T 14: Flavourphysik (Theorie) I

Convenor: Alexander Lenz

Zeit: Donnerstag 16:45–19:00　　　　　　　　　　　　　　　　　　　　　　Raum: 30.23: 3-1

T 14.1　Do 16:45　30.23: 3-1
$B \to K\ell^+\ell^-$ **at Low Hadronic Recoil** — Gudrun Hiller, Danny van Dyk, and •Christian Wacker — Institut für Physik, Technische Universität Dortmund, D-44221 Dortmund, Germany

Within the heavy quark effective theory framework it is shown, that the amplitude for the rare B decay $B \to K\ell^+\ell^-$ at low hadronic recoil has the identical structure as the amplitude for the decay $B \to K^*\ell^+\ell^-$ in the same kinematics region. This correspondence of short distance couplings allows us to check and improve the constraints on the Wilson coefficients, by analyzing the experimental data for the decay $B \to K\ell^+\ell^-$.

T 14.2　Do 17:00　30.23: 3-1
Charm-loop effect in B to K l l — Alexander Khodjamirian, Thomas Mannel, Alexei Pivovarov, and •Yuming Wang — Theoretische Physik 1,Fachbereich 7 (Physik),Universität Siegen

We calculate the long-distance effect generated by the four-quark operators with c-quarks in the B to K ll decays. At the lepton-pair invariant masses far below the c quark pair threshold, we use OPE near the light-cone. The nonfactorizable soft-gluon emission from c-quarks is cast in the form of a nonlocal effective operator. The B to K matrix elements of this operator are calculatedfrom the B-meson LCSR. To describe the charm-loop effect at large q2, we employ the hadronic dispersion relation with psi=Jpsi,psi(2S), ... contributions, where the measured B to K psi amplitudes are used as inputs. The resulting charm-loop effect is represented as a q2-dependent correction Delta C9(q2) to the Wilson coefficient C9. Within uncertainties of our calculation, at q2 below the charmonium region the predicted ratio Delta C9(q2)/C9 is less than 5 percents for B to K ll, but can reach as much as 20 percents for B to Kstar ll, the difference being mainly caused by the soft-gluon contribution.

T 14.3　Do 17:15　30.23: 3-1
$B \to X_s\gamma$ **in Warped Extra-Dimensions** — •Jennifer Mutschall — Institut für Physik (THEP), Johannes Gutenberg-Universität, Mainz

Flavor-changing neutral currents like $B \to X_s\gamma$ occure in the Standard Model (SM) only at loop level and are thus strongly sensitive to new physics. Moreover, thanks to the huge datasets collected at the B-factories, the experimental results for exclusive and inclusive decays of B-mesons have highly gained in precision during the last years. Therefore, strong constraints on extensions of the SM can be derived. In this talk I want to provide a leading-order calculation of the Wilson coefficient $C_{7\gamma}$ in the Randall-Sundrum Model. This calculation will be easily applicable to other models including copies of SM particles.

T 14.4　Do 17:30　30.23: 3-1
Phenomenology of $B \to X_s\gamma$ **in the Randall-Sundrum Model** — •Christoph Schmell — Institut für Physik, Universität Mainz

Flavor-changing neutral currents like the weak B meson decay $B \to X_s\gamma$ are very important processes for the investigation of New Physics (NP) as they do not occur on tree-level in the Standard Model (SM). In recent years, one achieved an enhanced accuracy in measurements of these processes at the B factories so that it is worth considering them in NP models. Concerning the mentioned B meson decay, people are interested in the Wilson coefficient $C_{7\gamma}$ since this coefficient is relevant for all associated observables.

One possibility for NP is the Randall-Sundrum model (RS) characterized by a five-dimensional space-time where the compact extra dimension is warped. This leads to an infinite number of massive so-called Kaluza-Klein excitations of all SM particles. Furthermore, all massive gauge bosons have flavor-violating couplings to fermions so that the contributions of the RS model to $C_{7\gamma}$ are expected to be significant.

In my talk I will present their effects to the branching ratio, the CP asymmetry and the photon polarization ratio.

T 14.5　Do 17:45　30.23: 3-1

Limits on New Physics from exclusive $B \to D^{(*)}\ell\bar{\nu}$ **Decays** — •Sven Faller, Benjamin Dassinger, Thomas Mannel, and Sascha Turczyk — Universität Siegen, Theoretische Physik 1

Exclusive $B \to D^{(*)}\ell\bar{\nu}$ decays are studied with a non-standard-model form of the hadronic current. This current is extended by additional right-handed vector as well as left- and right-handed scalar and tensor contributions. We discuss the decay rates in the Isgur-Wise limit and study the $\mathcal{O}(\alpha_s)$ corrections to the observables understudy. Using latest data and calculations of the form factors at the non-recoil point of exclusive semileptonic $b \to c$ decays constraints to the wrong helicity admixtures in the hadronic current are discussed.

T 14.6　Do 18:00　30.23: 3-1
Radiative flavour violation in SUSY GUT models — •Markus Bobrowski, Ulrich Nierste, and Moritz Schneider — Karlsruher Institut für Technologie (KIT), Institut für Theoretische Teilchenphysik

Present data show clear evidence for new physics beyond minimal flavour violation in the $b \to s$ transition. We discuss radiative sources of flavour violation in the MSSM with boundary conditions from unified theories. We show how a radiatively generated, hierarchical CKM matrix occurs naturally in supersymmetric GUT models and explain the relation between CKM elements and the trilinear SUSY breaking terms A_{ij}. The model makes predictions for FCNC which can be probed at LHCb.

T 14.7　Do 18:15　30.23: 3-1
Radiative flavour violation in SUSY GUT models – Part II — Markus Bobrowski, Ulrich Nierste, and •Moritz Schneider — Karlsruher Institut für Technologie (KIT), Institut für Theoretische Teilchenphysik

In certain supersymmetric GUT models, the Cabibbo-Kobayashi-Maskawa matrix is generated radiatively from the trilinear soft SUSY breaking terms. In this talk we discuss the effect on flavour changing neutral current observables, such as $b \to s\gamma$ and investigate to what extent our GUT model can explain recent evidence of new physics in B_s-$\bar{B}_s$-mixing.

T 14.8　Do 18:30　30.23: 3-1
B-meson distribution amplitudes — •Michael Knödlseder and Nils Offen — Universität Regensburg, Deutschland

We have calculated 2–to–2 renormalisation kernels of heavy-light light-ray operators in coordinate space using light-cone gauge. Special attention will be turned to meson-vacuum matrix elements of these operators, the B- or D-meson light-cone distribution amplitudes (LCDA). At one loop level light-cone gauge reduces all renormalisation kernels to two-particle kernels. The three particle kernels can be constructed by simply adding the previously calculated two-particle kernels. Calculations are performed in heavy quark effective theory (HQET). Our results can be compared with the light-light case where the renormalisation kernels exhibit conformal symmetry. We will discuss which symmetries of the full conformal group survive after applying the heavy quark limit of QCD and the renormalisation procedure.

T 14.9　Do 18:45　30.23: 3-1
Top Decays in Minimal Flavour Violation — •Stefan Gadatsch and Thomas Mannel — Theoretische Physik 1, Fachbereich Physik, Universität Siegen

We discuss the general form of two fermion - gauge boson anomalous couplings, generated by dimension-six gauge invariant effective operators in the framework of a Two Higgs Doublet Model type-II. In particular we focus on the charged $t \to bW^-$ transition as well as on the flavour changing neutral currents $t \to cZ$ and $t \to c\gamma$ in minimal flavour violating scenarios and examine the contributions to the decay rates for different helicities. We use the renormalization group to scale the anomalous couplings from high scales to observable scales.