

## Predictions

1. The gravitational mass of particles is an invariant quantity; it does not depend on their energy content.
2. The gravitational mass of photons is zero.
3. Gravitational repulsion between macroscopic matter and macroscopic antimatter. Free antihydrogen atoms are not attracted by Earth's gravity; they either are repelled or not affected by it.
4. Gravitational influence is instantaneous (gravitational waves are only ripples in the curvature of space-time; the curvature itself is determined instantaneously by the gravitational mass at the gravitationally simultaneous space of each event).
5. The expanding-universe cosmology is a big mistake; it applies a simplified theory outside of the domain where it is useful. Thus, it will never be observed that the universe was denser in the past, and the "horizon" does not exist; the most remote systems will never disappear from sight.
6. A cluster of galaxies is a gravitational crystal in which the two kinds of attraction (mutual attraction between matter galaxies and mutual attraction between antimatter galaxies) are balanced by the repulsion between matter and antimatter. Thus, observations of the local cluster will reveal a crystal structure. (Due to the special properties of the interaction between antimatter's light and matter, antimatter galaxies are observed as cosmological radio sources of faint visible radiation, their nuclei are observed as quasars.)
7. Galaxies oscillate at their vicinities; the course of motion of galaxies in the local cluster might be changed.

8. Primary cosmic rays have no observable source; appearance of primary cosmic rays inside detectors can be observed in space beyond the Moon's orbit.
9. The number of generations of leptons/quarks is limited only by the maximal energies available in nature and by the rules of energies required for the fusion of new generations; leptons/quarks of the fourth generation can be observed (the boson which is misinterpreted as a Higgs-boson is probably composed of a fourth-generation quark/charged-lepton and its antiparticle).
10. Photons can be annihilated by their antiphotons (emitted by antimatter), and lepton-antilepton pairs are produced (quasars emit antiphotons; they should be illuminated by cyclotron/synchrotron photons of the emission wave-lengths of the antiphotons).
11. If after an electron-positron annihilation one photon moves upward and the other downward, there is a 50% chance that both of them will gain energy and a 50% chance that both of them will lose energy.
12. The average energy of cosmic rays will very gradually decrease.
13. The Hydrogen Cycle—dead stars turn into nebulas where they are recycled back to hydrogen (it is done by extremely violet past-shift) from which young stars are created and gradually experience red past-shift.
14. Mixed atoms are atoms of which at least one participant is an antimatter participant, and at least one participant is a matter participant (e.g. positronium and antiprotonic helium). The wave-function of a mixed atom is a superposition of two states; in one state the gravitational mass of the mixed atom is positive; in the other state it is negative. The same is true also for mesons.
15. Gravitational waves can be detected in the proximity of nuclear reactors.

16. There is a difference between the afterglow of gamma ray bursts emitted in an antimatter region (mainly the ex-mediation radiation is observed, and its red-shift is reinforced) and the afterglow of gamma ray bursts emitted in a matter region (all the afterglow radiation can be observed, and its red-shift is due only to the time-effect and to Doppler affect).
17. Long-duration gamma ray bursts, unlike short-duration gamma ray bursts, are not accompanied by gravitational waves.
18. The activity of cosmic rays toward Mars is much less intensive than this activity toward Earth.