From Heatmetry to Entropymetry: a Cognitive Approach

Andrey Mityakov

Peter the Great St.Petersburg Polytechnic University, Saint-Petersburg, Russia

Short Communication

Abstract

Heatmetry is a science and practice of heat flux measurement. Heat flux plays a great role in our Universe: about 70% of energy transfer by heat. However, scientists measure the heat tens or hundreds times less than temperature. This happened because of there is no useful heat flux sensors. A novel Gradient Heat Flux Sensors (GHFS) invented and created by the authors are presented in the manuscript. GHFS can measure a heat flux of any nature with very small response time – about 10 ns with environmental temperature up to 2000 Centigrade. This allows to online monitoring of many industrial application: turbines, generators, boilers, electrical batteries etc. But first it is necessary to verify sensors by measuring the heat flux in well-known experimental problems: heat transfer from heated plate during free convection, forced convection from heated cylinder in cross-flow etc. After described tests were performed, it is possible to trust novel sensors and to make new step – simultaneous measure of temperature and heat flux changing. This allows us to go to another fundamental physical value – entropy. Direct entropy measurement opens new horizons in understanding of thermodynamic processes in industrial application.

Biography

Andrey V. Mityakov was born on November, 29, 1974 in Leningrad City, USSR. He received MSc (Mech. Eng.), PhD and D.Sc. (Tech.) degrees at Leningrad (Saint-Petersburg) Peter the Great St.Petersburg Polytechnic University in 1997, 2000 and 2010 respectively. Since 1997 till 2010 he acted as associated professor at the Department of Thermodynamics and Heat Transfer at Peter the Great St.Petersburg Polytechnic University, Russia. Since 2010 he is a professor at the same University. In the year 2011 he started his international work with a position of professor of Lappeenranta University of Technology, Finland. Prof. Mityakov's research include heat transfer (measuring techniques especially) and data acquisition systems. Prof. Mityakov is laureate of the Prize named the First Rector of Saint-Petersburg Polytechnical Institute Prince A.G. Gagarin (1998), the medal from Russian Union of Young Scientists "Devotion to the Science" (2008), winner of the Grant for Young Scientists from President of Russian Federation (2008) and Grant for Young Scientists from Government of Saint-Petersburg (2009)..

Note:- This work is partly presented at New Frontiers in Renewable Energy and Resources Jul 30-31, 2021 Paris, France)