

CEM Activities and Publications 2017-2020

1. Main research activities in fundamental thermometry and to improve the dissemination of the kelvin

- Determination of the Boltzmann constant by Acoustic Gas Thermometry (ppm level).
- Development of micro-scale photonic thermometers and their associated calibration systems.
- Measurement of $T-T_{90}$ in the range from 420 °C to 960 °C by primary radiation thermometry.
- Measurement of the thermodynamic temperature of fixed points for radiation thermometry.
- Construction of fixed points (Al, Cu and M-C eutectics) for radiation thermometry.

2. Main research activities in environment

- Coordination of the EMPIR project “Increasing the comparability of extreme air temperature measurements for meteorology and climate studies” (COAT)
- Development of a new technique to perform traceable temperature measurements of the sea water column and sea water surface based on optical fiber Bragg gratings.
- Contribution to WMO siting classification schemes by studying the building influence on air temperature measurements.
- Study of the sources of uncertainty linked to air temperature measurements.
- Development of procedures and protocols for the validation and calibration of non-catching precipitation gauges.

3. Main research activities in industry applications

- Development of traceable optical methods to measure temperature and gas concentration in a flame.
- Development of optimal Pt-Rh thermocouples for temperatures above 1100 °C.
- Development of traceable fibre-optic thermometry.

4. Key publications 2017-2020

- A novel technique based in a cylindrical microwave resonator for high pressure phase equilibrium determination. Rodrigo Susial, Ángel Gómez-Hernández, Daniel Lozano-Martína, Dolores del Campo, M. Carmen Martín, José J. Segovia, J. Chem. Thermodynamics 135 (2019) 124–132.
- Report on the comparison of the calibration of noble metal thermocouples from 419 °C up to 1100 °C (EURAMET.T-S5). Dolores del Campo, Carmen García Izquierdo,

Olgica Petrusova and Juan Carlos Soto3 <https://doi.org/10.1088/0026-1394/56/1A/03002>.

- Evaluation of the self-heating effect in a group of thermometers used in meteorological and climate applications. Carmen García Izquierdo, Sonia Hernández, Alicia González, Laura Matias, Lenka Šindelářová, Radek Strnad, Dolores del Campo, <https://doi.org/10.1002/met.1746>.
- Traceable sea water temperature measurements performed by optical fibers. C.García Izquierdo, A.García-Benadí, P.Corredera, S.Hernandez, A.Gonzalez Calvo, J.del Río Fernandez, M.Nogueres-Cervera, C.Pulido de Torres, D.del Campo. Measurement Volume 127, October 2018, Pages 124-133
- A systematic investigation of the thermoelectric stability of Pt–Rh thermocouples between 1300 °C and 1500 °C. J V Pearce, F Edler, C J Elliott, A Greenen, P M Harris, C Garcia Izquierdo, Y-G Kim, M J Martin, I M Smith, D Tucker. Metrologia 55 (2018) 558–567
- Evaluation of the self-heating effect in a group of thermometers used in meteorological and climate applications. Carmen García Izquierdo, Sonia Hernández, Alicia González, | Laura Matias, Lenka Šindelářová, Radek Strnad, Dolores del Campo. Meteorological Applications <https://doi.org/10.1002/met.1746>
- The Boltzmann Project. J Fischer, B Fellmuth, C Gaiser, T Zandt, L Pitre, F Sparasci, M D Plimmer, M de Podesta, R Underwood, G Sutton, G Machin, R M Gavioso, D Madonna Ripa, P P M Steur, J Qu, X J Feng, J Zhang, M R Moldover, S P Benz, D R White, L Gianfrani, A Castrillo, L Moretti, B Darquié, E Moufarej, C Daussy, S Briaudeau, O Kozlova, L Risegari, J J Segovia, M C Martín, and D del Campo Metrologia 55 (2018) R1–R20
- Updated determination of the molar gas constant R by acoustic measurements in argon at UVa-CEM. J J Segovia, D Lozano-Martín, M C Martín, C R Chamorro, M A Villamañán, E Pérez, C García Izquierdo and D del Campo; Metrologia 00 (2017) 1–11
- Characterization of a biomethane-like synthetic gas mixture through accurate density measurements from (240 to 350) K and pressures up to 14 MPa. R. Hernández-Gómez, T. Fernández-Vicente, D. del Campo, M. Valková, M. Chytil, C.R. Chamorro; Fuel 206 (2017) 420–428.
- Performance of Different Light Sources for the Absolute Calibration of Radiation Thermometers. M. J. Martín, · J. M. Mantilla, · D. del Campo, · M. L. Hernanz, · A. Pons, · J. Campos. Int J Thermophys (2017) 38:138.
- The MeteoMet2 Project – Highlights and Results", Measurement Science and Technology. Merlone, Andrea, García Izquierdo, Carmen; et al, (2017), in press <https://doi.org/10.1088/1361-6501/aa99fc>.
- Traceable Sea temperature vertical profile measured by optical fibers. A.. Garcia-Benadí, C. García Izquierdo P. Corredera, D. del Campo, S. Hernandez, J. del Río Fernandez, M. Nogueres-Cervera, C. Pulido de Torres. Conference: OCEANS 2017 – Aberdeen, June 2017.DOI 10.1109/OCEANSE.2017.8084718.