What about Gravimetry, if *Dark Matter* and *Dark Energy* Really Exist?

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Summary

The present physical understanding of the universe is essentially based on the hypothesis that the relativistic model of gravitation is universally valid. As a matter of fact, the performance of this model has been proved by the explanation of observed and the discovering of predicted multifarious phenomena. The history of the relativistic gravitation model will be briefly recalled.

However, certain astrophysical and cosmological facts which have been detected in the course of the recent decades can so far not be explained by the application of the relativistic gravitation model only.

The evidence of an accelerated expansion of the universe led to the introduction of an unknown hypothetic energy which was called *Dark Energy*. Since accelerations need the existence of a force or energy, respectively. And since the accelerations occur in the “wrong” direction they can therefore not be explained by gravitation forces due to the distribution of baryonic matter inside of the universe, meaning matter being composed of protons, neutrons, electrons and related particles.

Furthermore, since the quantity of visible matter in the universe is not sufficient to explain certain observed astrophysical phenomena, the presumption of an additional gravitationally effective matter is needed when those phenomena shall be modelled by Einstein’s relativistic law of gravitation. The introduced hypothetic additional matter has been named *Dark Matter*, not being visible and not emitting radiation nor absorbing radiation; hence that matter should not be of baryonic type.

The importance of the question whether *Dark Energy* and, specially, *Dark Matter* is really existing or not is getting obvious when regarding the ratios according to “conventional” matter: the recent cosmological models claim that the universe is composed of 75% of *Dark Energy*, 21% of *Dark Matter* and only 4% of baryonic matter!

It is noteworthy that the hypothesis of the universal validity of the relativistic gravitation model is only little questioned. Nevertheless, it should alternatively be considered too, whether for cosmic dimensions the present model of gravitation may be modified or completed.

So far, the only known property of the *Dark Matter* is its gravitational interaction with baryonic matters. A significant (preferably experimental) verification of the physical existence of that matter needs further information. One of the primary questions concern the spatial distribution of that matter.

Potential implications of the existence of *Dark Matter* and *Dark Energy* on geosciences and gravimetry will be discussed.