GR 10: Foundations and Alternatives II

Time: Wednesday 16:00–17:40 Location: ZEU/0255

GR 10.1 Wed 16:00 ZEU/0255

The assumption of a continuous Lorentzian spacetime manifold in quantum gravity — •René Friedrich — Strasbourg

Spacetime is more and more often suspected of being at the origin of the problem of quantum gravity, and it is said that the concept of spacetime needs to be revised.

In this talk, we want to provide the concrete reason why the Lorentzian spacetime manifold is not compatible with quantum gravity, by showing that it is a man-made artefact: unlike the Euclidean metric, no Lorentzian pseudometric is able to span up a real-valued manifold. This is why - since its introduction with Minkowski's famous lecture "Space and time" and until today - Lorentzian manifolds require always the addition of a second metric in order to override the appearance of negative squares and of imaginary values.

This artificial "patchwork" of two opposite metrics is not only incompatible with quantum mechanics, it is even contradicting the very principles of general relativity.

GR 10.2 Wed 16:20 ZEU/0255

A Physically Founded and Exact Model of Dark Energy — •Hans-Otto Carmesin — Gymn. Athenaeum, Harsefelder Str. 40, 21680 Stade — Studienseminar Stade, Bahnhofstr. 5, 21682 Stade — Universität Bremen, Fachbereich 1, Postfach 330440, 28334 Bremen

While Newton proposed static space, Einstein used his general relativity, GR, and derived a possible dynamic expansion of space [1]. Hubble observed it [2]. When Perlmutter [3] discovered the energy density u_Λ of cosmological vacuum, dark energy, an essential property of space beyond GR had been discovered. So, what is dark energy? Here, I present a physically founded model of the dark energy u_Λ [4,5]. I provide an exact solution of that model, and I derive the dark energy $u_{\Lambda,model}$. It is in precise accordance with the observed value $u_{\Lambda,obs}$. Thereby, I do not apply any fit parameter. Using that model, I explain the H_0-tension [6]. Lit.: [2] Hubble, E. (1929): A relation between distance and radial velocity among extra-galactic nebulae. Proc. of National Acad. of Sciences, 15, pp. 168-173. [3] Perlmutter, S. et al. (1998): Discovery of a Supernova Explosion at Half the Age of the Universe. Nature, 391, pp. 51-54. [4] Carmesin, H.-O. (March 2021): Quanta of Spacetime Explain Observations, Dark Energy, Graviton and Nonlocality. Berlin: Verlag Dr. Köster. [5] Carmesin, H.-O. (December 2022): Unification of Spacetime, Gravity and Quanta. Berlin: Verlag Dr. Köster. [6] Riess, A. et al. (2022): A Comprehensive Measurement of the Local Value of the Hubble Constant with 1 km s^{-1} Mpc^{-1} Uncertainty from the Hubble Space Telescope and the SHOES Team. The Astrophys. J. Lett., 934:L7, pp. 1 - 52.

GR 10.3 Wed 16:40 ZEU/0255

Comparison of Models of Dark Energy — •Paul Sawitzki[1], Jannes Ruder[1], and Hans-Otto Carmesin[1,2,3] — [1]Gymn. Athenaeum, Harsefelder Str. 40, 21680 Stade — [2]Studienseminar Stade, Bahnhofstr. 5, 21682 Stade — [3]Universität Bremen, Fachbereich 1, Postfach 330440, 28334 Bremen

While Newton proposed a static and flat space, Einstein used his general relativity, GR, and derived a possible dynamic expansion of space [1]. Hubble observed that expansion [2]. When Perlmutter [3] discovered the energy density u_Λ of the cosmological vacuum, the dark energy, an essential property of space beyond GR had been discovered. Moreover, the dark energy amounts to 68 % of all energy in the universe. So, a basic question became relevant: What is dark energy? Here, we summarize proposed models of dark energy, and we compare these models according to criteria of physics and epistemology [4,5]. [1] Einstein, A. (1917): Kosmologische Betrachtungen zur allgemeinen Relativitätstheorie. Sitzungsb. d. Königl. Preuß. Akad. d. Wiss., pp. 142-152. [2] Hubble, E. (1929): A relation between distance and radial velocity among extra-galactic nebulae. Proc. of National Acad. of Sciences, 15, pp. 168-173. [3] Perlmutter, S. et al. (1998): Discovery of a Supernova Explosion at Half the Age of the Universe. Nature, 391, pp. 51-54. [4] Humphreys, P. (2004): Scientific Knowledge. In: Niiniluoto, Ilkaa et al. (Eds.): Handbook of Epistemology. Dordrecht: Springer, pp. 549-569. [5] Styrman, A. (2020): Only a unified ontology can remedy disunification. Journal of Physics: Conference Series, 1466, pp. 1-25.

GR 10.4 Wed 17:00 ZEU/0255

Comparison of Models of the H_0 Tension — •Philipp Schöneberg[1], Phil Immanuel Gustke[1], and Hans-Otto Carmesin[1,2,3] — [1]Gymn. Athenaeum, Harsefelder Str. 40, 21680 Stade — [2]Studienseminar Stade, Bahnhofstr. 5, 21682 Stade — [3]Universität Bremen, Fachbereich 1, Postfach 330440, 28334 Bremen

While Newton proposed a static and flat space, Einstein used his general relativity, GR, and derived a possible dynamic expansion of space [1]. Hubble observed that expansion [2]. The dynamics of that expansion can be described by the Hubble parameter, and by its present-day limit H_0. However, the observed value at the early universe $H_{0,obs,early}$ differs from the observed value at the late universe $H_{0,obs,late}$ by five standard deviations [3]. So, what is the origin of that H_0 difference or H_0 tension? Here, we summarize proposed models of that H_0 difference, and we compare these models according to criteria of physics and epistemology [4].

[1] Einstein, A. (1917): Kosmologische Betrachtungen zur allgemeinen Relativitätstheorie. Sitzungsb. d. Königl. Preuß. Akad. d. Wiss., pp. 142-152. [2] Hubble, E. (1929): A relation between distance and radial velocity among extra-galactic nebulae. Proc. of National Acad. of Sciences, 15, pp. 168-173. [3] Riess, A. et al. (2022): A Comprehensive Measurement of the Local Value of the Hubble Constant with 1 km s^{-1} Mpc^{-1} Uncertainty from the Hubble Space Telescope and the SHOES Team. The Astrophys. J. Lett., 934:L7, pp. 1 - 52. [4] Humphreys, P. (2004): Scientific Knowledge. In: Niiniluoto, Ilkaa et al. (Eds.): Handbook of Epistemology. Dordrecht: Springer, pp. 549-569.

GR 10.5 Wed 17:20 ZEU/0255

Questionable predictions by EHT image of Sgr A* — •Jürgen Brandes — Karlsbad, Germany

The famous EHT image of Sgr A* predicts BH features in contradiction with observation: a*=0.9375 against a*=0.15; spin direction face-on against edge-on; accretion light variability arising with accretion disks against variability of accretion wind. And there is a theoretical shortcut by Broderick et al.: The missing UV bump agrees with *degenerate* supermassive objects being no BH. [1],[2]

[1] "*Observations questioning classical GRT ...*", chapter 13, homepage www.grt-li.de.

[2] J. Brandes, J. Czerniawski, L. Neidhart: *Spezielle und Allgemeine Relativitätstheorie für Physiker und Philosophen - Einstein- und Lorentz-Interpretation, Paradoxien, Raum und Zeit, Experimente*, 5th edition., VRI: 2022.