III. GRAVITATION

THEORY OF THE CLASSICAL GRAVITATIONAL FIELD

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The Relativistic Theory of Gravitation (RTG) is constructed in the framework of the Special Theory of Relativity. The energy-momentum tensor density of all the matter fields including gravity is a source of the gravitational field. The energy-momentum and angular momentum conservation laws are respected by this theory. The notion of the effective Riemannian space arises and it has the field theory origin. The gravitational and inertia forces are separated from each other, and they have a different nature. The equality of gravitational and inertial masses arises as a result of the role of the tensor density of matter as a source of the gravitational field. The need for the introduction of a graviton mass arises in this theory as a necessary requirement. The cosmological constant is expressed through the graviton mass. The RTG equations form a hyperbolic system and it is different from the General Relativity system of equations. This theory unambiguously explains all the known gravitational effects in Solar system related to an inertial reference frame. The acceleration has an absolute meaning in the RTG. The Mach principle is fulfilled. According to the RTG a homogeneous and isotropic Universe can be only "flat" and its evolution is cyclewise from some maximal density to minimal and so on. The theory predicts a presence of the large hidden mass of matter in the Universe.

The ideas about the gravitational collapse are changed. It occurs so that the process of compression stops and changes for a subsequent expansion when a spherically symmetric body of arbitrary mass collapses close to the Schwarzschild sphere. Therefore according to the RTG "black holes" (i.e. objects having no material boundaries and "cut" from the external world) are excluded from their existence. The notions of Newton's theory and of the Special Theory of Relativity, i.e. conservation laws, inertial reference frames, gravitational forces, acceleration regarding to the space, are regained in the RTG. This work discusses the ambiguity of the General Relativity predictions and the impossibility to give a field theory formulation in Minkowski space for this theory.