

Flavour in the era of the LHC

a Workshop on the interplay of flavour and collider physics

First meeting:

CERN, November 7–10 2005

Introduction to Working Group 2 B/D/K Decays

- BSM signatures in B/K/D physics, and their complementarity with the high- p_T LHC discovery potential
- Flavour phenomena in the decays of SUSY particles
- Squark/slepton spectroscopy and family structure

Conveners

Gerhard Buchalla, Luca Silvestrini (theory)

Takeshi Komatsubara, FM (experiment)

Local Organizing Committee

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<http://mlm.home.cern.ch/mlm/FlavLHC.html>

Scope of WG2

- **Complementarity**

- Explore the **complementarity** between the **B/K/D sector** and the **high- Q^2 collider physics** in extracting information on BSM phenomena. Identification of new-physics **parameters** within various **BSM scenarios** which are simultaneously accessible in collider and flavour physics experiments and, thus, allow for nontrivial crosschecks.

- **Benchmark comparisons**

- Develop codes to allow a **direct comparison** of **high-pt** and **low-energy observables**, develop **benchmarks** to explore synergy and complementarity of the two sets of observables.

- **BSM scenarios**

- Compare **BSM scenarios** in the B, K and D sectors accessible via **rare decays** and **CP violation** effects. Explore **interplay** between rare decays and CP violations
- Exploit synergy with lepton flavour violation

Scope of WG2

- **Future flavour factories**
 - Critical examinations of the new-physics impact of **future super B/K/D factories** in addition to the approved B physics experiments at the LHC.
- **Future Fixed Target experiments**
 - Explore the opportunities offered by a possible **fixed-target kaon** and **charm** programme at an **upgraded PS/SPS** and **JPARC**
- **Hadronic uncertainties**
 - Critical discussion of **theoretical (hadronic) uncertainties** especially in cases when these are expected to limit discovery/investigation of the BSM mechanisms. In particular, study the impact of our understanding of D's, and needs for further D experiments, on improving the theoretical systematics associated with B system.

Goals for WG2

- **Common framework/language**

- Between direct searches and precision flavour studies, experimentalists and theorists, see also Hazumi-san's plenary talk

- **Interfaces and Benchmarks**

- Select benchmarks (decays and NP models) for all flavour sectors (beauty, charm, strange)
- **Comparison of Theory vs Experiment**
 - Parameters to compare data with NP models? BR's and CP asymmetries, Couplings (V-A, V+A, S, P, T), Wilson coeff., r_d^2 , ϕ_d^2 , ... (see plenary talks)
 - E.g. in a (worst case) scenario where no deviation from SM is measured in CP violation, how do exclusion plots limit New Physics?
- **High Q^2 vs dedicated flavour experiments**
 - Optimise the use of high Q^2 input for flavour experiments and vice-versa
 - Eg. ATLAS & CMS find missing transverse energy NP signal at LHC, what are the relevant parameters for flavour physics?

Goals for WG2

- **Working Group Format**
 - This meeting - many (short) presentations due to requests
 - Next meeting (Feb 2006) - Mainly discussions, round-tables
 - Call for contributions to specific tasks of WG2
 - Create sub-working groups
 - WG2 is huge - about 200 registered participants
 - Plan to split into sub-working groups
 - Anything else you want to suggest
 - Please contact us with your plans