



Scientia Professor Victor Flambaum presents two short talks:

1pm Friday November 6, 2009

Rountree Room, Third Floor, Biological Sciences Building (D26), University of New South Wales, Kensington, NSW

(1) Does the rapid appearance of life on Earth suggest that life is common in the universe?

First life on Earth appeared very early. Some researchers have concluded that the probability of life to appear on Earth-like planets is close to 100%. We suggest a different conclusion: rapid initial biogenesis is consistent with a large number (N of the order of 10) of crucial steps in evolution from simplest life forms to humans.

(2) Search for space-time variation of fundamental constants of nature

Physics has a number of fundamental constants like the speed of light, electron electric charge and the quantum Planck constant. If the fundamental constants were even slightly different we could not exist. The spatial variation can explain the fine tuning of the fundamental constants which allows humans (and any life) to appear.

We appeared in the area of the Universe where the values of the fundamental constants are consistent with our existence. Some theories unifying gravity with other interactions suggest temporal and spatial variation of the fundamental "constants" in an expanding Universe.

Physicists and astronomers have performed a large number of different measurements aiming to search for the variation of the fundamental constants. There are some hints for the variation in quasar spectra and Big Bang Nucleosynthesis data, however, they have not been confirmed yet. A very promising method to search for the variation consists in comparison of different atomic clocks. Huge enhancement of the variation effects may happen in transitions between very close nuclear, atomic or molecular energy levels.

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