



# Structure of Space and the Submicroscopic Deterministic Concept of Physics

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This book, **Structure of Space and the Submicroscopic Deterministic Concept of Physics**, completely formalizes fundamental physics by showing that all space, which consists of objects and distances, arises from the same origin: a manifold of sets. A continuously organized mathematical lattice of topological balls represents the primary substrate named the tessellattice. All fundamental particles arise as local fractal deformations of the tessellattice. The motion of such particulate balls through the tessellattice causes it to deform neighboring cells, which generates a cloud of a new kind of spatial excitations named 'inertons'. Thus so-called "hidden variables" introduced in the past by de Broglie, Bohm and Vigier have acquired a sense of real quasiparticles of space. This theory of space unambiguously answers such challenging issues as: what is mass, what is charge, what is a photon, what is the wave psi-function, what is a neutrino, what are the nuclear forces, and so on. The submicroscopic concept uncovers new peculiar properties of quantum systems, especially the dynamics of particles within a section equal to the particle's de Broglie wavelength, which are fundamentally impossible for quantum mechanics.

This concept, thoroughly discussed in the book, allows one to study complex problems in quantum optics and quantum electrodynamics in detail, to disclose an inner world of particle physics by exposing the structure of quarks and nucleons in real space, and to derive gravity as the transfer of local deformations of space by inertons which in turn completely solves the problems of dark matter and dark energy. Inertons have revealed themselves in a number of experiments carried out in condensed media, plasma, nuclear physics and astrophysics, which are described in this book together with prospects for future studies in both fundamental and applied physics.

Key features of the book:

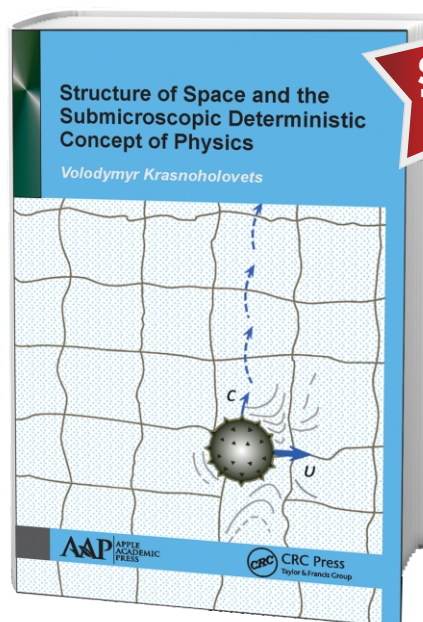
- Presents an original theoretical consideration of physical space and matter that appears from space
- Introduces a new physical field, which appears as a basic field of the universe (the inerton field), whose carriers are responsible for quantum mechanical, nuclear and gravitational interactions of matter
- Reveals new effects caused by inerton fields in different physical systems
- Describes experimental techniques that are able to measure and generate an inerton field
- Poses challenges and questions concerning new physics



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*"An unorthodox but critical update as to physics, and I highly recommend it. In spirit, this is very similar to another 'deep think' book by Paul Wesson titled 'Five-Dimensional Physics: Classical and Quantum Consequences of Kaluza-Klein Cosmology,' and the two books complement each other well, and in addition the very good section on the fine structure constant written by Krasnoholovets has a perspective that is important and which is not elucidated anywhere else in physics. The author's efforts in understanding the deterministic foundations of physics is also important and should be seriously reviewed by any theoretical physicist who wishes to understand the limitations of the standard model, and quark-lepton physics. The sections on inertons are unique as well and is getting my continual review and study."*

—Andrew Beckwith, PhD, Visiting Professor, Physics Department, Chongqing University, People's Republic of China

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### ABOUT THE AUTHOR

**Dr. V. Krasnoholovets** was born in Kyiv, Ukraine. He graduated from a mathematical school, and then became a student of the Kyiv's Taras Shevchenko National University, Department of Physics, Faculty of Theoretical Physics; he received a master's degree in 1979. For next several years he worked as an experimentalist in the area of superconductivity at the Institute for Metal Physics, National Academy of Sciences of Ukraine, Kyiv. Since the end of 1981 and to now, he has been working at the Department of Theoretical Physics, Institute of Physics, Natl. Acad. Sci., Kyiv. A PhD thesis was defended in 1987; it was devoted to the study of a proton polaron model in compounds with hydrogen bonds including biological systems. At the Department, he focuses on condensed matter physics. Since 1993 he is a Senior Research Scientist. In the mid-1980s he also began to take an interest in the foundations of physics. The first paper in this field was published in 1993. In 1998-2003 Dr. Krasnoholovets actively worked with one of the classical French mathematicians, Prof. Michel Bounias (1943-2003). Together with Prof. Bounias a theory of real physical space was developed, which started from pure mathematical principles, namely, set theory, topology and fractal geometry. Another professional interest is applied physics. In 2006 he co-founded a company in Belgium devoted to the development of technologies proposed by Ukrainian scientists. The company was named Indra Scientific and it has been gradually developing embracing new areas of applications (the production of biodiesel, recycling of industrial waste, organic waste to energy by using a new design of a gasifier, cleaning of waste water, infrared heating thin films, measuring devices, ecological chemistry, etc.). He was an editor of several books and collections of works dealing with quantum physics and gravity. Dr. Krasnoholovets published over 80 research papers.

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