T 19: Beyond The Standard Model (Theorie) 3

Convenor: Tilman Plehn

Zeit: Freitag 14:00–15:45   Raum: M114

T 19.1 Fr 14:00 M114

Two Step Unification — •FELIX BRAAM[1], JÜRGEN REUTER[1], and WOLFGANG KILIAN[2] — [1]Universität, Freiburg — [2]Universität, Siegen

Grand unified theories based on an E_6 gauge symmetry are possible low energy scenarios of string theories. In addition to Quark and Lepton fields, the fundamental **27** of the E_6 contains one up- and down-type Higgs superfield, a pair of exotic particles ("Leptoquarks"), and a NMSSM-like Singlet under the SM gauge group for each generation. The appearance of the Leptoquarks spoil simple gauge coupling unification. Embedding the SM into a Pati-Salam gauge group above 10^{16} GeV, one achieves full E_6 unification below the Planck mass. Aside from model building aspects, implications for physics at the TeV scale will be presented. Three generations of Higgs fields may introduce a new type of dark matter in addition to the usual LSP. The signatures of TeV-scale Leptoquarks are studied using the event generator WHIZARD.

T 19.2 Fr 14:15 M114

On Quartification — •MAIK MINUTH[1] and HEINRICH PÄS[2] — [1]Theoretical Physics III, Department of Physics, TU Dortmund, D-44221 Dortmund — [2]Theoretical Physics III, Department of Physics, TU Dortmund, D-44221 Dortmund

Quartification denotes an extension of *trinification* models, which postulate a left-right-symmetry due to the gauge group $SU(3)_c \times SU(3)_L \times SU(3)_R$. *Quartification* promotes this gauge group with the inclusion of a leptonic color interaction $SU(3)_l$, thus creating a $SU(3)^4$ for the total gauge group of the theory. In this theory leptons and quarks are now completely symmetric. Breaking of the *quartification* gauge group down to the standard model reveals new doublets with half-integer electric charge, so-called *hemions*. The *hemions* are confined by the $SU(2)_l$ remnant interaction and thus can only exist in the form of integer charged boundstates.

We study the creation and decay of hemion boundstates via proton collisions at the LHC, both for quark antiquark annihilations via a γ/Z_0 channel and a $W^{\pm}$ channel.

T 19.3 Fr 14:30 M114

Multijet-Resonanzen am LHC — •STEFFEN SCHUMANN — Universität Heidelberg, Institut für Theoretische Physik, Heidelberg (Deutschland)

Zahlreiche theoretische Erweiterungen des Standardmodells bedingen die Existenz neuer farbgeladener Zustände. Im Vortrag soll ein phänomenologisches Modell mit zusätzlichen Spin-1 und Spin-0 $SU(3)_c$ Oktets vorgestellt werden. Grundlage ist eine Ergänzung des Standardmodells um eine $SU(3)_{hc}$ Eichgruppe, genannt Hyperfarbe, welche $SU(3)_c \otimes SU(3)_{hc}$ fermionische Bifundamentale zu Farboktets bindet. Hadron-Beschleuniger sind ideal für die Entdeckung derartiger Zustände bzw. ihrer Zerfallsprodukte. Die Tevatron und insbesondere LHC Phänomenologie des Modells soll diskutiert werden. Als möglicher Entdeckungskanal dienen Multijet-Endzustände, deren theoretische Modellierung für Signale und Untergründe präsentiert werden soll.

T 19.4 Fr 14:45 M114

s **channel production of heavy vector bosons in the Three-Site Higgsless Model** — THORSTEN OHL and •CHRISTIAN SPECKNER — Universität Würzburg

The Three-Site Higgsless Model provides a minimal example for higgsless BSM model building in which the unitarity of scattering amplitudes is ensured by the exchange of additional heavy vector bosons. Their couplings to the standard model fermions are strongly constrained by electroweak precision observables and typically very small. We demonstrate that they will nevertheless be produced at the LHC in the *s*-channel and determine the regions of parameter space where a discovery is possible in four fermion final states.

T 19.5 Fr 15:00 M114

Holographic approach to a minimal Higgsless model — •DONATELLO DOLCE — ThEP, Mainz

Following holographic approach, we carry out a low energy effective study of a minimal Higgsless model based on SU(2) bulk symmetry broken by boundary conditions, both in flat and warped metric. The holographic procedure turns out to be an useful computation technique to achieve an effective four dimensional formulation of the model taking into account the corrections coming from the extra dimensional sector. This technique is used to compute both oblique and direct contributions to the electroweak parameters in presence of fermions delocalized along the fifth dimension.

T 19.6 Fr 15:15 M114

Phenomenology of a Supersymmetric Higgsless EWSB sector — •ALEXANDER KNOCHEL[1,2] and THORSTEN OHL[2] — [1]Institut fuer theoretische Physik und Astrophysik, Universitaet Wuerzburg — [2]Physikalisches Institut, Universitaet Freiburg

We have extended warped higgsless models of electroweak symmetry breaking with a 5D supersymmetric bulk and no supersymmetry on the UV brane. We obtain a realistic LSP cold dark matter candidate at around 100 GeV and a rich and interesting phenomenology of heavy, almost supersymmetric N=2 multiplets. We have simulated the production of this nonstandard LSP at the LHC using O'Mega/Whizard and discuss ways to distinguish this setup from other Randall-Sundrum inspired models.

T 19.7 Fr 15:30 M114

Graviton monojet production at NLO in the large extra dimensions — STEFAN KARG[1], MICHAEL KRÄMER[1], •QIANG LI[2], and DIETER ZEPPENFELD[2] — [1]Institut für Theoretische Physik E, RWTH Aachen — [2]Institut für Theoretische Physik, Universität Karlsruhe

We compute the $O(\alpha_s)$ QCD corrections to Kaluza-Klein (KK) graviton monojet production in the large extra dimensions model at the LHC. We make predictions for both the signal and the dominant Zj and Wj background at next-to-leading order. We study the scale dependence and PDF uncertainty of the differential cross sections and present distributions where the QCD corrections strongly modify the leading order results.