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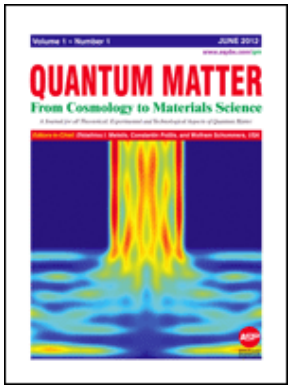

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A Special issue on

QUANTUM MATTER CHEMISTRY

GUEST EDITOR

Prof. Dr. Aleksander Herman, Gdansk University of Technology, Poland

Dear Colleagues:

As a Guest Editor of the special issue of **"Quantum Matter"** journal and on behalf of the journal's Editorial Board, I would like to invite you to contribute to this special volume.

The special issue is devoted to **"Quantum Matter Chemistry"** topic and will cover all areas of chemical phenomena in which quantum properties of matter are important and need the quantum approach for their explanation, understanding and modeling. The most important characteristic properties of **quantum matter chemistry** are: new dynamics due to wave property of atoms, new energy states caused by atom exchange, and new concepts of atoms, molecules and solids. The theoretical methods used frequently in classical chemistry are based on the Born-Oppenheimer separation of the nuclear and electronic degrees of freedom, i.e. solving the nuclear dynamics with nuclear quantum corrections on a potential energy surface obtained by solving the electronic Schrödinger equation. However, when quantum corrections such as tunneling are large, it is an implicit warning that the Born-Oppenheimer approximation may also be problematic. Theoretical modeling of **quantum matter chemistry** rather than trying to improve on the underlying model by adding correction terms treat the nuclei within a quantum framework from the start. Methods that treat all of the electron and nuclear degrees of freedom within a combined quantum framework are starting to appear; so far they are mostly based on a mean-field (i.e. Hartree-Fock) approximation where the coupling of the nuclear and electron motions is included in an average fashion. Both conceptual and computational developments are required before such methods can be considered mature. One clear advantage of these methods is the ability to implicitly include both tunneling and vibrational effects, and to selectively treat some nuclei as classical, thereby allowing a simplification for large systems.

The Editorial Board would like to present in this issue an overview of different experimental and theoretical approaches to the problems of **quantum matter chemistry** as well as some original results or a compilation of the existing results from previous studies. The special issue will consist of 12 to 15 original articles. We expect that some of them will be short reviews or mini-reviews and some will be a presentation of either original results or a compilation of previous results. This "Call for Papers" is not only addressed to many recognized contributors in this field, but also to the emerging scientists to encourage them to present their results. We expect that the special issue will be published as soon as enough papers are selected, so the deadline for sending the contribution is practically open as it depends on the response from the scientific and engineering community, and on the quality of the contributed materials. The Editorial Board will contact the authors of selected papers as fast as possible. If you would like to contribute, please send a short abstract of the paper to the address printed below or submit your manuscript electronically as a PDF or MS Word file to the Editors-in-Chief.

The **"Quantum Matter"** is a new international journal published by American Scientific Publishers (ISSN: 2164-7615 (print); EISSN: 2164-7623 (online); Copyright © 2000-2012 American Scientific Publishers. All rights reserved). The journal offers a very broad readership covering all disciplines of science, engineering and medicine. The journal is expected to be a common platform for the presentation of papers and exchange of views on all theoretical, experimental and technological aspects of the quantum approach to matter from cosmology to materials science.

I hope that you will be able to contribute to the special issue of **"Quantum Matter"**. I would be grateful for suggesting the names of other candidates whom I could invite to contribute to this special volume.

To get more information about the journal and the notes for authors, please contact the www-home page: http://www.aspbs.com/qm.html.

I look forward to hearing from you soon.

With kind regards,

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