GR 15: Alternative Ansätze

Zeit: Freitag 9:10–10:30 Raum: 30.45: 101

GR 15.1 Fr 9:10 30.45: 101

Repulsive gravity model for dark energy — •Manuel Hohmann — II. Institut für theoretische Physik, Universität Hamburg

We present a multimetric gravity theory containing $N \geq 3$ copies of standard model matter and a corresponding number of metrics. In the Newtonian limit, this theory generates attractive gravitational forces within each matter sector, and repulsive forces of the same strength between matter from different sectors. We apply our theory to cosmology and show that the repulsion between different types of matter may induce the observed accelerating expansion of the universe. In this way dark energy can be explained simply by dark copies of the well-understood standard model. We finally show that our result is consistent with solar system experiments at the post-Newtonian level.

GR 15.2 Fr 9:30 30.45: 101

Finsler spacetimes and Finsler gravity — •Christian Pfeifer — II Institut für theoretische Physik Universität Hamburg, Luruper Chaussee 149, 22761 Hamburg, Germany

Based on the methods of Finsler geometry I introduce the notion of physical Finsler spacetimes which generalize semi-Riemannian spacetime manifolds. On these generalized backgrounds I develop the mathematical tools needed to write down field theory actions. I use these tools to present a theory of Finsler gravity that reduces to general relativity in case the Finsler spacetime is semi-Riemannian, and I discuss matter coupling in this context.

GR 15.3 Fr 9:50 30.45: 101

Eine Klasse von sphärisch-symmetrischen statischen Finsler-Raumzeiten — Claus Lämmerzahl und •Volker Perlick — ZARM, Universität Bremen, Am Fallturm, 28359 Bremen

Wir betrachten sphärisch-symmetrische statische Finsler-Raumzeiten, in denen sich die räumliche Metrik als Wurzel aus einem quartischen Term schreiben lässt. Nach Linearisierung der Metrik um die Schwarzschild-Metrik herum untersuchen wir, welche Schranken sich aus den gegenwärtigen Beobachtungen (Lichtablenkung, Periheldrehung, Lichtlaufzeitmessung u.a.) im Sonnensystem für die Finsler-Störung ergeben. Insbesondere diskutieren wir, ob sich im Rahmen eines solchen Finsler-Modells die Pioneer-Anomalie erklären lässt, ohne mit anderen Beobachtungsdaten in Widerspruch zu geraten.

GR 15.4 Fr 10:10 30.45: 101

Entropy, bio-evolution and the psychological arrow of time — •Heinrich Päs — TU Dortmund

Physics seems to be almost time symmetric. Apart from small CP violating effects in weak interactions microscopic processes can run backwards just as they can run forward in time. The only difference in macroscopic environments between future and past thus seems to be entropy. If entropy increase is the only measure of time, though, the psychological arrow of time is a most puzzling fact: why do we remember the past, but do not "premember" the future. In this talk we propose a darwinist approach to this problem: in order deal with a situation in the present, individuals premembering the future have to process larger amounts of information due to entropy increase. Species which were developing the necessary physique are thus disfavored in evolution. Thus even if no other source of time asymmetry than macroscopic entropy would be relevant for the psychological arrow of time, the selection processes of biological evolution alone would imply its existence, and thus could be of relevance for the understanding of the phenomenon.