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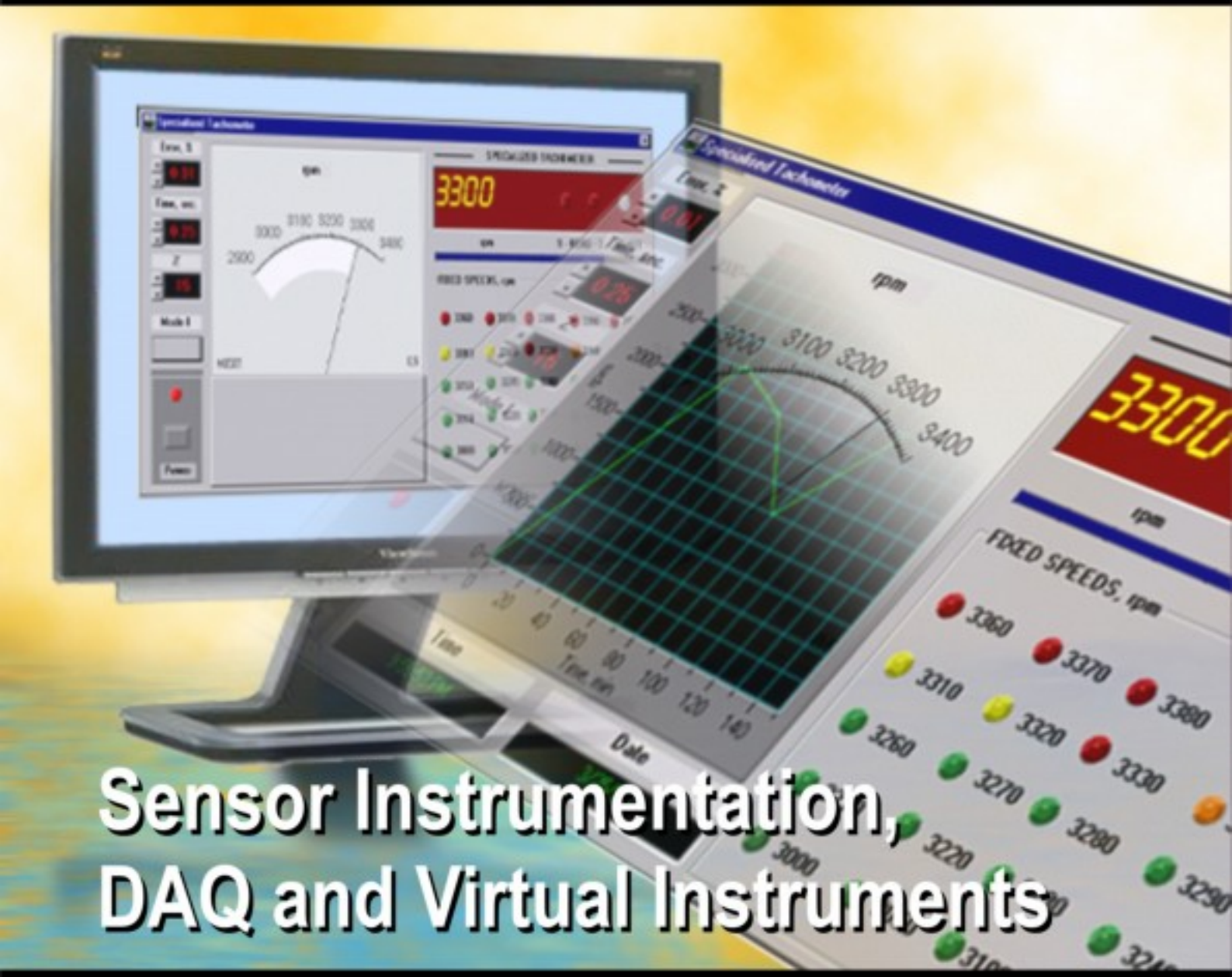

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New Optoacoustic Device for Water Properties Monitoring: Comprehensive Analyzer of Matter Properties (CAMP)

Alex Kaivarainen
University of Turku, Department of physics. Finland
web.petrsu.ru/~alexk

Short Communication

The new quantum Hierarchic theory of condensed matter and computer software based theory (Copyright 1997, USA, Kaivarainen) allow calculating about 300 physical parameters of any material, including water and ice. Among these parameters are: total internal energy, heat capacity, thermal conductivity, surface tension, vapor pressure, viscosity, self-diffusion, etc. Most of intermediate parameters of calculations are unable for direct experimental measurements. The computerized evaluation of all of 300 output parameters is possible in a couple of seconds, if the following experimental input parameters are available: 1) Sound velocity; 2) Density; 3). Refraction index; 4) Positions of translational or librational bands in far and middle IR range: 30-2500 1/cm. These data should be obtained at the same temperature and pressure from the sample (liquid or solid).

The Hierarchic theory and software have been verified, using the input parameters listed above for water and ice reported in literature in the temperature range from 20 to 373 K. (http://arxiv.org/abs/physics/0102086). The coincidence between theory and experiment is very good.

Such possibilities were used in a basis of new idea of optoacoustic device: Comprehensive Analyzer of Matter Properties (CAMP), providing a lot of information about any condensed matter under study. The FT-IR or FT-Raman spectrometer can be used for registration of spectra in far and middle IR range. The desktop system for measurement of sound velocity, density and refraction index of the same liquid, almost at the same time, is available (DSA 5000 + RXA 156; Anton-Paar, Graz, Austria). The perturbation of water properties after permanent magnetic field treatment was investigated, using this experimental approach and CAMP software (Kaivarainen, 2004: http://arxiv.org/abs/physics/0207114). One of possible configuration of CAMP may include the FT-Brillouin light scattering spectrometer, based on a Fabry-Perrot interferometer. This configuration makes possible simultaneous measurement of hypersound velocity (from the Doppler shift of side bands of Brillouin spectra) and positions of intermolecular bands (translational and librational) from the Stokes/antiStokes satellite components on the central peak of Brillouin spectra. The CAMP may allow monitoring of perturbation of very different physical properties of water, ice and other

condensed matter (material) under the influence of guest molecules, temperature, pressure or external electromagnetic or acoustic fields. The CAMP could be the ideal instrument for monitoring of water quality, using 'fingerprints' containing more than 300 physical parameters. This can be used in the environmental research and water treatment stations.

The demo version of pCAMP software for evaluation of water and ice properties in the range of 20-373K can be downloaded from the web page web.petrsu.ru/~alexk (download pCAMP). For additional information please see: http://arxiv.org/find/physics/1/au:+Kaivarainen_A/0/1/0/all/0/1

Guide for Contributors

Aims and Scope

Sensors & Transducers Journal (ISSN 1726- 5479) provides an advanced forum for the science and technology of physical, chemical sensors and biosensors. It publishes state-of-the-art reviews, regular research and application specific papers, short notes, letters to Editor and sensors related books reviews as well as academic, practical and commercial information of interest to its readership. Because it is an open access, peer review international journal, papers rapidly published in *Sensors & Transducers Journal* will receive a very high publicity. The journal is published monthly as twelve issues per annual by International Frequency Association (IFSA). In additional, some special sponsored and conference issues published annually.

Topics Covered

Contributions are invited on all aspects of research, development and application of the science and technology of sensors, transducers and sensor instrumentations. Topics include, but are not restricted to:

- Physical, chemical and biosensors;
- Digital, frequency, period, duty-cycle, time interval, PWM, pulse number output sensors and transducers;
- Theory, principles, effects, design, standardization and modeling;
- Smart sensors and systems;
- Sensor instrumentation;
- Virtual instruments;
- Sensors interfaces, buses and networks;
- Signal processing;
- Frequency (period, duty-cycle)-to-digital converters, ADC;
- Technologies and materials;
- Nanosensors;
- Microsystems;
- Applications.

Submission of papers

Articles should be written in English. Authors are invited to submit by e-mail editor@sensorsportal.com 4-12 pages article (including abstract, illustrations (color or grayscale), photos and references) in both: MS Word (doc) and Acrobat (pdf) formats. Detailed preparation instructions, paper example and template of manuscript are available from the journal's webpage: http://www.sensorsportal.com/HTML/DIGEST/Submition.htm Authors must follow the instructions strictly when submitting their manuscripts.

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