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# CURRICULUM VITAE

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## Rodolphe VAILLON

### PERSONAL INFORMATION and PROFESSIONAL CONTACT DETAILS

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DATE OF BIRTH: March 16, 1970  
LANGUAGES: French and English (fluent)  
CURRENT ADDRESS: Mechanical Engineering Kennecott Building  
1495 E 100 S  
1550 MEK  
Salt Lake City, UT 84112  
ADDRESS IN FRANCE: Centre for Energy and Thermal Sciences of Lyon (CETHIL, CNRS-INSA Lyon, Univ. Lyon 1)  
Bât. Sadi Carnot, 9 rue de la Physique  
INSA de Lyon, 69621 Villeurbanne cedex, France  
E-MAIL ADDRESSES: [rodolphe.vaillon@utah.edu](mailto:rodolphe.vaillon@utah.edu); [rodolphe.vaillon@insa-lyon.fr](mailto:rodolphe.vaillon@insa-lyon.fr)

### EDUCATION – ACADEMIC QUALIFICATIONS

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Habilitation University of Lyon (INSA Lyon: National Institute of Applied Sciences in Lyon), France, 2008  
Ph.D. University of Poitiers (ENSMA: National Engineering School of Mechanics and Aeronautics), Poitiers, France, 1996  
Dissertation title: Radiative transfer – reactive fluid coupling in hydrogen – helium plasmas by using the Discrete Ordinates Method in curvilinear coordinates  
M.S. University of Poitiers, ENSMA, Poitiers, France, 1993  
Engineer diploma ENSMA (National Engineering School of Mechanics and Aeronautics), Poitiers, France, 1993  
Fields: aerodynamics, energy, thermodynamics, combustion, propulsion

### PROFESSIONAL APPOINTMENTS

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01/2016-12/2017 **Visiting Scholar** in the Department of Mechanical Engineering at the University of Utah, USA  
01/2016-12/2016 **W.W. Clyde Visiting Chair** in the College of Engineering, University of Utah, USA  
10/2011-present **CNRS Professor\***, Centre d’Energétique et de Thermique de Lyon (Center for Energy and Thermal Sciences of Lyon, CNRS-INSA Lyon-UCBL), Villeurbanne, France  
\*“Directeur de Recherche au CNRS”, equivalent to Full Professor at the University  
10/1998-09/2011 **CNRS Researcher**, Centre de Thermique de Lyon (Center for Thermal Sciences of Lyon, CNRS-INSA Lyon-UCBL), Villeurbanne, France  
12/1996-08/1998 **Assistant Professor**, CNAM (National Conservatory of Arts and Crafts), Paris, France

### RESEARCH TOPICS

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Nanoscale thermal radiation  
Thermal behavior of photovoltaic devices  
Electromagnetic light scattering by complex particles

## **PUBLICATIONS**

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56 peer-reviewed journal articles  
51 articles in peer-reviewed proceedings of international conferences  
100 communications (national & international conferences without proceedings, workshops,...)  
1 book  
4 book chapters  
2 patents (1 French + international extension, 1 US application)  
(...)

## **SUPERVISIONS and MANAGEMENT**

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Ph.D. students: 8 (+2); Post-doctoral researchers: 4; CNRS researchers: 2; Engineers: 6;  
M.S. students: 7; Internships: 10.

Leader of the "Microscale and Nanoscale Heat Transfer" group of the Center for Energy and Thermal Sciences of Lyon (5 permanent researchers, several postdocs, Ph.D. and M.S. students, engineers [15 people on average]), 08/2011-01/2016.

## **EXPERTISE and SERVICES**

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Associate Editor of the Journal of Quantitative Spectroscopy and Radiative Transfer, Elsevier, 2009-present.

Member of the Scientific Council of the International Centre of Heat and Mass Transfer (ICHMT): 2013-present.

Co-chairman and co-organizer of the international conference Eurotherm 103 "Nanoscale and Microscale Heat Transfer IV", October 15-17, 2014.

Scientific Committees:

Fourth, Fifth, Sixth, Seventh and Eighth International Symposia on Radiative Transfer (06/20-25/2004, 06/17-23/2007, 06/3-19/2010, 06/2-8/2013, 06/6-10/2016), Eurotherm 73, 78, 83 and 105, Computational Thermal Radiation in Participating Media I, II & III, IV, V, VI (04/15-17/2003, 04/5-7/2006, 04/15-17/2009, 04/18-20/2012, 04/1-3/2015, 04/9-11/2018), Electromagnetic Light Scattering XIV & XV (06/17-21/2013, 06/21-26/2015), Eurotherm 103 and 108, Nanoscale and Microscale Heat Transfer IV & V (10/15-17/2014, 09/26-30/2016).

Technical reviews for: App. Phys. Letters, ASME J. Heat Transfer, ASME J. Solar Energy Eng., Exp. Thermal Fluid Sci., IEEE Trans. Energy Conv., Int. J. Heat & Mass Transfer, Int. J. Thermal Sci., J. Quant. Spectrosc. Radiat. Transfer, Num. Heat Transfer, Optics Express, Solar Energy, The Open Optics J.,...; /funding agencies/ Agence Nationale de la Recherche (ANR), France; Department Of Energy (DOE), USA; Centre National de la Recherche Scientifique (CNRS), France; European Research Council (ERC), European Union; Natural Sciences and Engineering Research Council of Canada (NSERC), Canada; Malaysian Ministry of Higher Education, Malaysia;...

University Services:

- Member of the Board of Administrators of INSA Lyon (2006-2010),
- Member of the Scientific Council of INSA Lyon (2002-2006, 2010-2011).

## **HONORS and AWARDS**

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Co-supervisor of the Ph.D. thesis of Dr. I. Ayranci-Kiling awarded by: Parlar Foundation, Turkey (2007 best Ph.D. thesis); EADS Foundation, France (2007 best Ph.D. thesis in Physics and Material Science); JQSRT, Elsevier (2007 Young Scientists' Award in Radiative Transfer).

Co-author of awarded articles (written by Dr. F. André, who received the honorable mention to the 2007 Young Scientists' Award in Radiative Transfer delivered by JQSRT, Elsevier).

2<sup>nd</sup> prize, best Ph.D. thesis in Engineering Science, delivered by the Doctoral School of Poitiers University, France (1996).

## **INTERNATIONAL ACTIVITIES and NOMINATIONS**

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Visiting Scholar (2 years), Radiative Energy Transfer Lab (Ass. Prof. Francoeur), Department of Mechanical Engineering, College of Engineering, University of Utah, USA, 01/06/2016-12/31/2017.

W.W. Clyde Visiting Chair (1 year) in the College of Engineering, University of Utah, USA, 01/06/2016-12/31/2016.

Visiting Scholar (total of 7 weeks), Radiative Energy Transfer Lab (Ass. Prof. Francoeur), Department of Mechanical Engineering, University of Utah, USA, April 15-May 14 2011 and April 22-May 15 2014.

Visiting Scholar (total of 3 months), Experimental Physics of Complex Systems (Prof. A. Kittel), EHF Laboratory, Department of Physics, Carl von Ossietzky University of Oldenburg, Germany, April 20-July 19 2010.

Visiting Scholar (total of 6 months), Radiation Transfer Laboratory (Prof. M.P. Mengüç), Department of Mechanical Engineering, University of Kentucky, Lexington, USA: June/July 2002, July/August 2003, March/April 2007, June/July 2008, July 2009.

Associate Member of the Graduate Faculty of the Mechanical Engineering Department of the University of Kentucky, USA, March 2008 / June 2011.

Cooperative Agreement between the University of Kentucky (UKY), Lexington, USA and Institut National des Sciences Appliquées de Lyon (INSA Lyon), Villeurbanne, France (signed in April [UKY] and May [INSA Lyon] 2007, for three years).

Member of the French-Japanese joint research laboratory (ElyT lab, Engineering and Science Lyon Tohoku Laboratory), French leader of Group F (Flow Dynamics, Heat Transfer and Microfluidics) and of subproject *RadiativMat* (the Japanese leader is Prof. S. Maruyama), 2007-11/2016.

Associate Professor (accreditation to co-supervise M.S. and Ph.D. students), Department of Mechanical Engineering, Laval University, Quebec, Canada (01/2003 – 12/2004).

Co-supervision of a Ph.D. thesis (Dr. I. Ayranci-Kilingç) under the Ph.D. thesis co-supervision agreement established between the Department of Chemical Engineering, Middle East Technical University, Ankara, Turkey and INSA Lyon, Villeurbanne, France (2003-2007); Turkish co-supervisor: Prof. N. Selçuk.

Collaborations (ongoing and past) leading to co-authored peer reviewed journal papers with: the Australian Centre for Advanced Photovoltaics (ACAP), School of Photovoltaic and Renewable Energy Engineering, University of New South Wales, Sydney, Australia; Radiative Energy Transfer Lab, Department of Mechanical Engineering, University of Utah, USA; Heat Transfer Control Laboratory, Institute of Fluid Science, Tohoku University, Sendai, Japan; Radiation Transfer Laboratory, Department of Mechanical Engineering, University of Kentucky, Lexington, USA; Department of Chemical Engineering, Middle East Technical University, Ankara, Turkey; Department of Mechanical Engineering, Laval University, Quebec, Canada; University of Quebec in Chicoutimi, Chicoutimi, Quebec, Canada; Korean Advanced Institute of Science and Technology (KAIST), Daejeon, South-Korea.

## **RESEARCH GRANTS and CONTRACTS**

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Research proposals approved and funded by the French Ministry of Defense (DGA; 1: 2002-2005); the French National Research Agency (3; 2005-2007 and 2006-2010, 2016-2019), French Ministry of Research (1; 2003-2005), Energy Program of CNRS (2; 2002-2004 and 2013-2014); CNRS integrated program in astrophysics (2009-2010), Carnot Institute Engineering at Lyon (I@L) (1; 2014), INSA Lyon seed grant (1; 2016-2017), European Union 7<sup>th</sup> Framework Program (QUANTIHEAT project, coordinated by Dr. S. Gomès, 2013-2017), grants for Ph.D. students, post-doctoral researchers, travel and accommodation expenses associated with international collaboration programs.

Research contracts with companies (STMicroelectronics, Total, Nexter,...).

## TEACHING EXPERIENCE and MASTER PROGRAM ADMINISTRATION

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- 2005-2014 Lectures in thermal radiation heat transfer (average of 15 to 30 h/year) in the Department of Energy and Environmental Engineering at INSA Lyon and in the Master of "Heat Transfer and Energy" studies at the University of Lyon.
- 09/2012-08/2013 **Director of the Master** of "Heat Transfer and Energy" studies at the University of Lyon.
- 12/1996-08/1998 **Assistant Professor**, CNAM (National Conservatory of Arts and Crafts), Paris, France. Lectures in Heat Transfer.

## LIST OF PUBLICATIONS

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### Book and book chapters

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- Book.1 R. Vaillon and A. Delmas, *Rayonnement thermique*, Chap. 4 in « Transferts Thermiques: Initiation et Approfondissement », Heat Transfer Textbook (in French), Lavoisier, 2015.
- Book.2 P.-O. Chapuis, R. Revellin & R. Vaillon, *Transferts thermiques aux petites échelles*, Chap. 9 in « Transferts Thermiques: Initiation et Approfondissement », Heat Transfer Textbook (in French), Lavoisier, 2015.
- Book.3 M. Verdier, R. Vaillon, S. Merabia, D. Lacroix, K. Termentzidis, *Applications*, Chap. 4 in « Nanostructured Semiconductors: Amorphisation and Thermal Properties », Pan Stanford Publishing Pte. Ltd., ISBN 9789814745642, 2017.
- Book.4 O. Dupré, R. Vaillon, M.A. Green, *Thermal Behavior of Photovoltaic Devices – Physics and Engineering*, Springer International Publishing, ISBN 978-3-319-49456-2, 170 p., 2017. <http://dx.doi.org/10.1007/978-3-319-49457-9>
- Book.5 R. Vaillon, *Radiative properties of particles*, Chapter in « Handbook of Thermal Science and Engineering », Springer International Publishing, ISBN 978-3-319-26694-7, 2017.

### Peer-reviewed journal articles

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- J.1 R. Vaillon, M. Lallemand & D. Lemonnier, *Radiative heat transfer in orthogonal curvilinear coordinates using the discrete ordinates method*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 55, N. 1, pp. 7-17, 1996.
- J.2 V. Le Dez, F. Youssefian, R. Vaillon, D. Lemonnier & M. Lallemand, *Problème de Stefan direct dans un milieu semi-transparent gris*, Journal de Physique III France 6, pp. 373-390, Mars 1996.
- J.3 R. Vaillon, M. Lallemand & C. Stehlé, *Specific frequency integration method applied to thermally nonhomogeneous hydrogen - helium gas mixture*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 58, N. 3, pp. 301-328, 1997.
- J.4 V. Le Dez, R. Vaillon, D. Lemonnier & M. Lallemand, *Conductive-radiative coupling in an absorbing-emitting axisymmetric medium*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 65, N. 6, pp. 787-803, 2000.
- J.5 R. Vaillon, *Derivation of an equivalent Mueller matrix associated to an absorbing, emitting and multiply scattering plane medium*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 73, N. 2-5, pp. 147-157, 2002.
- J.6 R. Bourayou, R. Vaillon & J.F. Sacadura, *FTIR low resolution emission spectrometry of a laboratory-scale diffusion flame: experimental set-up*, Experimental Thermal and Fluid Science, Vol. 26, pp. 181-187, 2002.
- J.7 H-M. Koo, R. Vaillon, V. Goutière, V. Le Dez, H. Cha, T-H. Song, *Comparison of three discrete ordinates methods applied to two dimensional curved geometries*, International Journal of

- Thermal Sciences, Vol. 42, N. 4, pp. 343-359, 2003. [http://dx.doi.org/10.1016/S1290-0729\(02\)00036-4](http://dx.doi.org/10.1016/S1290-0729(02)00036-4)
- J.8 C. Muresan, R. Vaillon, C. Ménézo & R. Morlot, *Discrete ordinates solution of coupled conductive radiative heat transfer in a two-layer slab with Fresnel interfaces subject to diffuse and obliquely collimated irradiation*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 84, N. 4, pp. 551-562, 2004. [http://dx.doi.org/10.1016/S0022-4073\(03\)00271-1](http://dx.doi.org/10.1016/S0022-4073(03)00271-1)
- J.9 R. Vaillon, B.T. Wong & M.P. Mengüç, *Polarized radiative transfer in a particle-laden semi-transparent medium via a Vector Monte Carlo Method*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 84, N. 4, pp. 383-394, 2004. [http://dx.doi.org/10.1016/S0022-4073\(03\)00257-7](http://dx.doi.org/10.1016/S0022-4073(03)00257-7)
- J.10 M. Francoeur, R. Vaillon, D.R. Rousse, *Theoretical analysis of frequency and time domain methods for optical characterization of absorbing and scattering media*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 93, N. 1-3, pp. 139-150, 2005. <http://dx.doi.org/10.1016/j.jqsrt.2004.08.018>
- J.11 C. Muresan, C. Ménézo, R. Bennacer, R. Vaillon, *Numerical simulation of a vertical solar collector integrated in building frame: radiation and turbulent natural convection coupling*, Heat Transfer Engineering, Vol. 27, N. 2, pp. 29-42, 2006. <http://dx.doi.org/10.1080/01457630500397658>
- J.12 R. Vaillon, L. Robin, C. Muresan, C. Ménézo, *Modeling of coupled spectral radiation, thermal and carrier transport in a silicon photovoltaic cell*, International Journal of Heat and Mass Transfer, Vol. 49, pp. 4454-4468, 2006. <http://dx.doi.org/10.1016/j.ijheatmasstransfer.2006.05.014>
- J.13 I. Ayranci, R. Vaillon, N. Selçuk, *Performance of Discrete Dipole Approximation for prediction of amplitude and phase of electromagnetic scattering by particles*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 103, N. 1, pp. 83-101, 2007. <http://dx.doi.org/10.1016/j.jqsrt.2006.06.006>
- J.14 P. Sabouroux, B. Stout, J-M. Geffrin, C. Eyraud, I. Ayranci, R. Vaillon, N. Selçuk, *Amplitude and phase of light scattered by micro-scale aggregates of dielectric spheres: comparison between theory and microwave analogy experiments*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 103, N. 1, pp. 156-167, 2007. <http://dx.doi.org/10.1016/j.jqsrt.2006.06.001>
- J.15 I. Ayranci, R. Vaillon, N. Selçuk, F. André, D. Escudié, *Determination of soot temperature, volume fraction and refractive index from flame emission spectrometry*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 104, N. 2, pp. 266-276, 2007. <http://dx.doi.org/10.1016/j.jqsrt.2006.07.013>
- J.16 I. Ayranci, G. Pinguet, D. Escudié, N. Selçuk, R. Vaillon, F. André, *Effect of particle polydispersity on particle concentration measurement by using laser Doppler anemometry*, Experimental Thermal and Fluid Science, Vol. 31, N. 8, pp. 839-847, 2007. <http://dx.doi.org/10.1016/j.expthermflusci.2006.03.031>
- J.17 F. André & R. Vaillon, *The k-moment method for modeling the blackbody weighted transmission function for narrow and wide band radiative properties of gases*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 108, N. 1, pp. 1-16, 2007. <http://dx.doi.org/10.1016/j.jqsrt.2007.02.013>
- J.18 F. André, R. Vaillon, *The k-moment method for the narrow band modeling of the radiative properties of nonuniform gaseous media*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 109, N. 2, pp. 258-268, 2008. <http://dx.doi.org/10.1016/j.jqsrt.2007.08.014>
- J.19 I. Ayranci, R. Vaillon, N. Selçuk, *Near-infrared emission spectrometry measurements for nonintrusive soot diagnostic in flames*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 109, N. 2, pp. 349-361, 2008. <http://dx.doi.org/10.1016/j.jqsrt.2007.08.013>
- J.20 F. André, R. Vaillon, *The spectral-line moment-based (SLMB) modeling of the wide band and global blackbody-weighted transmission function and cumulative distribution function of the absorption coefficient in uniform gaseous media*, Journal of Quantitative Spectroscopy and

- Radiative Transfer, Vol. 109, N. 14, pp. 2401-2416, 2008. <http://dx.doi.org/10.1016/j.jqsrt.2008.05.002>
- J.21 M. Francoeur, M.P. Mengüç, R. Vaillon, *Near-field radiative heat transfer enhancement via surface phonon-polaritons coupling in thin films*, Applied Physics Letters, Vol. 93, N. 4, 043109, 2008. <http://dx.doi.org/10.1063/1.2963195>
- J.22 O. Merchiers, J-M. Geffrin, R. Vaillon, P. Sabouroux, B. Lacroix, *Microwave analog to light scattering measurements on a fully characterized complex aggregate*, Applied Physics Letters, Vol. 94, N. 18, 181107, 2009. <http://dx.doi.org/10.1063/1.3129196>
- J.23 M. Francoeur, M.P. Mengüç, R. Vaillon, *Solution of near-field thermal radiation in one-dimensional layered media using dyadic green's functions and the scattering matrix method*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 110, N. 18, pp. 2002-2018, 2009. <http://dx.doi.org/10.1016/j.jqsrt.2009.05.010>
- J.24 F. André, R. Vaillon, *A database for the SLMB modeling of the full spectrum radiative properties of CO<sub>2</sub>*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 111, N. 2, pp. 325-330, 2010. <http://dx.doi.org/10.1016/j.jqsrt.2009.06.012>
- J.25 B. Gay, R. Vaillon, M.P. Mengüç, *Polarization imaging of multiply-scattered radiation based on Integral-Vector Monte Carlo Method*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 111, N. 2, pp. 287-294, 2010. <http://dx.doi.org/10.1016/j.jqsrt.2009.06.010>
- J.26 M. Francoeur, M.P. Mengüç, R. Vaillon, *Local density of electromagnetic states within a nanometric gap formed between two thin films supporting surface phonon-polaritons*, Journal of Applied Physics, Vol. 107, 034313 (8p), 2010. <http://dx.doi.org/10.1063/1.3294606>
- J.27 M. Francoeur, M.P. Mengüç, R. Vaillon, *Spectral tuning of near-field radiative heat flux between two thin silicon carbide films*, Journal of Physics D: Applied Physics, Vol. 43, 075501 (12p), 2010. <http://dx.doi.org/10.1088/0022-3727/43/7/075501>
- J.28 O. Merchiers, C. Eyraud, J.-M. Geffrin, R. Vaillon, B. Stout, P. Sabouroux, B. Lacroix, *Microwave measurements of the full amplitude scattering matrix of a complex aggregate: a database for the assessment of light scattering codes*, Optics Express, Vol. 18, N. 3, pp. 2056-2075, 2010. <http://dx.doi.org/10.1364/OE.18.002056>
- J.29 F. André, R. Vaillon, *A nonuniform narrow band correlated-k approximation using the k-moment method*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 111, N. 12-13, pp. 1900-1911, 2010. <http://dx.doi.org/10.1016/j.jqsrt.2010.03.013>
- J.30 F. André, R. Vaillon, C. Galizzi, H. Guo, O. Gicquel, *A multi-spectral reordering technique for the full spectrum SLMB modeling of radiative heat transfer in nonuniform gaseous mixtures*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 112, N. 3, pp. 394-411, 2011. <http://dx.doi.org/10.1016/j.jqsrt.2010.09.011>
- J.31 M. Francoeur, M.P. Mengüç, R. Vaillon, *Control of near-field radiative heat transfer via surface phonon-polariton coupling in thin films*, Applied Physics A, Vol. 103, pp. 547-550, 2011. <http://dx.doi.org/10.1007/s00339-010-6184-0>
- J.32 R. Vaillon, J-M. Geffrin, O. Merchiers, C. Eyraud, P. Sabouroux, B. Lacroix, *A new implementation of a microwave analog to light scattering measurement device*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 112, N. 11, pp. 1753-1760, 2011. <http://dx.doi.org/10.1016/j.jqsrt.2010.12.008>
- J.33 M. Francoeur, R. Vaillon, M.P. Mengüç, *Thermal Impacts on the Performance of Nanoscale-Gap Thermophotovoltaic Power Generators*, IEEE Transactions on Energy Conversion, Vol. 26, N. 2, pp. 686-698, 2011. <http://dx.doi.org/10.1109/TEC.2011.2118212>
- J.34 M. Francoeur, M.P. Mengüç, R. Vaillon, *Coexistence of multiple regimes for near-field thermal radiation between two layers supporting surface phonon polaritons in the infrared*, Physical Review B, Vol. 84, N. 7, 075436, 9 p., 2011. <http://dx.doi.org/10.1103/PhysRevB.84.075436>
- J.35 F. André, R. Vaillon, *Generalization of the k-moment method using the maximum entropy principle. Application to the NBKM and full spectrum SLMB gas radiation models*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 113, N. 12, pp. 1508-1520, 2012. <http://dx.doi.org/10.1016/j.jqsrt.2012.03.008>

- J.36 F. André, R. Vaillon, The Multi-Spectral Reordering (MSR) technique for the narrow band modeling of the radiative properties of nonuniform gaseous paths: the correlated/uncorrelated approximations, *Journal of Physics: Conference Series*, Vol. 369, 012024, 2012. <http://dx.doi.org/10.1088/1742-6596/369/1/012024>
- J.37 H. Gonome, M. Baneshi, R. Vaillon, J. Okajima, A. Komiya, S. Maruyama, *The effect of dispersed state to control of radiative properties of coatings pigmented with nanoparticles*, *Journal of Thermal Science and Technology*, Vol. 7, N. 2, pp. 364-378, 2012. <http://dx.doi.org/10.1299/jtst.7.364>
- J.38 J.M. Geffrin, B. García-Cámara, R. Gómez-Medina, P. Albella, L.S. Froufe-Pérez, C. Eyraud, A. Litman, R. Vaillon, F. González, M. Nieto-Vesperinas, J.J. Sáenz, F. Moreno, *Magnetic and electric coherence in forward and backscattered electromagnetic waves by a single dielectric subwavelength sphere*, *Nature Communications*, Vol. 3, article N. 1171, 8 p., 2012. <http://dx.doi.org/10.1038/ncomms2167>
- J.39 F. André, V. Solovjov, R. Vaillon, D. Lemonnier, *Modeling the cumulative distribution of absorption coefficients of gases using the generalized k-moment method*, *Journal of Quantitative Spectroscopy and Radiative Transfer*, Vol. 124, N. 3, pp. 49-61, 2013. <http://dx.doi.org/10.1016/j.jqsrt.2013.02.026>
- J.40 C. Eyraud, R. Vaillon, A. Litman, J-M Geffrin, O. Merchiers, *Polarization effects in 3D vectorial induced current reconstructions*, *Journal of the Optical Society of America A*, Vol. 30, N. 10, pp. 1967-1974, 2013. <http://dx.doi.org/10.1364/JOSAA.30.001967>
- J.41 F. André, V. Solovjov, L. Hou, R. Vaillon, D. Lemonnier, *The Generalized k-Moment Method for the Modelling of Cumulative k-Distributions of H<sub>2</sub>O at High Temperature*, *Journal of Quantitative Spectroscopy and Radiative Transfer*, Vol. 143, pp. 92-99, 2014. <http://dx.doi.org/10.1016/j.jqsrt.2013.09.008>
- J.42 O. Dupré, R. Vaillon, *Optimizations of photovoltaic cells including the minimization of internal heat sources*, *Journal of Renewable and Sustainable Energy*, Vol. 6, p. 011201, 2014. <http://dx.doi.org/10.1063/1.4828367>
- J.43 M.R. Short, J.-M. Geffrin, R. Vaillon, H. Tortel, B. Lacroix, M. Francoeur, *Evanescent wave scattering by particles on a surface: validation of the discrete dipole approximation with surface interaction against microwave analog experiments*, *Journal of Quantitative Spectroscopy and Radiative Transfer*, Vol. 146, pp. 452-458, 2014. <http://dx.doi.org/10.1016/j.jqsrt.2013.12.007>
- J.44 R. Vaillon, J.-M. Geffrin, *Recent advances in microwave analog to light scattering experiments*, *Journal of Quantitative Spectroscopy and Radiative Transfer*, Vol. 146, pp. 100-105, 2014. <http://dx.doi.org/10.1016/j.jqsrt.2014.02.031>
- J.45 F. André, L. Hou, M. Roger, R. Vaillon, *The multispectral gas radiation modeling: A new theoretical framework based on a multidimensional approach to k-distribution methods*, *Journal of Quantitative Spectroscopy and Radiative Transfer*, Vol. 147, pp. 178-195, 2014. <http://dx.doi.org/10.1016/j.jqsrt.2014.05.021>
- J.46 O. Dupré, R. Vaillon, M.A. Green, *Physics of the temperature coefficients of solar cells*, *Solar Energy Materials and Solar Cells*, Vol. 140, pp. 92-100, 2015. <http://dx.doi.org/10.1016/j.solmat.2015.03.025>
- J.47 E. Blandre, P.-O. Chapuis, M. Francoeur, R. Vaillon, *Spatial and spectral distributions of thermal radiation emitted by a semi-infinite body and absorbed by a flat film*, *AIP Advances*, Vol. 5, 057106, 2015. <http://dx.doi.org/10.1063/1.4919931>
- J.48 M. Bernardi, O. Dupré, E. Blandre, P.-O. Chapuis, R. Vaillon, M. Francoeur, *Impacts of propagating, frustrated and surface modes on radiative, electrical and thermal losses in nanoscale-gap thermophotovoltaic power generators*, *Scientific Reports*, Vol. 5, 11626, 2015. <http://dx.doi.org/10.1038/srep11626>
- J.49 O. Dupré, R. Vaillon, M.A. Green, *Experimental assessment of temperature coefficient theories for silicon solar cells*, *IEEE Journal of Photovoltaics*, Vol. 6, N. 1, pp. 56-60, 2016. <http://dx.doi.org/10.1109/JPHOTOV.2015.2489864>

- J.50 J.-M. Geffrin, M. Chamtour, O. Merchiers, H. Tortel, A. Litman, J.-S. Bailly, B. Lacroix, M. Francoeur, R. Vaillon, *The Surface Wave Scattering – Microwave Scanner (SWS-MS)*, Journal of Quantitative Spectroscopy and Radiative Transfer, Vol. 168, pp. 1-9, 2016. <http://dx.doi.org/10.1016/j.jqsrt.2015.08.019>
- J.51 E. Blandre, P.-O. Chapuis, R. Vaillon, *Spectral and total temperature-dependent emissivity of few-layer structures on a metallic substrate*, Optics Express, Vol. 24, N. 2, pp. A374-A387, 2016. <http://dx.doi.org/10.1364/OE.24.00A374>
- J.52 Y. Tsurimaki, P.-O. Chapuis, J. Okajima, A. Komiya, S. Maruyama, R. Vaillon, *Transition from the incoherent to the coherent regime for propagative wave-based thermal radiation*, Journal of Physics: Conference Series, Vol. 676, 012023, 2016. <http://dx.doi.org/10.1088/1742-6596/676/1/012023>
- J.53 O. Dupré, R. Vaillon, M.A. Green, *Optimization of solar thermophotovoltaic systems including the thermal balance*, Proceedings of the 43rd IEEE Photovoltaic Specialists Conference, pp. 1030-1033, 2016. <http://dx.doi.org/10.1109/PVSC.2016.7749767>
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- J.56 J. DeSutter, R. Vaillon, M. Francoeur, *External luminescence and photon recycling in near-field thermophotovoltaics*, accepted in Physical Review Applied, 2017. <https://arxiv.org/abs/1612.02083>

## Invited conferences

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- B.1 R. Vaillon, *Polarisation et caractérisation de milieux semi-transparentes hétérogènes*, VI<sup>ème</sup> Colloque Interuniversitaire Franco-Québécois, Thermique des systèmes, Québec, Canada, May 26-28 2003, editor: Laval University, 2003.
- B.2 P.-O. Chapuis, S. Gomès, S. Lefèvre, R. Vaillon, *Nanothermique : contrôle du transfert de chaleur dans les nanostructures (Ingénierie phononique pour le routage thermique)*, XXV<sup>e</sup> Entretiens Jacques Cartier (France-Québec) : Nanotechnologies, une autre vision sur les énergies !, Lyon, 19-20 November 2012. [Or : P-O.C.]
- B.3 P.-O. Chapuis, S. Gomès, S. Lefèvre, R. Vaillon, *Nanostructuration et contrôle du transfert de chaleur*, Journées Nano Microtechnologies au service de l'Énergie, INSA Lyon, 29-30 November 2012. [Or : P-O.C.]
- B.4 P.-O. Chapuis, R. Vaillon, *Heat transfer at nanoscale: Opportunities for solar energy conversion?*, Workshop on Nanostructures as Efficient Solar Energy Converters (NESEC), Perpignan, France, December 11, 2012. [Abst. + Or. : P-O.C.]
- B.5 P.-O. Chapuis, E. Blandre, K.L. Nguyen, J. Sarr, O. Merchiers, R. Vaillon, *Sub-wavelength thermal radiation and thermophotovoltaics*, PIERS, Saint Petersburg, Russia, 22-25 May 2017. [Abst. + Or. : P-O.C.]

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- C.1 R. Vaillon, M. Lallemand & D. Lemonnier, *Radiative-conductive heat transfer in curvilinear coordinates using the discrete ordinates method*, EURO THERM 36, Advanced Concepts and Techniques in Thermal Modelling, Poitiers-Futuroscope, France, Sept. 1994 ; D. Lemonnier, J.B. Saulnier & M. Fiebig Editors, Elsevier, pp. 339-345, 1996.
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- C.3 R. Vaillon, C. Stehlé, D. Lemonnier & M. Lallemand, *Radiative equilibrium of an hydrogen - helium gas mixture within an ellipsoidal shell using the discrete ordinates method and a specific frequency integration method*, Second International Symposium on Radiative Heat Transfer, Kusadasi, Turkey, July 1997 ; M. Pinar Mengüç Editor, Begell House, N. Y., pp. 237-252, 1998.
- C.4 R. Vaillon, M. Lallemand & D. Lemonnier, *Radiative convective heat transfer in a reacting bow shock layer*, EURO THERM 53, Advanced Concepts and Techniques in Thermal Modelling, Mons, Belgique, Oct. 1997 ; J. Henriette, P. Lybaert & M. El Hayeck Editors, Elsevier, pp. 239-246, 1998.
- C.5 C. Proulx, D. Rousse, R. Vaillon & J.F. Sacadura, *Handling of collimated irradiation on a plane-parallel participating medium*, HTD-Vol. 366-1, Proceedings of the ASME Heat Transfer Division, Vol. 1, pp. 85-92, 2000.
- C.6 R. Vaillon, J.F. Sacadura & M.P. Mengüç, *Analysis of polarization state of radiation intensity in an absorbing, emitting and scattering medium*, 3<sup>rd</sup> European Thermal Sciences Conference, Eurotherm, Heidelberg, Germany, Sept. 10-13 2000, editors: E.W.P. Hahne, W. Heidemann & K. Spindler, Edizioni ETS, Vol. 1, pp. 593-598, 2000.
- C.7 C. Proulx, D. Rousse, R. Vaillon & J.F. Sacadura, *Rayonnement collimaté sur une couche plane semi-transparente : incidence oblique du faisceau*, V<sup>ème</sup> Colloque InterUniversitaire Franco-Québécois, Thermique des systèmes, Lyon, May 28-30 2001, editor: J. Brau, pp. 41-48, 2001.
- C.8 R. Vaillon, *Derivation of an equivalent Mueller matrix associated to an absorbing, emitting and multiply scattering plane medium*, 3<sup>rd</sup> International Symposium on Radiation Transfer, Antalya, Turkey, June 18-22 2001, editors: M. Pinar Mengüç et Nevin Selçuk, begell house inc., New York, pp. 16-25, 2001.
- C.9 R. Bourayou, R. Vaillon & J.F. Sacadura, *FTIR low resolution emission spectrometry of a laboratory-scale diffusion flame : experimental set-up*, 5th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics, Thessaloniki, Grèce, Sept. 24-28 2001, éditeurs : G.P. Celata, P. Di Marco, A. Goulas, A. Mariani, Edizioni ETS, Pisa, Italy, pp. 485-490, 2001.
- C.10 C. Muresan, C. Ménézo, J. Virgone, R. Vaillon & R. Morlot, *Modeling of the thermal behavior of a photovoltaic module*, 12<sup>th</sup> International Heat Transfer Conference, Grenoble, France, August 18-23 2002.
- C.11 C. Muresan, R. Vaillon, C. Ménézo & R. Morlot, *Discrete ordinates solution of coupled conductive radiative heat transfer in a two-layer slab with Fresnel interfaces subject to diffuse and obliquely collimated irradiation*, Eurotherm73 on Computational Thermal Radiation in Participating Media, Mons, Belgique, April 15-17 avril, editors: P. Lybaert, V. Feldheim, D. Lemonnier & N. Selçuk, Editions scientifiques et médicales Elsevier, pp. 317-326, 2003.
- C.12 R. Vaillon, B.T. Wong & M.P. Mengüç, *Polarized radiative transfer in a particle-laden semi-transparent medium via a Vector Monte Carlo Method*, Eurotherm73 on Computational Thermal Radiation in Participating Media, Mons, Belgique, April 15-17 2003, editors: P. Lybaert, V. Feldheim, D. Lemonnier & N. Selçuk, Editions scientifiques et médicales Elsevier, pp. 23-33, 2003.
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- C.14 M. Francoeur, D.R. Rousse & R. Vaillon, *Analyse du transfert radiatif instationnaire en milieu semi-transparent absorbant et diffusant*, VI<sup>ème</sup> Colloque Interuniversitaire Franco-Québécois, Thermique des systèmes, Québec, Canada, May 26-28 2003, editor: Laval University, 2003.
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- C.17 F. André, R. Vaillon, I. Ayranci, D. Escudié, N. Selçuk, *Radiative transfer diagnostic technique of sooting flames from emission spectroscopy*, 4<sup>th</sup> International Symposium on Radiative Transfer, Istanbul, Turkey, June 20-25 2004, editors: M. Pinar Mengüç & Nevin Selçuk, begell house inc., New York, pp. 435-443, 2004.
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- C.23 M. Amara, R. Vaillon, C. Ménézo, *Thermal and electrical behaviors of silicon photovoltaic cells with antireflection layers*, CHT08: ICHMT International Symposium on Advances in Computational Heat Transfer, Marrakech, Maroc, May 11-16 2008.
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- C.25 M. Francoeur, M.P. Mengüç, R. Vaillon, *Near-field thermal radiation emission from SiC thin films*, Eurotherm83 on Computational Thermal Radiation in Participating Media III, Lisbon, Portugal, April 15-17 2009, editors: P. Coelho, D. Lemonnier, P. Lybaert, V. & N. Selçuk, IST Press, pp. 335-346, 2009.
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- C.31 R. Vaillon, J-M. Geffrin, O. Merchiers, C. Eyraud, P. Sabouroux, B. Lacroix, *A novel implementation of a microwave analog to light scattering measurement set-up*, The XII<sup>th</sup> Conference on Electromagnetic & Light Scattering, Helsinki, Finland, June 28 – July 1<sup>st</sup>, 2010.
- C.32 M. Francoeur, M.P. Mengüç, R. Vaillon, *Thermal impacts on performances of nanoscale-gap thermophotovoltaic energy conversion devices*, The XII<sup>th</sup> Conference on Electromagnetic & Light Scattering, Helsinki, Finland, June 28 – July 1<sup>st</sup>, 2010.

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- C.38 J-M. Geffrin, R. Vaillon, C. Eyraud, B. Lacroix, *Scaled analog measurements of light scattering by aggregates with merging monomers*, The XIII<sup>th</sup> Conference on Electromagnetic & Light Scattering, AAPP | Physical, Mathematical, and Natural Sciences, 4p., Taormina, Italy, September 26 - 30, 2011.
- C.39 F. André, R. Vaillon, *The Multi-Spectral Reordering (MSR) technique for the narrow band modeling of the radiative properties of nonuniform gaseous paths: the correlated/uncorrelated approximations*, Eurotherm Conference No. 95: Computational Thermal Radiation in Participating Media IV, Nancy, France, April 18-20, 2012.
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- C.43 Y. Tsurimaki, P-O. Chapuis, R. Vaillon, J. Okajima, A. Komiya, S. Maruyama, *Reducing thermal radiation between parallel plates in the far-to-near field transition regime*, Proceedings of the 15th International Heat Transfer Conference, IHTC-15, August 10-15, 2014, Kyoto, Japan.
- C.44 M. Chamtouri, O. Merchiers, M. Francoeur, H. Tortel, J-M. Geffrin, R. Vaillon, *Electromagnetic surface wave scattering with microwaves*, Proceedings of PIERS in Guangzhou 2014, The 35<sup>th</sup> Progress In Electromagnetics Research Symposium, Guangzhou, China, August 25-28<sup>th</sup>, 2014.
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- C.47 Y. Tsurimaki, P-O. Chapuis, J. Okajima, A. Komiya, S. Maruyama, R. Vaillon, *Transition from the incoherent to the coherent regime for propagative-wave based thermal radiation*, Eurotherm 105 - Computational Thermal Radiation in Participating Media V, Albi, France, 1-3 April 2015. [Or. : R.V.]

- C.48 O. Dupré, R. Vaillon, M.A. Green, *Experimental assessment of temperature coefficient theories for silicon solar cells*, 42<sup>nd</sup> IEEE Photovoltaic Specialists Conference, New Orleans, USA, 14-19 June 2015. [Or. : O.D.]
- C.49 O. Dupré, R. Vaillon, M.A. Green, *Optimization of solar thermophotovoltaic systems including the thermal balance*, 43<sup>rd</sup> IEEE Photovoltaic Specialists Conference, Portland, USA, 5-10 June 2016. [Or. : O.D.]
- C.50 O. Merchiers, E. Blandre, P.-O. Chapuis, R. Vaillon, *Radiative transfer reduction through a multilayer cavity design*, 3<sup>rd</sup> International Workshop on Nano-Micro Thermal Radiation, NanoRad 2017, Daejeon, South Korea, 26-28 June 2017. [Or. : O.M.]
- C.51 M. Shimizu, E. Blandre, A. Kohiyama, P.-O. Chapuis, R. Vaillon, H. Yugami, *High spectral selectivity based on a few layer structure for solar-thermophotovoltaics*, 3<sup>rd</sup> International Workshop on Nano-Micro Thermal Radiation, NanoRad 2017, Daejeon, South Korea, 26-28 June 2017. [Or. : M.S.]

### **National conferences, international conferences without proceedings, workshops, seminars,...**

Legend: [Art.]: article ; [Post.]: poster ; [Or.]: oral presentation.

- Com.1 R. Vaillon, M. Lallemand & D. Lemonnier, *Transfert radiatif par la méthode SN dans un milieu semi-transparent à spectre fortement thermodépendant*, Congrès de la Société Française des Thermiciens, CNAM Paris, France ; Editions Européennes Thermique et Industrie, pp. 72-77, 1994. [Art.]
- Com.2 R. Vaillon, M. Lallemand & D. Lemonnier, *Méthode des ordonnées discrètes en coordonnées curvilignes. Application au couplage rayonnement-conduction dans un milieu semi-transparent de forme complexe*, Congrès de la Société Française des Thermiciens, Poitiers-Futuroscope, France ; Editions scientifiques et médicales, Elsevier, pp. 296-301, 1995. [Art.]
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- Com.4 R. Bourayou, R. Vaillon & J.F. Sacadura, *Spectrométrie d'émission basse résolution d'une flamme de diffusion*, Congrès de la Société Française de Thermique, Nantes, 29-31 mai 2001, éditeurs : C. Castelain et D. Delaunay, Elsevier, pp. 327-332, 2001. [Art.]
- Com.5 R. Vaillon, M. Lallemand & D. Lemonnier, *Développement et application de la méthode des ordonnées discrètes en coordonnées curvilignes orthogonales*, Journée d'Etudes de la Société Française des Thermiciens, Paris, France, fév. 1996. [Art. + Or.]
- Com.6 R. Vaillon, *Méthodes numériques en rayonnement thermique (résolution de l'équation de transfert radiatif)*, séminaire invité au Département d'Astronomie Stellaire et Galactique (DASGAL, UMR 8633, Observatoire de Paris, section de Meudon), France, 19 février 1999. [Or.]
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- Com.8 R. Vaillon, D. Lemonnier & V. Le Dez, *Discrete Ordinate solutions of the Radiative Transfer Equation in complex geometry*, séminaire de l'Action Concertée en Rayonnement Thermique, EM2C (UPR 288), Chatenay-Malabry, 15-16 mars 2001. [Or.]
- Com.9 C. Muresan, C. Ménézo, R. Vaillon, J. Virgone & R. Morlot, *Modélisation du transfert radiatif dans les couches semi-transparentes d'un module photovoltaïque*, IBPSA 2002, Méthodes, modèles et simulation des bâtiments, Paris, 18-19 octobre 2002. [Art.]

- Com.10 C. Muresan, C. Ménézo, R. Vaillon, J. Virgone & R. Morlot, *Accurate model of heat transfer in PV modules*, PV in Europe, from PV technology to energy solutions Conference and Exhibition, Rome, Italie, 7-11 octobre 2002. [Art. + Or.]
- Com.11 C. Crofcheck, M.P. Mengüç, B.T. Wong, D. Tao, M. Aslan & R. Vaillon, *Development of a polarized light sensor to monitor bubble size and liquid hold-up in foam*, ASAE annual international meeting, Las Vegas, 27-30 July 2003. [Post.]
- Com.12 R. Vaillon, F. André, D. Escudié, *Caractérisation des particules de combustion dans les moteurs aéronautiques*, 1<sup>ère</sup> Journée du groupe Régional Rhône-Alpes de l'Association Aéronautique et Astronautique de France, Ecole Centrale de Lyon, 27 May 2004. [Post. + Or.]
- Com.13 P. Desgroux, Y. Bouvier, E. Therssen, A. Coppalle, M. Weill, R. Vaillon, F. André, D. Escudié, P. Sabouroux, *Caractérisation des particules dans les moteurs aéronautiques : projet CAPAS*, Atelier "Physique des poussières durant l'évolution stellaire", Observatoire de Meudon, 14-15 October 2004. [Or.]
- Com.14 F. André, C. Galizzi, R. Vaillon, D. Escudié, *Impacts des transferts thermiques sur les milieux en combustion – Application aux moteurs aéronautiques*, 2<sup>ème</sup> Journée du groupe Régional Rhône-Alpes de l'Association Aéronautique et Astronautique de France, ENSHMG - INPG, 7 July 2005. [Post. + Or.]
- Com.15 P. Desgroux, Y. Bouvier, E. Therssen, A. Coppalle, M. Weill, J. Yon, R. Vaillon, F. André, D. Escudié, *Caractérisation des particules dans les moteurs aéronautiques : projet CAPAS*, Workshop INCA, Snecma Villaroche, France, 20-21 October 2005. [Art.]
- Com.16 F. André, R. Vaillon, D. Escudié, *Caractérisation spectrométrique des flammes : émission radiative des suies et des gaz*, GDR CNRS 2864 "Incendie", Laboratoire de Combustion et de Détonique, ENSMA, Poitiers, 5-6 January 2006. [Or.]
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- Com.18 R. Vaillon, *Development of radiative transfer / optical diagnostic techniques to characterize soot particles in flames*, séminaire invité, Atelier thématique, Anniversaire conjoint Ecole Centrale – Université de Tohoku – INSA de Lyon, Ecully, France, 9 February 2007. [Or.]
- Com.19 R. Vaillon, *Development of radiative transfer based / optical diagnostic techniques to characterize soot particles in flames*, invited seminar, Université de Cantabria, Santander, Espagne, 21 February 2007. [Or.]
- Com.20 R. Vaillon, *Development of radiative transfer based / optical diagnostic techniques to characterize soot particles in flames*, séminaire invité, University of Kentucky, Lexington, Kentucky, USA, 3 April 2007. [Or.]
- Com.21 R. Vaillon, P. Sabouroux, B. Stout, J-M. Geffrin, C. Eyraud, I. Ayranci, N. Selcuk, *Interaction of light with non spherical particles: application of the microwave analogy principles to assess Maxwell equation solvers in primary variables*, The Tenth Conference on Electromagnetic & Light Scattering, Bodrum, Turquie, 17-22 June 2007. [Or.]
- Com.22 R. Vaillon, F. André, D. Baillis, A. Delmas, *Thermophysical and radiative properties of various media : a compendium of multi-scale analyses*, The 4th LYON-TOHOKU engineering & science forum, Tohoku University, Sendai, Japon, 13-14 December 2007. [Or.]
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- Com.24 M. Francoeur, R. Vaillon, M.P. Mengüç, B. Gay, O. Merchiers, M. Amara, *Compendium of collaborative research activities on particle characterization and photovoltaic systems between RTL and CETHIL*, invited seminar, Institute for Chemical Process and

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