Author: **Alexander Shalyt-Margolin**

Adress: ***Research Institute for Nuclear Problems, Belarusian State University, 11Bobruiskaya str., Minsk 220040, Belarus***

Title: **Discrete Paradigm and Measurability Notion in Quantum Theory, Gravity and Thermodynamics. Initial Information and Some Its Implications**

Abstract

At the present time the majority of researchers agree that a minimal length is involved at high (Planck's) energies. But all the currently used low-energy theories (quantum mechanics and quantum field theory, gravity, etc.) are continuous, i.e. the minimal length in them is zero. This report presents an alternative approach when the minimal length is nonzero at all the energy scales. By this approach the definition of **measurability** and of **measurable quantities** is given, within the scope of which there is no infinitesimal increment of space-time coordinates. As a result, the initial low-energy **continuous** theory (quantum theory or general relativity) inevitably must be replaced by a **discrete** theory that gives very close results but operates with absolutely other mathematical apparatus. A real **discreteness** is exhibited only at high energies which are close to the Planck energies.A analogous concept (dual) of **measurabilit**y is defined in thermodynamics on the basis of a minimal inverse temperature. Based on this notions, some implications are obtained, in particular, for gravitational thermodynamics of black holes at all the energy scales, quantum corrections of the basic quantities in the general case and Hawking's problem. Given report is a continuation of the author's papers on denoted topic over the past three years.