GR 17: Quantenfeldtheorie

Zeit: Freitag 8:30–9:10   Raum: ZHG 002

GR 17.1   Fr 8:30   ZHG 002

A new approach to a unified force — •Jürgen Kässer — Ahornweg 5 D31199 Diekholzen

The assumption is presented that the true structure of the world is a six dimensional (6D) Euclidian space in which our 4D world is embedded properly. Because of the local isomorphism of SO(6) and SU(4) physics developed for this space crystallizes as being very symmetric with only one force and no gravity. Analyzing how this 6D physics can be interpreted by a 4D observer it emerges that the transition seems to be something like a universal remedy. It shows that the result allows formulating our known physics. It gives reason why quantum physics is a probabilistic theory, can explain quarks as transformed 6D symmetry, can deduct our three forces from the one 6D force, can introduce particle mass in the Lagrange density and can implement gravity. The paper presents a structural description. To achieve quantitative results mathematical problems have to be overcome.

GR 17.2   Fr 8:50   ZHG 002

A sheet of graphene - quantum fields in a discrete curved space — •Nikodem Szpak — Fakultät für Physik, Universität Duisburg- Essen

Hubbard-like Hamiltonian systems describing quantum fields in a discrete space, known from optical lattices or crystalline materials like graphene, offer a fascinating possibility for studying and simulating the impact of non-trivial geometries (e.g. curved graphene sheets) on the quantum fields living in it. Despite existing analogies between deformations and defects in the lattice systems and curvature and torsion in the differential geometry, the correspondence is still incomplete and the language allowing for effective calculations is still lacking. We will report on progress in this direction.