

Challenges of Life Support/Medical Support for Human Missions (8)  
 Challenges of Life Support/Medical Support for Human Missions (3) (3)

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## TOWARDS QUANTUM ASTRONAUTICS

### Abstract

Newtonian or classical gravitation is a foundation for today's practical astronautics. However, classical gravity is merely phenomenological theory which is needed modern relativistic and quantum refinements. As is known contemporary practice to introduce more exact notions of advanced nonclassical gravity in astronautics are faced with some difficulties of translation of Einstein's gravity as curvature of spacetime into current practical astronautics. Another kind of difficulties are arising from attempts of today's Five Great Pretenders (string theory, loop quantum gravity, modular spacetime, supergravity and causal set theory) to replace Einstein's "abstract" spacetime concept by pure quantum entities. But from another side, Einstein's GR is now considered as the most valid and testable scientific theory in space sciences and cosmology in general. Hence, more balanced approach to the attempts to replace Einstein's key spacetime idea is needed. As an example of a balanced approach is probably John Bell's theory of gravity dependent objective collapse of quantum wave function. In fact, this is a possibility of unification of GR and quantum theory without refutation of Einstein's curvature of spacetime (as known, based on principle of equivalentness of inertia and gravitation). Following Bell (1960s presentation at Oxford's Mathematical Institute) Quantum gravity describes trajectories of masses produced by collapse of superposition. Points of superposition transform continuous trajectories into discrete paths divided by the superposition points. Hence, we do not need such entities as gravitons and spontaneous collapse of wave function. In 1990s Roger Penrose showed applicability of Bell's discovery in neuroscience. Today's Bell - Penrose's solution is associated with idea of new "Gravityzation" of physical and biological sciences. Hence, idea of Quantum Astronautics is formulated. Quantum Astronautics in practical terms may include two major projects - (1) Quantum model of Brain in Astronautics for long term missions (it is surprisingly that all megaprojects of Brain now are based on attempts to ignore gravity as a fundamental matter in behaviour predictions and new gravityzation of the brain can restore true state of art, indeed) and (2) Gravitational Epigenetics where in contrast with current paradigm we cannot ignore gravity as a force that controls which genes could be blocked from being "read" by the cell's machinery for example in the case of genesis of flying organisms.