

Publications de l'équipe Thermométrie

2016

Publications avec comité éditorial

R. M. Gavioso, D. Madonna Ripa, P. P. M. Steur, C. Gaiser, T. Zandt, B. Fellmuth, M. de Podesta, R. Underwood, G. Sutton, L. Pitre, F. Sparasci, L. Risegari, L. Gianfrani, A. Castrillo, G. Machin, "Progress towards the determination of thermodynamic temperature with ultra-low uncertainty", *Phil. Trans. R. Soc. A* 374: 20150046.
<http://dx.doi.org/10.1098/rsta.2015.0046>

B. Gao, L. Pitre, E.C. Luo, M.D. Plimmer, P. Lin, J.T. Zhang, X.J. Feng, Y.Y. Chen, F. Sparasci, "Feasibility of primary thermometry using refractive index measurements at a single pressure", soumis au journal "Measurement" en Octobre 2016.

B. Fellmuth, E. Mendez-Lango, T. Nakano, F. Sparasci, "Guide to the realization of the ITS-90 – Cryogenic fixed points", en attente de publication sur le site du BIPM.

G. Machin, K. Anhalt, M. Battuello, F. Bourson, P. Dekker, A. Diril, F. Edler, C.J. Elliott, F. Girard, A. Greenen, L. Knazovická, D. Lowe, P. Pavlásek, J.V. Pearce, M. Sadli, R. Strnad, M. Seifert, E.M. Vuelban "The European project on high temperature measurement solutions in industry (HiTeMS) - A summary of achievements" *Measurement*, vol 78, p168-179 (2016).

Woolliams E et al. "Thermodynamic temperature assignment to the point of inflection of the melting curve of high temperature fixed points" *Phil. Trans. R. Soc. A* 374 20150044 (2016).

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S.G.R. Salim, S. Briaudeau, F. Bourson, B. Rougié, D. Truong, O. Kozlova, J.-M. Coutin, M. Sadli "A reference radiance-meter system for thermodynamic temperature measurements" *Metrologia* 53 (2016) 945–955
[doi:10.1088/0026-1394/53/3/945](https://doi.org/10.1088/0026-1394/53/3/945).

O. Kozlova, A. Sadouni, D. Truong, S. Briaudeau, M. Himbert, "Tunable transportable spectroradiometer based on an acousto-optical tunable filter: Development and optical performance", *Review of Scientific Instruments* 87 (12), 125101 (2016).

G. Machin, J. Engert, R.M. Gavioso, M. Sadli, E. Woolliams "Summary of achievements of the European Metrology Research Programme Project "Implementing the new Kelvin" (InK 1)" *Measurement* 94 (2016) 149–156.

Communications

M. L. Pitre "Determinations of the Boltzmann constant k" CCU, BIPM, Paris, 14/6/2016

L. Pitre, F. Sparasci, L. Risegari, C. Guianvarc'h, M.D. Plimmer, "Determination of the Boltzmann constant k using a 3 litre copper quasi-sphere" Tempmeko2016 26/06/2016- 01/07/2016 Zakopane (PI)

L. Pitre, F. Sparasci, L. Risegari, C. Guianvarc'h, M.D. Plimmer "ACOUSTIC THERMOMETRY WITH A 3 LITER COPPER QUASI-SPHERE FROM 220 K TO 303 K AT LNE- CNAM " Tempmeko2016 26/06/2016- 01/07/2016 Zakopane (Pologne)

NICOLA CHIODO, Andrea Cappella, Laurent Pitre, Fernando Sparasci, Lara Risegari, Mark D. Plimmer and Eric Georgin "DIFFERENTIAL MICROWAVES HYGROMETER FOR MOISTURE MEASUREMENTS ON A WIDE WATER VAPOR CONCENTRATION RANGE" Tempmeko2016 26/06/2016- 01/07/2016 Zakopane (Pologne)

F. Sparasci, L. Pitre, A. Vergé, B. Buée, A. El Matarawy, "An improved calorimeter for SPRTs and CSPRTs at the mercury triple point", Tempmeko2016 26/06/2016- 01/07/2016 Zakopane (Pologne)

F. Sparasci, L. Pitre, A. Vergé, B. Buée, A. Kowal, B. Koodziej, "The triple points of Xe, C2F6 and SF6: preliminary realization at LNE-Cnam", Tempmeko2016 26/06/2016- 01/07/2016 Zakopane (Pologne)

F. Sparasci, L. Pitre, M. Le Menn, D. Malardé, "A calibration facility for an absolute salinometer based on the index of refraction of seawater", Tempmeko2016 26/06/2016- 01/07/2016 Zakopane (Pologne)

C. Cappella, F. Sparasci, L. Pitre, B. Buée, "Calibration of capsule SPRTs at the triple point of water in copper sealed cells", Tempmeko2016 26/06/2016- 01/07/2016 Zakopane (Pologne)

N. Chiodo, A. Cappella, L. Pitre, F. Sparasci, M. Lours, L. Risegari, M. Plimmer, E. Georgin, "Differential microwaves hygrometer for moisture measurements on a wide water vapor concentration range", MMC-2016, 26-29/09/2016, Madrid (Espagne)

F. Sparasci, L. Pitre, B. Buée, N. Chiodo, "Metrology of thermodynamic quantities for atmospheric and oceanic research", ENVRIPlus Meeting, MMC-2016, 26-29/09/2016, Madrid (Espagne)

F. Sparasci, L. Pitre, M. Le Menn, D. Malardé, " Progress building a calibration facility for an absolute salinometer based on the index of refraction of seawater", MMC-2016, 26-29/09/2016, Madrid (Espagne)

F. Sparasci, L. Pitre, B. Buée, N. Chiodo, " Temperature and salinity measurements in oceans: towards the improvement of long-term traceability", JPI Oceans Workshop, 13/10/2016, Brest

S. Briaudeau, O. Kozlova, A. Sadouni, D. Truong, F. Bourson, S.G.R. Salim and M. Sadli, "Metrological validation of a new tuneable visible radiation thermometer" presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

O. Kozlova, S. Briaudeau, D. Truong, V. Vidal, A. Sadouni, F. Bourson and M. Sadli, "Portable and wavelength tuneable near infrared radiation thermometer", presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

M. J. Martin, F. Bourson, C. García-Izquierdo, M. Sadli "A Comparison of the Melting Temperatures of Two High-Temperature Fixed Point Cells between LNE-Cnam and CEM" presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

P Saunders, E R Woolliams, H W Yoon, A D W Todd, M Sadli, S Briaudeau, E W M van der Ham, K Anhalt, L Werner, D R Taubert, B Khlevnoy "Uncertainty Estimation In Primary Radiometric Temperature Measurement" presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

Y. Yamada, M. Battuello, F. Girard, M. Sadli, F. Bourson, D. Lowe, T. Wang, W. Dong, E. Woolliams, G. Machin "Stability of High-Temperature Fixed Point Cells During Thermodynamic Temperature Determination" presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

Graham Machin, Jost Engert, Roberto Gavioso, Mohamed Sadli, Emma Woolliams "Summary of Achievements of The EMRP Project Implementing the New Kelvin (InK)" presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

F. Bourson, M. Sadli, S. Briaudeau, O. Kozlova and B. Rougié “A Review of the Development of HTFP Cells at LNE-Cnam over the last 15 Years” presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

M. Sadli, F. Bourson, S. Briaudeau, S.G.R. Salim, O. Kozlova, D. Truong, A. Sadouni and B. Rougié “Determination of T-T90 on a Set Of High-Temperature Fixed Points at LNE-Cnam” presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

S. Briaudeau, F. Bourson, S.G.R. Salim, O. Kozlova, D. Truong, A. Sadouni, B. Rougié, M. Sadli “Measurement of the Thermodynamic Melting Temperatures of High-Temperature Fixed Points at LNE-Cnam” presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

H C McEvoy, G Machin, D Lowe, A Whittam, M Sadli, F Bourson, L Xiaofeng, M J Martin, C E Gibson, H W Yoon, V B Khromchenko, A Todd, D Woods, Y Yamada, Y Yamaguchi, M S Matveyev, D Taubert, K Anhalt, YS Yoo “Update on Progress with The Radiation Thermometry Key Comparison CCT-K10” presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

M. Sadli, B. Khlevnoy, F. Bourson, I. Grigoryeva, S. Briaudeau, O. Kozlova, V. Gavrilov, D. Otryaskin and B. Rougié “Comparison and Melting Temperature Determination of WC-C Cells Developed at VNIIOFI and LNE-Cnam” presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

J.-R. Filtz, B. Hay, N. Arifovic, M. Sadli, G. Failleau, D. Mac Lochlainn, A. Blahut, J. Bojkovski6, J. Drnovsek, N. Hodzic, L. Knazovicka, N. Milosevic, S. Simic, D. Sestan, R. Strnad, E. Thurzo-Andras, D. Zvizdic “Strengthening the European Traceability and Dissemination in Thermal Metrology” presented at the 13th Symposium on Temperature and Thermal Measurements in Industry and Science, TEMPMEKO 2016, 26 June – 1st July, Zakopane, Poland

M. Sadli “Métrologie des hautes températures dans le contexte du programme européen de recherche et d’innovation : premiers résultats et perspectives” 6ème Conférence Internationale de Métrologie du 21 au 24 mars 2016, Dakar, Sénégal.

M. Sadli, F. Bourson, G. Failleau, T. Deuzé, C. Journeau, C. Parga, D. Lowe, A. Diril “Nouvelles références pour la traçabilité in-situ des mesures à haute température jusqu’à 2500 °C” Séminaire « Matériaux et Fluides à Haute Température » du “Groupe Hautes Températures” de la Société Française de Thermique 20 septembre 2016, Paris

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L. Pitre, L. Risegari, F. Sparasci, M. D. Plimmer, M. E. Himbert, P. A. Giuliano Albo, “Determination of the Boltzmann constant k from the speed of sound in helium gas at the triple point of water”, *Metrologia* **52** (2015) S263–S273, doi:10.1088/0026-1394/52/5/S263

F. Sparasci, D. Jouin, T. Deuzé, J. Bordereau, G. Coeur-Joly, D. Sourgen, A. Hertzog, “Submillimetre thermistors for balloon-borne applications up to lower stratosphere: preliminary characterization with 0.02K uncertainty”, *Meteorol. Appl.* (2015), doi:10.1002/met.1504

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I. Yang, L. Pitre, M. R. Moldover, J. Zhang, X. Feng and K. Jin Seog “Improving acoustic determinations of the Boltzmann constant with mass spectrometer measurements of the molar mass of argon” *Metrologia* (2015) **52**: 394–403.

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O. Kozlova, S. Briaudeau, L. Rongione, F. Bourson, S. Guimier, S. Kosmalski et M. Sadli "Caractérisation d'un corps noir de transfert pour l'étalonnage de pyrometers jusqu'à 3 000 C" *REVUE FRANÇAISE DE MÉTROLOGIE* no 36, Volume 2014-4 pp29-37 (2015).

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F. Edler, S. Haupt, S.-A. Mokdad, G. Failleau, and M. Sadli "Investigation of self-validating thermocouples with integrated fixed-point units" *Int. J. Metrol. Qual. Eng.* 6, 103 (2015).

D. Lowe, G. Machin, M. Sadli "Correction of temperature errors due to the unknown effect of window transmission on ratio pyrometers using an in situ calibration standard" in *Measurement* 68 (2015) 16–21.

Y. Yamada, K. Anhalt, M. Battuello, P. Bloembergen, B. Khlevnoy, G. Machin, M. Matveyev, M. Sadli, A. Todd, T. Wang "Evaluation and Selection of High-Temperature Fixed-Point Cells for Thermodynamic Temperature Assignment" *Int J Thermophys*, Volume 36, Issue 8, pp 1834-1847 (2015) DOI 10.1007/s10765-015-1860-0

O. Kozlova, S. Briaudeau, L. Rongione, F. Bourson, S. Guimier, S. Kosmalski, M. Sadli "Calibration of Radiation Thermometers up to 3000 C: Effective Emissivity of the Source" *Int J Thermophys* Volume 36, Issue 8, pp 1726-1742 (2015) DOI 10.1007/s10765-015-1867-6.

A. Diril, F. Bourson, C. Parga, M. Sadli "Construction and Characterization of Mini-ruthenium–Carbon Eutectic Cells for Industrial Use" *Int J Thermophys*, 36:3355–3365, (2015) DOI 10.1007/s10765-015-1971-7

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Y. Hermier et al. « Etalons métrologiques fondamentaux », *Techniques de l'ingénieur*, r50-v2,2015.

Communications

M. Laurie, M. Sadli, G. Failleau, L. Vlahovic, M. Fuetterer, J-M. Lapetite, S. Fourrez and V. V. Rondinella "New fixed-point mini-cell to investigate thermocouple drift in a high-temperature environment under neutron irradiation" presented at ANIMMA 2015 in Lisbon, 20th-24th April 2015.

O. Kozlova, L. Rongione, S. Briaudeau "Estimation des erreurs d'étalonnage de thermomètres infrarouges industriels liés à la méconnaissance de l'émissivité de sources et des bandes spectrales de thermomètres infrarouges" 17ème Congrès de Métrologie CIM2015, Paris 21-24 Septembre 2015.

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M. Sadli "Is it possible to improve temperature measurement in the nuclear industry?" Workshop "In-pile thermal measurements" à ANIMMA 2015, 20th April 2015.

G. Machin, J. Engert; R. Gavioso, M. Sadli, E. Woolliams "The Euramet Metrology Research Programme Project: Implementing the new kelvin (InK)" Tempertaure-2015, 5-th All-Russian and Countries-Participants of COOMET Conference on Thermometry Problems, VNIIM 21-24 April 2015 Saint-Petersbourg, Russian Federation (oral).

M. Sadli, G. Machin, K. Anhalt, F. Bourson, S. Briauudeau, D. del Campo, A. Diril, O. Kozlova, D.Lowe, J. M. Mantilla Amor, M. Martin, H. Mc Evoy, M. Ojanen, Ö. Pehlivan, B. Rougié, S. G. R. Salim "Dissemination of thermodynamic temperature above the silver freezing point temperature" Présentation orale au workshop Theo Murphy "Towards implementing the new kelvin" Kavli Royal Society Centre, Chicheley Hall, 18-19 Mai 2015 (<https://royalsociety.org/events/2015/05/new-kelvin/>).

F. Bourson, S. Briauudeau, S. G. R. Salim, B. Rougie, D. Truong, O. Kozlova, M. Sadli "Radiometric temperature measurements on high-temperature fixed points at LNE-Cnam" Présentation poster au workshop "Towards implementing the new kelvin" Kavli Royal Society Centre, Chicheley Hall, 18-19 Mai 2015 (<https://royalsociety.org/events/2015/05/new-kelvin/>).

G. Machin, R. Strnad, F. Edler, M. Sadli, K. Anhalt, M. Seifert, J. Pearce "The research outcomes of the European Metrology Research Programme Project: HiTeMS – High Temperature Measurement Solutions for Industry" 17ème Congrès de Métrologie CIM2015, Paris 21-24 Septembre 2015 (oral).

O. Kozlova et al. "Estimation des erreurs d'étalonnage de thermomètres infrarouges industriels liés à la méconnaissance de l'émissivité de sources et des bandes spectrales de thermomètres infrarouges" 17ème Congrès de Métrologie CIM2015, Paris 21-24 Septembre 2015 (poster).

M. Sadli "Réalisation et dissémination de la température thermodynamique au-dessus de 1000°C : Résultats du JRP « Implementing the new K" Séminaire RetD LNE, Trappes, 17/12/2015.

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Achour Sadouni «Réalisation et caractérisation métrologique d'un pyromètre accordable », 11 décembre 2015, au CNAM, Saint-Denis.

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M. Laurie, S. Fourrez, M.A. Fütterer, J.M. Lapetite, M. Sadli, R. Morice, G. Failleau "Long term out-of-pile thermocouple tests in conditions representative for nuclear gas-cooled high temperature reactors" Nuclear Engineering and Design 271 (2014) 283–290.

F. Bourson, M. Sadli, B. Rougié, S. Briauudeau, O. Kozlova "Influence of the Opening of a Blackbody Cavity Measured at the Ag and Cu ITS-90 Fixed Points" Int J Thermophys (2014) 35:516–525

H. C. McEvoy, M. J. Martin, A. Steiner, E. Schreiber, F. Girard, M. Battuello, M. Sadli, P. Ridoux, B. Gutschwager, J. Hollandt, A. Diril, Ö. Pehlivan "EURAMET Project to Examine Underlying Parameters in Radiance Temperature Scale Realization, 156 °C to 1000 °C" Int J Thermophys (2014) 35:446–466.

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M. Sadli, F. Bourson, A. Diril, C. Journeau, D. Lowe and C. Parga "Construction and in-situ characterisation of high-temperature fixed point cells devoted to industrial applications" *EPJ Web of Conferences* 77, 00018 (2014).

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O. Kozlova, S. Briaudeau, L. Rongione, F. Bourson, S. Guimier, S. Kosmalski, M. Sadli, « Caractérisation d'un corps noir de transfert pour l'étalonnage de pyromètres jusqu'à 3 000 °C », *Revue française de métrologie* N36, Vol. 2014-4, 29-37.

Communications

M. Sadli "Self-validation techniques and path transmission corrections for radiation thermometry >2000 °C" Workshop on industrial high temperature measurement solutions 15 Mai 2014 Cnam Saint-Denis.

M. Sadli "Mesure précise de la température : de la redéfinition de l'unité à l'utilisateur" Conférence invitée au séminaire de la filière « Instrumentation » de l'université Aix-Marseille, 14 mars 2014.

M. Sadli "Traçabilité et incertitudes à haute temperature" 2ème reunion du Groupe de Travail "Analyse thermique à haute temperature" du Groupement de Recherche Thermodynamique des Matériaux à Haute Température (GDR TherMatHT) – 3 décembre 2014 au CEA - Paris 15.

A. Sadouni, O. Kozlova, D. Truong, F. Bourson M. Sadli, and S. Briaudeau "Performances of the innovative portable spectroradiometer: rapid wide-range tunability and high reproducibility", Poster presentation, NEWRAD 2014 Conference 24 - 27 June 2014

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M R Moldover, R M Gavioso, J B Mehl, L Pitre, M de Podesta and J T Zhang « ACOUSTIC GAS THERMOMETRY », *Metrologia* 51 (2014) R1–R19.

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