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Cosmological Mass-Defect: A New Effect of General Relativity
DMITRI RABOUNSKI — This study targets the change of mass of a mass-bearing particle with the distance travelled in the space of the main cosmological metrics. The mass-defect is obtained due to a new method of deduction: by solving the scalar geodesic equation (equation of energy) of the particle. This equation manifests three factors affecting the particle's mass: gravitation, non-holonomity, and deformation of space. In the space of Schwarzschild's mass-point metric, the obtained solution coincides with the well-known gravitational mass-defect whose magnitude increases toward the gravitating body. No mass-defect has been found in the space of Gödel's metric, and in the space of Einstein's metric. The other obtained solutions manifest a mass-defect whose magnitude increases with distance from the observer so that manifests itself at cosmologically large distances travelled by the particle. This effect has been found in the space of Schwarzschild's metric of a sphere of incompressible liquid, in the space of de Sitter's metric, and in the deforming spaces of Friedmann's metric. Herein, we refer to this effect as the cosmological mass-defect. It has never been considered prior to the present study.

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