T 19: Flavourphysik (Theorie) 2

Convenor: Sebastian Jäger

Zeit: Freitag 8:25–10:30   Raum: VG 3.102

T 19.1   Fr 8:25   VG 3.102

Squark Flavor Constraints from $\bar{B} \to \bar{K}^{(*)}l^+l^-$ — Christian Gross[1,2], Gudrun Hiller[2], and •Stefan Schacht[2] — [1]Departement Physik, Universität Basel, 4056 Basel, Switzerland — [2]Institut für Physik, Technische Universität Dortmund, 44221 Dortmund, Germany

We analyze the implications of recent experimental and theoretical progress regarding $\bar{B} \to \bar{K}^{(*)}l^+l^-$ decays on squark flavor violation in the MSSM.

T 19.2   Fr 8:40   VG 3.102

Radiative lepton flavour violation in SUSY GUT models — Markus Bobrowski, •Wolfgang G. Hollik, and Ulrich Nierste — Institut für Theoretische Teilchenphysik, KIT, Karlsruhe

The small flavour mixing in the quark sector can be generated radiatively from SUSY-breaking terms in the MSSM. However,it seems difficult to generate the large neutrino mixing radiatively. Embedding the MSSM into a left-right symmetric model, which realizes the seesaw formula for the light neutrino masses, we constrain the trilinear terms in the SUSY breaking sector. In this class of models we get an appealing correlation between LR breaking scale and soft SUSY breaking parameters.

T 19.3   Fr 8:55   VG 3.102

Flavor Physics in the Randall Sundrum Model — •Raoul Malm — Joh.-Gut. Univ, THEP Group, Mainz, Germany

In 1999, Lisa Randall and Raman Sundrum proposed a 5-dimensional warped geometry theory to solve the mass hierarchy problem of the Standard Model (SM). In addition, the Yukawa-matrix hierarchy of the SM can be explained, if all SM particles, except for the Higgs-boson, and their Kaluza-Klein excitations propagate through the 5th dimension. Properties of this model and its contribution to CP violation in $K - \bar{K}$ mixing, parametrized through ϵ_K, will be discussed in this talk.

T 19.4   Fr 9:10   VG 3.102

A Solution to the Flavor Problem in Warped Extra Dimensions — •Martin Bauer, Raoul Malm, and Matthias Neubert — Johannes-Gutenberg Universität, THEP, Mainz

Models with warped extra dimensions (Randall Sundrum models) can explain the hierachy in the quark masses and mixings based on the geometry of the fifth dimension. Furthermore can the same geometry arrange for a suppression of dangerous flavor changing neutral currents, without the need of additional assumptions such as minimal flavor violation. This so called RS-GIM mechanism has proven to be extremely successful, apart from one observable: The CP-violating quantity in $K - \bar{K}$ mixing, ϵ_K, which requires significant fine-tuning in order to agree with a new physics scale in the TeV range. This is known as the RS flavor problem. We have found that an extension of the strong interaction gauge group can solve the RS flavor problem without suppressing interesting effects in other flavor sectors.

T 19.5   Fr 9:25   VG 3.102

Re-Analysis of Direct Searches for a Fourth Generation of Quarks at Tevatron — Heiko Lacker, •Geoffrey Herbert, Andreas Menzel, Fabian Spettel, and Peter Uwer — Institut fur Physik, Humboldt-Universitat zu Berlin

Direct searches undertaken by the CDF Collaboration at Tevatron have resulted in lower mass limits for a fourth generation of quarks. These searches have focused on looking for the production of Up type fourth generation quarks (t'), decaying into a light quark and a W boson. Whilst the search undertaken in 2011 required at least one b-tag, the search produced in 2010 did not set any b-tagging requirements. Both of these searches always assumed 100% branching ratio for the decay topology under study as well as contributions from only $t'\bar{t}'$ production. A Re-interpretation of these results was incorporated into a CKMfitter package allowing for Br values in agreement with CKM-element constraints as well as possible signal contamination from b' contributions.

T 19.6   Fr 9:40   VG 3.102

Radiative Wilson Coefficients in Warped Extra Dimensions — •Christoph Schmell — Institut für Physik, Johannes Gutenberg-Universität Mainz

Flavor-changing neutral currents like $B \to X_s\gamma$ occur in the Standard Model (SM) only at loop level and are thus strongly sensitive to new physics (NP). Concerning the above B decay, people are interested in the NP contributions to the radiative Wilson coefficients $C_{7\gamma}$, C_{8g}, $\widetilde{C}_{7\gamma}$, and $\widetilde{C}_{8g}$, since these ones play the most important role for all associated observables. One promising possibility for NP is the Randall-Sundrum (RS) model characterized by a five-dimensional space-time with a compact warped extra dimension. Among other things, this set-up leads to an infinite number of massive so-called Kaluza-Klein (KK) excitations of all SM particles. It turns out that the RS contributions to the above Wilson coefficients contain double sums over infinite towers of KK particles so that it is not a priori clear if the coefficients converge. In my talk, I will show the finiteness of all coefficients in the RS model and present the latter's effects on some observables like the branching ratio, the CP asymmetry, and the photon polarization ratio.

T 19.7   Fr 9:55   VG 3.102

Constraining UED mass spectra with electroweak precision tests and flavor physics — •Thomas Flacke and Christian Pasold — Universität Würzburg

In models with universal extra dimensions (UED), all Standard Model fields are promoted to fields on the flat five dimensional spacetime, where the fifth dimension is compactified on S^1/Z_2. The masses of the Kaluza-Klein partners of the Standard model fields depend on the compactification radius R, but also on five-dimensional fermion masses (split-UED) and boundary localized operators (nUED), whose parameters are a priory not determined. In this talk, we present strongly improved bounds on the split-UED and the nUED model from electroweak precision tests as well as from flavor physics. We also show the implications of these bounds for the masses of the particles at the first Kaluza-Klein level, which dictate the LHC phenomenology of the UED model.

Gruppenbericht   T 19.8   Fr 10:10   VG 3.102

Can a fourth fermion family be ruled out? — •Otto Eberhardt[1], Geoffrey Herbert[2], Heiko Lacker[2], Alexander Lenz[3], Andreas Menzel[2], Ulrich Nierste[1], and Martin Wiebusch[1] — [1]KIT — [2]HU Berlin — [3]CERN

It seems to be common belief that a sequential fourth generation of Standard-Model-like fermions (SM4) is already ruled out or at least disfavoured. We show that a consistent analysis has to take care of several loopholes, and that the full parameter space has not been excluded yet. In this analysis, we combine the recent results from LHC with electroweak precision observables and flavour bounds in a global fit of the SM4 parameters using CKMfitter.