

Some Short Notes on the Discussion Session

1. OPE for semileptonic width/moments

- Prospects for improvements in the calculations (in the different schemes)

Status of the 1S scheme:

- 1S mass is also used in V_{ub}
- Should be done as a cross check of the kin scheme results
- Why do the uncertainties in the 1S scheme turn out to be smaller?

- How reliable are the current error estimates of OPE? How can the theory error be reduced in the future?

Error budget on V_{cb} inclusive:

- perturbative Series: Higher Orders?
- Quark Masses
- HQE Parameters
- > TH Uncertainty are the higher order corrections: roughly 1%
- Dominant uncertainty form $1/m^3$, need the α_s corrections
- > Look @ the third hadronic moment
- > Radiative corrections to the Darwin term are important

- Range of applicability of the OPE, duality violation (why don't we see it in the data for high lepton momentum cuts)
- What is an adequate parametrization of duality violations?

Small Duality Violations: Study within a model

- Comparison between different ways to extract a parameter

- Scheme translation/uncertainties
- What is the perspective for a calculation / determination of the higher-order HQE parameters?

New Observables: Forward backward Asymmetry

(Sascha Turczyks presentation)

Other Observables?

2. Experimental uncertainties

- Impact of $B \rightarrow D^{**} \ell \bar{\nu}_\ell$ (how to model)
- Signal model — is there an inclusive signal model (rather than the sum of exclusive modes)
- Dependence of the final state multiplicity/fragmentation model

3. Radiative corrections

- How to make the analysis consistent with $B \rightarrow D^* \ell \bar{\nu}_\ell$
- How to properly include soft photons?

Coulomb Photons: soft phases behaving as α_{em} / v

- is the factor $1 + \pi \alpha_{em}$ real?

- How do we treat these soft pieces in exclusive (and also inclusive) decays ?

- Photons move collinear ply to electrons, not done for the muon

- What QED corrections are included in the OPE?

- Can we describe Photons which are neither soft nor hard?

- Sensitivity to the wave function of the mesons?

4. Quark masses

- Prospects for quark mass determinations

Refined lattice calculations:

Small lattice spacings: Long term project.

Lattice can calculate m_c / m_b : can this be used

to get information for the kinetic scheme?

Scheme conversion yields uncertainties

- Prospects for the calculation of μ_{π^2}

--> Is a lattice calculation needed,

given the large amount of data?

Discussion if the perturbative uncertainties (Papers by Hoang)

Lattice study with different priors for the

coefficients of the perturbative corrections

5. LHCb and Belle II

- Prospects for measuring semileptonic width/moments at LHCb

LHCb: Measurements at $E_{cut} = 0$ (similar tot the DELPHI measurement) in in principle possible.

- Would we learn anything new from B_s/Λ_b semileptonic?