T 207: BSM Theorie I

Zeit: Dienstag 16:45–18:45 Raum: KIP SR 2.402

T 207.1 Di 16:45 KIP SR 2.402

An Anisotropic Orbifold Compactification of the Heterotic String — •Jonas Schmidt — DESY Hamburg, Notkestrasse 85, D-22603 Hamburg

We study an anisotropic limit of the $\mathbb{Z}_{6-\mathrm{II}}$ orbifold compactification model of the $E_8 \times E_8$ heterotic string first described in hep-ph/0511035. This model is known to give the correct MSSM matter content at low energies without further exotics. The introduction of a hierarchy between the radii of compactification of the three appearing two-tori can naturally explain the discrepancy between the GUT and the Planck scale. We present a resulting effective six dimensional Orbifold GUT theory with $SU(6)$ gauge symmetry in the bulk in the visible sector. All fields in this model are fixed by the embedding into the heterotic string. The resulting spectrum is anomaly-free and preserves the wanted four dimensional low-energy properties.

T 207.2 Di 17:00 KIP SR 2.402

The Noncommutative Standard Model To Second Order: Ambguities and Observables — •Ana Alboteanu, Thorsten Ohl, and Reinhold Rückl — Institut für Theoretische Physik und Astrophysik, Universität Würzburg

The standard model on noncommutative space-time can be realised as effective theory by an expansion in powers of the noncommutative parameter θ/Λ^2_{NC}. The central ingredient of the model are the Seiberg-Witten Maps, expressing noncommutative fields by their ordinary counterparts such that the noncommutative gauge invariance is realized by commutative gauge invariance. We study the neutral current sector of the noncommutative standard model in second order in θ/Λ^2_{NC} and analize the ambiguities of the Seiberg-Witten Maps and their nontrivial consequences for observables in the model.

T 207.3 Di 17:15 KIP SR 2.402

Minimal walking technicolour — •Dennis Dean Dietrich — Institut für Theoretische Physik, Universität Heidelberg, Heidelberg, Deutschland

In technicolour theories the standard model's elementary Higgs is replaced by a strongly interacting sector. The electroweak symmetry is broken dynamically by chiral symmetry breaking in this sector. Viable theories of this kind must be quasi-conformal and have a small matter content in order to be consistent with electroweak precision data. This can be achieved with techniquarks in higher-dimensional representations of the technicolour gauge group.

T 207.4 Di 17:30 KIP SR 2.402

Stability and Symmetry Breaking in the General Two-Higgs-Doublet Model — Markos Maniatis, •Andreas v. Manteuffel, Otto Nachtmann, and Felix Nagel — ITP Heidelberg

A method is presented for the analysis of the scalar potential in the general Two-Higgs-Doublet Model. This allows us to give the conditions for the stability of the potential and for electroweak symmetry breaking in this model in a very concise way. These results are then applied to the Two-Higgs-Doublet potential proposed by Gunion et al. We can clarify the stability and symmetry breaking properties of this model with our method.

T 207.5 Di 17:45 KIP SR 2.402

Determining the global minimum of Higgs potentials via Groebner bases - applied to the NMSSM — •Markos Maniatis, Otto Nachtmann, and Andreas von Manteuffel — Institut für Theoretische Physik, University Heidelberg, Germany

Determining the global minimum of Higgs potentials with several Higgs fields like the next-to-minimal supersymmetric extension of the Standard Model (NMSSM) is a non-trivial task already at the tree level. The global minimum of a Higgs potential can be found from the set of all its stationary points defined by a multivariate polynomial system of equations. We introduce here the algebraic Groebner basis approach to solve this system of equations. We apply the method to the NMSSM with CP conserving as well as CP violating parameters. The results reveal an interesting stationary-point structure of the potential. Requiring the global minimum to give the electroweak symmetry breaking observed in Nature excludes large parts of the parameter space.

T 207.6 Di 18:00 KIP SR 2.402

R-Parity violating mSUGRA Phenomenology — •Markus Bernhardt — Universitaet Bonn

An overview of the phenomenology of R-parity violating minimal Supergravity is given. R-Parity violation in general allows all sparticles to be the lightest supersymmetric particle. Thus, new regions in parameter space are no longer excluded, that have not been analysed before. The "BC benchmarks" for R-Parity violation developed in the course of this work [hep-ph/0609263] are introduced. Collider signatures of these points and results of simulations are analysed.

T 207.7 Di 18:15 KIP SR 2.402

Minimal Lepton Flavour Violation and Leptogenesis — •Selma Uhlig — TU Muenchen, Muenchen, Deutschland

We analyze lepton flavour violation (LFV), as well as generation of the observed baryon-antibaryon asymmetry of the Universe (BAU) within a generalized minimal lepton flavour violation (MLFV) framework as proposed recently in the literature. We allow for CP violation both at low and high energies. The generation of BAU is obtained through radiative resonant leptogenesis (RRL), starting with three exactly degenerate right-handed neutrinos at the GUT scale, the splittings between their masses at the Majorana scale are generated by renormalization group effects and turn out to be sufficient for a successful leptogenesis widely independent of the Majorana scale. Flavour specific effects are relevant. Correlations to LFV processes like mu -> e gamma are discussed.

T 207.8 Di 18:30 KIP SR 2.402

Extra-dimensions and elementary particle — •Christian Ythier — Faculte des Sciences, Universite de Nice, France

There exists a new approach for justifying the role of extra-dimensions in physics. Since any charged particle has a mass, and since any rest-mass is related to a rest-frequency by Einstein's double relation, a connection between charge and the impressive values of the rest- frequencies had to be searched for. An extension of the views of L. de Broglie [1] and R.P. Feynman [2] suggests that the conservation of the charge in a hydrogen atom could result from the existence of a closed loop in a three-dimensional time [3]:indeed, the rest-mass is proportional to a rest-angular-frequency. Since the creation of a neutral lepton requires an additional 3D-space orthogonal to the 3D-time, six extra-dimensions have to be added to the 4D-space-time of special relativity . 1. L. de Broglie, Annales de Physique 3 (1925)22;2. R.P. Feynman, Phys. Rev. 76 (1948) 749;3. C. Ythier and G. Mouze, D.P.G.-Verhandl. 2006, 3, HK 56-5.