

## T 32: Flavourphysik (Theorie)

Zeit: Montag 16:45–19:00

Raum: VMP8 SR 106

T 32.1 Mo 16:45 VMP8 SR 106

**Explaining  $R_{D^{(*)}}$  with leptoquarks and flavor symmetries** — ●KAY SCHÖNWALD — TU Dortmund

Recently LHCb confirmed the anomalies in  $R_{D^{(*)}}$  previously measured by BaBar and Belle. We use flavor symmetries capable of explaining the observed mixing in the quark and lepton sector to constrain leptoquark couplings and study whether this models can explain the anomalies in  $R_{D^{(*)}}$ .

T 32.2 Mo 17:00 VMP8 SR 106

**precise predictions for inclusive semi-tauonic B decay rate** — THOMAS MANNEL and ●FARNOUSH SHAHRIARAN — University of Siegen

We get Standard Model prediction for the decay rate of  $B \rightarrow X_{cT}\tau\nu$  transitions. The triple differential decay rate has been derived including the nonperturbative corrections of order  $\Lambda_{QCD}^3/m_b^3$  and the leading  $\mathcal{O}(\alpha_s)$  corrections.

The total decay width is obtained by numerical integration with an estimated uncertainty of roughly 5%. We compare our result to the sum of the rates of the exclusive  $B \rightarrow D\tau\nu$ ,  $B \rightarrow D^*\tau\nu$  and  $B \rightarrow D^{**}\tau\nu$  decays.

T 32.3 Mo 17:15 VMP8 SR 106

**Impact of leptonic tau decays on the distribution of  $\bar{B} \rightarrow D\mu\bar{\nu}$**  — ●MARZIA BORDONE, GINO ISIDORI, and DANNY VAN DYK — Physik-Institut, Universität Zürich, Winterthurer Strasse 190, 8057 Zürich, Schweiz

We present results for the decay rate of  $\bar{B} \rightarrow D\tau(\rightarrow \mu\nu\nu)\bar{\nu}$ , which is a sizeable background to  $\bar{B} \rightarrow D\mu\bar{\nu}$  decays. In particular, we calculate analytically the differential decay rate with respect to all seven kinematic variables. We consider the impact of this decay on the distributions of  $\bar{B} \rightarrow D\mu\bar{\nu}$  in either the muon helicity angle or the muon energy in the  $\bar{B}$  rest frame. Our numerical results are obtained from Monte Carlo pseudo events. Finally, we provide necessary information for cross checks of the experimental analyses.

T 32.4 Mo 17:30 VMP8 SR 106

**The impact of  $\Lambda_b \rightarrow \Lambda\ell^+\ell^-$  in global fits of rare  $b \rightarrow s\ell^+\ell^-$  decays** — STEFAN MEINEL<sup>1,2</sup> and ●DANNY VAN DYK<sup>3</sup> — <sup>1</sup>University of Arizona, Tucson (AZ), USA — <sup>2</sup>RIKEN BNL Research Center, Upton (NY), USA — <sup>3</sup>Universität Zürich, Zürich, Switzerland

We carry out a global fit of the Wilson coefficients  $C_7$ ,  $C_9$  and  $C_{10}$  based on the most recent experimental results on exclusive and inclusive rare  $b \rightarrow s\gamma$  and  $b \rightarrow s\ell^+\ell^-$  decays. We specifically investigate the impact of the decay  $\Lambda_b \rightarrow \Lambda(\rightarrow p\pi^-)\ell^+\ell^-$ . Updates of the  $\Lambda_b \rightarrow \Lambda$  form factors from lattice QCD reduce the theoretical uncertainties for this channel.

T 32.5 Mo 17:45 VMP8 SR 106

**Higher-Twist Effects in the  $B \rightarrow \pi$  Transition Form Factor from QCD Light-Cone Sum Rules** — ALEXANDER KHODJAMIRIAN and ●ALEKSEY RUSOV — Universität Siegen Fakultät IV/Department Physik Theoretische Physik 1 Walter-Flex-Straße 3 57068 Siegen

I will report on the progress in calculating new higher-twist corrections to the QCD light-cone sum rule for the  $B \rightarrow \pi$  transition form factor. First, the expansion of the massive heavy-quark propagator in the external gluonic field near the light-cone was extended to include new terms containing the gluon-field strength derivatives. The result-

ing analytical expressions for the twist-5 and twist-6 contributions to the correlation function were obtained in a factorized approximation, expressed via the product of the quark-condensate density and the lower-twist pion distribution amplitudes. The numerical analysis of new higher-twist effects is in progress.

T 32.6 Mo 18:00 VMP8 SR 106

**Relating masses and mixing angles: a model-independent model** — ●WOLFGANG GREGOR HOLLIK<sup>1</sup> and ULISES JESUS SALDANA-SALAZAR<sup>2</sup> — <sup>1</sup>DESY, Hamburg — <sup>2</sup>CINVESTAV, Mexico

In general, mixing angles and fermion masses are seen to be independent parameters of the Standard Model. However, exploiting the observed hierarchy in the masses, it is viable to construct the mixing matrices for both quarks and leptons in terms of the corresponding mass ratios only. A closer view on the symmetry properties leads to potential realizations of that approach in extensions of the Standard Model. We discuss the application in the context of flavored multi-Higgs models.

T 32.7 Mo 18:15 VMP8 SR 106

**Corrections to the Bag Factor in  $B$ - $\bar{B}$ -Mixing** — ANDREY G. GROZIN<sup>1</sup>, ●REBECCA KLEIN<sup>2</sup>, THOMAS MANNEL<sup>2</sup>, and ALEXEI A. PIVOVAROV<sup>2</sup> — <sup>1</sup>BINP, Novosibirsk — <sup>2</sup>Universität Siegen

$B$ - $\bar{B}$ -Mixing is parameterized by the matrix elements of local operators  $O_i$ . For the computation of these matrix elements a bag factor  $B_i$  can be introduced  $\langle \bar{B}|\mathcal{O}_i|B \rangle = B_i \langle \bar{B}|\mathcal{O}_i|B \rangle^{fac}$ , which is unity in naive factorization. Any deviation from unity describes the accuracy of the naive factorization prescription. Corrections to  $B_i$  emerge from QCD radiative corrections and from nonperturbative contributions at order  $1/m_b$ . We present the current status of these corrections to  $B_i$ .

T 32.8 Mo 18:30 VMP8 SR 106

**Precise predictions for CP asymmetries in B decays** — ●ULRICH NIERSTE and PHILIPP FRINGS — Institut für Theoretische Teilchenphysik, KIT, Karlsruhe

The extraction of fundamental CP phases from  $B_d$  or  $B_s$  decays to charmonium is affected by penguin contributions. We show how these contributions can be calculated with dynamical QCD-based methods and present our predictions for a variety of decay modes and briefly discuss branching ratios in  $B \rightarrow DD$  decays.

T 32.9 Mo 18:45 VMP8 SR 106

**Standard Model Wilson coefficients for  $c \rightarrow u\ell^+\ell^-$  transitions at next-to-leading order** — STEFAN DE BOER<sup>1</sup>, ●BASTIAN MÜLLER<sup>2</sup>, and DIRK SEIDEL<sup>3</sup> — <sup>1</sup>TU Dortmund — <sup>2</sup>Uni Siegen — <sup>3</sup>Uni Siegen

The standard theoretical framework to deal with exclusive, weak decays of heavy mesons is the so-called weak effective Hamiltonian. It involves the short-distance Wilson coefficients, which depend on the renormalization scale  $\mu$ . For specific calculations one has to evolve the Wilson coefficients down from the electroweak scale  $\mu_W$  to the typical mass scale of the decay under consideration. This is done by solving a renormalization group equation for the effective operator basis.

In this talk the results of a consistent two-step running of the  $c \rightarrow u\ell^+\ell^-$  Wilson coefficients are presented. This running involves the intermediate scale  $\mu_b$  (with  $\mu_W > \mu_b > \mu_c$ ) where the bottom quark is integrated out. All the matching coefficients and anomalous dimensions are taken to the required order by generalizing and extending results from  $b \rightarrow s$  or  $s \rightarrow d$  transitions available in the literature.