Gravimetric Aspects of the Present Cosmological Model
- *Dark Matter and Dark Energy* -

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The physical significance and reliability of a mathematical model depend also on its degree of completeness. However, incompleteness has to be rated with reference to the respective application. High resolving observations may lead to the imperative of the extension and improvement of a model. Should *Dark Matter* and *Dark Energy* be a concern of gravimetry?

The modeling of the gravity field of the Earth as well as the models of the kinematics of the solar system are based on gravitation fields of atomistic (baryonic, visible) matter and its mass property. That elementary particle which shall, according to theory, create the mass property has recently been detected experimentally (Higgs-Englert-boson); but possibly this verification is just a first step towards a complete understanding of the mass phenomenon.

Discrepancies between calculated and observed astronomical phenomena in the solar system could in the past be removed by the transition from Newton's law of gravitation to Einstein's relativistic approach.

Inter alia, motions of stars within galaxies reveal discrepancies between observed actions and theoretical actions calculated on basis of the relativistic model of gravitation, when taking into account the known baryonic matter only. To explain the kinematical anomalies a hypothetic non-baryonic matter is introduced, called *Dark Matter*, which is invisible but interacting with atomic matter.

The redshift of the electro-magnetic waves emitted from distant sources indicate a permanent expansion of the cosmic space, described by the Hubble-Parameter. However, contrary to the formerly assumed *deceleration*, in the recent decade an *acceleration* of the expansion is observed. To explain that phenomenon a hypothetic energy, called *Dark Energy* is introduced.

The present cosmological model claims the cosmos to be composed of 4% atomic matter, 21% dark matter, 75% dark energy.

If *Dark Matter* and *Dark Energy* are erratically distributed in space, changes of the relative position in space will generally be associated with changes of the *impacts* of Dark Matter and Dark Energy. This will e.g. be the case when the solar system is moving around the centre of "our" galaxy, with a revolution period of 300 Mio years around the galactic centre and a track speed of about 200km/s

Principally, any gravimetric sensor will be affected by *Dark Matter* and *Dark Energy*. Considering that their relative quantity in the cosmic space amounts up to about 96% (if the theory is right) it should not a priori be excluded that effects of *Dark Matter* and *Dark Energy* could in appropriate observatories terrestrially be observed by high resolution gravimetric time series.
If sufficiently small-scaled spatial structures exist!

Should *Dark Matter* and *Dark Energy* be a concern of gravimetry? Yes, tentatively.