GR 2: Alternative klassische Gravitationstheorien

Zeit: Montag 18:25–19:05 Raum: KGI-HS 1010

GR 2.1 Mo 18:25 KGI-HS 1010

A New Look at the Contributions to Cosmology of Dirac, Sciama and Dicke — •Alexander Unzicker — Pestalozzi-Gymnasium München

Though the separate contributions to cosmology of the above named researchers seem abandoned today, surprisingly their basic ideas can be encompassed into a consistent framework. We study Dirac's large number hypothesis (Proc.Roy.Soc. Lon. A 165, 199; 1938), Sciama's proposal of realizing Mach's principle (MNRAS 113, 34; 1953), and Dicke's considerations on an 'electromagnetic' theory of gravitation with a variable speed of light (Rev.Mod.Phys. 29, 363; 1957). Dicke's tentative theory can be formulated in a way which is compatible with Sciama's hypothesis on the gravitational constant G. Additionally, such a gravitational model satisfies Dirac's large number hypothesis without entailing a visible time dependence predicted by Dirac which indeed has never been verified. While Dicke's proposal, similarly to well-known flat space representations of general relativity (e.g. Dehnen et al., Ann.Phys. 6 (Folge 7),370; 1960) in first approximation agrees with the four classical tests, the cosmological redshift arises from a shortening of measuring rods rather than from an expansion of space.

GR 2.2 Mo 18:45 KGI-HS 1010

The Physical Fundament of General Relativity — •Albrecht Giese — Taxusweg 15, 22605 Hamburg

General Relativity is governed by the paradigm of Einstein, that the speed of light c is a strict constant in all situations. Einstein has paid for his conviction by giving up the traditional understanding of space and time.

General Relativity is presently in a deadlock situation. The problems are the non-detectable gravitational waves, the Dark Matter phenomenon, and the Quantum Gravity question. Since 40 years the latter is an open issue, so a change of paradigm may be overdue.

The problems can have a solution if we follow a hint of Roman Sexl to understand gravity as a refraction process. As an example, the deflection of a photon beam at the sun, which once caused the breakthrough for Einstein's theory, can be quantitatively explained as a classical refraction process. If this refraction is applied to the internal oscillation of an elementary particle as it was found by E. Schrödinger ("Zitterbewegung"), then gravity for an object at rest can be quantitatively explained. Also the Schwarzschild formalism can be derived using this ansatz.

In this view, gravity is not the "forth force", but a side effect of mainly the Strong Interaction. - And this solves easily the problem of Quantum Gravity, as the Strong Interaction is fully covered by QM.

For further information see www.ag-physics.org/gravity