fornasier, M.A Barucci, F.E. DeMeo, C. de Bergh and A. Doressoundiram, E. [Quirico](#) and B. Schmitt 2009. Stratification of methane ice on Eris' surface. *The journal of Astronomy* 137, 315-328
- 25 Montes-Hernandez, G., N. Concha-Lozano, F. Renard and E. [Quirico](#) 2009. Removal of oxyanions from synthetic wastewater via carbonation process of calcium hydroxyde : Applied and fundamental aspects. *Journal of Hazardous Materials* 166, 788-795
- 24 [Quirico](#), E., G. Montagnac, V. Lees, P. F McMillan, C. Szopa, G. Cernogora, J-N Rouzaud, P. Simon, J-M Bernard, P. Coll, N. Fray, R. D Minard, F. Raulin, B. Reynard and B. Schmitt 2008. New experimental constraints on composition and structure of tholins. *Icarus* 198, 218-231.
- 23 Rochette P., J. Gattacceca, L. Bonal, M. Bourot-Denise, V. Chevrier, J-P Clerc, G. Consolmagno, L. Folco, M. Gounelle, T. Kohout, L. Pesonen, E. [Quirico](#), L. Sagnotti, A. Skripnik 2008. Magnetic Classification of Stony Meteorites : 2. Non-Ordinary Chondrites 2008. *Met. Plan. Sci.* 43, 959-980
- 22 [Bonal](#), L., M. Bourot-Denise, E. [Quirico](#), G. Montagnac and E. Lewin 2007. Organic matter and metamorphic history in CO chondrites 2007. *Geochim. Cosmochim. Acta* 71, 1605-1623
- 21 [Bernard](#), J-M, E. [Quirico](#), O. Brissaud, G. Montagnac, B. Reynard, P. Mc Millan, P. Coll, M-J Nguyen, F. Raulin, B. Schmitt 2006. Reflectance spectra and chemical structure of Titan's tholins. Application to the analysis of CASSINI-HUYGENS observations. *Icarus* 185, 301-307
- 20 [Bonal](#), L., E. [Quirico](#), M. Bourot-Denise and G. Montagnac. Petrologic types of CV3 chondrites as revealed by Raman spectroscopy of organic matter 2006. *Geochim. Cosmochim. Acta.* 70, 1849-1863
- 19 [Quirico](#), E., J. Borg, P-I Raynal, G. Montagnac and L. d'Hendecourt. A micro-Raman survey of 10 IDPs and 6 carbonaceous chondrites 2005. *Planet. Space. Sci.* 53, 1443-1448
- 18 [Quirico](#), E., J-N Rouzaud, L. Bonal and G. Montagnac 2005. Maturation grade of coals as revealed by Raman spectroscopy : progress and problems. *Spectrochim. Acta A.* 61, 2368-2377
- 17 [Quirico](#), E., P-I Raynal and M. Bourot-Denise 2003. Metamorphic grade of organic matter in six Unequilibrated Ordinary Chondrites. *Meteoriti. Planet. Sci.* 38, 795-812
- 16 Borg, J., E. [Quirico](#), A. Simionovici, P-I Raynal, P. Chevallier and Y. Langevin 2002. Synchrotron radiation as a tool for in-situ investigation of extraterrestrial grains in low density collectors : Application to the analyses of the PIE polymid foams targets. *Planet. Space Sci.* 50, 1050-1055
- 15 Westphal, A., C. Snead, J. Borg, E. [Quirico](#), P-I Raynal, Zolensky, M., Ferrini, G., Colangeli, L., Palumbo P. 2002. Small hypervelocity particles in aerogel collectors : Location, extraction, handling and storage. *Meteoriti. Planet. Sci.* 37, 855-866
- 14 Grundy, W, B. Schmitt and E. [Quirico](#) 2002. The temperature dependent spectrum of methane ice I between 0.7 and 5 mm and opportunities for near-infrared remote thermometry. *Icarus* 155, 486-496
- 13 Le Bras A., E. Dotto, M. Fulchignoni, A. Doressoundiram, M. A. Barucci, S. Le-Mouuelic, O. Forni, and E. [Quirico](#) 2001. The 2000 Rosetta asteroid targets observational campaign : 140 Siwa and 4979 Otawara. *AA*, 379, 660-663

- 12 Demyk, K., P. Carrez, H. Leroux, P. Cordier, A. Jones, J. Borg, E. **Quirico**, E, P-I Raynal and L. d'Hendecourt 2001. Structural and chemical alteration of crystalline olivine under low energy He+ irradiation. AA, 368, 38-41
- 11 **Raynal**, P.-I., E. **Quirico**, J. Borg, D. Deboffe, P. Dumas, L. d'Hendecourt, J-P Bibring and Y. Langevin 2000. Using synchrotron infrared microscopy for the analysis of micronic extraterrestrial particules. Planet. Space Sci., 48/12-14, 1329-1339
- 10 Cruikshank, D. P., Schmitt, B., Roush T. L., Owen T. C., **Quirico** E., Geballe T. R., de Bergh C., Bartholomew M. J., Dalle Ore C. M., Douté S., Meier R. 2000. Water Ice on Triton. Icarus 147, 309-316
- 9 Lellouch, E., Laureijs, R., Schmitt, B., **Quirico**, E., de Bergh, C., Crovisier, J., Coustenis, A 2000. Pluto's Non-isothermal Surface. Icarus 147, 220-250
- 8 Cruikshank, D.P., C. de Bergh, S. Douté, T. R. Geballe, T. C. Owen, E. **Quirico**, T. L. Roush, and B. Schmitt 1999. Ethane on Pluto? Science 27, 1355
- 7 Douté, S., B. Schmitt, E. **Quirico**, T. C. Owen, D. P. Cruikshank, C. de Bergh, T. L. Roush and T. R. Geballe 1999. Evidence for methane segregation at the surface of Pluto. Icarus 142, 421-444
- 6 **Quirico**, E., S. Douté, B. Schmitt, C. de Bergh, D. P. Cruikshank, T. Owen, T. Roush 1999. Composition, physical state and distribution of ices on the surface of Triton. Icarus. 139,159-178
- 5 **Quirico**, E., and B. Schmitt 1997. A spectroscopic study of CO diluted in N2 ice : Applications for Triton and Pluto. Icarus 128, 181-188
- 4 **Quirico**, E., and B. Schmitt 1997. Near infrared spectroscopy of simple hydrocarbons and carbon oxides diluted in solid N2 and as pure ices : implication for Triton and Pluto. Icarus 127, 354-378
- 3 **Quirico**, E., B. Schmitt, R. Bini, P. R. Salvi 1996. Spectroscopy of some ices of astrophysical interest : SO2, N2 and N2 :CH4 mixtures. Planet. Space Sci. 44, 973-986
- 2 Grundy, W., B. Schmitt and E. **Quirico** 1993. The temperature dependent spectra of a and b nitrogen ice with application to Triton. Icarus, 105, 254-258
- 1 Schmitt, B., E. **Quirico** and E. Lellouch 1991. Near infrared spectra of potential solids at the surface of Titan. In Proceeding of the Symposium on Titan, Toulouse, ESA Spec. Publ., SP-338, 383-388