4th International Workshop on the CKM Unitarity Triangle (CKM2006)

Proposed Workshop Format

The organization of the workshop will be similar to the previous workshop. The workshop will be a culmination of the effort of six working groups, as proposed below.

WG1: Precise Determination of Vud and Vus

Conveners: 2 (exp.) + 2 (theory)

exp.: E.Lucia (Frascati), M.Artuso (Syracuse)

theory: V.Cirigliano (CalTech), T.Kaneko (KEK)

The main topic is the precise determination of the Cabibbo angle through the determination of the CKM elements Vud and Vus

- Determination of Vus
  - from K13 decays: new K13 results, measurement and analysis of K13 Dalitz plot to constrain CHPT parameters, new lattice results and their errors
  - from τ and hyperon decays: estimate of theoretical errors, prospects
  - from $fK/f\pi$: new lattice results, exhaustive estimate of unquenched lattice uncertainty
- Determination of Vud from super-allowed Fermi transitions, neutron and pion decays: theoretical and experimental updates, also new idea.
- Determination of Vcs, Vcd

WG2: Determination of Vub and Vcb through Inclusive / Exclusive Semileptonic B decays

Conveners: 2(exp.)+2(theory)

exp: A.Limosani (KEK), J.Dingfelder (SLAC)

theory: B.Lange (MIT), T.Onogi (Kyoto)

The main goal of this group is the determination of Vub and Vcb through the inclusive and exclusive semileptonic B decays

- Determination of Vcb and HQE parameters from inclusive B→X l ν decay.
  - Theoretical uncertainties: prospects
  - Spectral moments: new results, averages, global fits, scheme differences, determination of quark masses and hadronic parameters and their combination.
- Determination of Vub inclusive
  - New measurements of E_lepton, Mx, q2 spectrum.
  - Methods to determine |Vub| from the measured rate, based on shape function scheme, weighting functions and DGE(Dressed Gluon Exponentiation) etc.
  - Associated theoretical errors. Weak annihilation effect.
  - How to make the average etc.
- Determination of Vcb exclusive: theoretical and experimental update
  - New measurements for the form factors.
  - F(1) lattice unquenched calculation, LCSR
- Determination of Vub exclusive: theoretical and experimental update
  - New measurements of the q2 distribution with different tagging methods.
  - Experimental determination of the form factor shape.
  - Form factor normalization from unquenched lattice, LCSR and others.
- Exclusive D semileptonic decays and form factors
- D→πlν, extrapolation from D to B and possible determination of Vub

WG3: Vtd/Vts through Mixings and Rare B and K Decays

Conveners: 2(exp.)+2(theory)

exp: P.Chang(NTU), J.Kroll (Penn)

theory: U.Haisch (Zurich/FNAL), V.Lubicz(Roma)

The main goal is determination of Vtd/Vts through meson mixing and rare B and K decays.

- εK, ΔMd, ΔMs.
  - Lattice determination and experimental constraints on F_{Bd}, F_{Bs}, and ζ
  - Critical review on quenching and chiral logs associated errors
- B hadron widths and differences: theoretical and experimental update
- Measurement of Ds/D+→τ(μ)ν
  - Determination of f_{Ds}, f_{D+} and their ratio

- Possible extrapolation to f_B and ζ

- Vtd/Vts from B→ργ and B→K*γ
  - New results from experiments.
  - Results from lattice, LCSR, prospects, long distance contributions
- Radiative decays as probe of CKM
  - Theoretical and experimental updates of B→Xsγ
  - use of b→sγ for moments and for Vub (discussion in conjunction with WG2)
- Role of the radiative charm decays.
- Rare K decays of relevance to CKM studies

WG4: Angles from charmless B decays

Conveners: 2(exp.) + 2(theory)

exp.: T.Gershon (Warwick), H.Ishino (TIT)

theory: E.Kou (Catholique de Louvain), M.Ciuchini (INFN)

The main goal is to study the measurements of the angles $\phi1,\phi1,\phi3$ (or β, α, γ) in charmless B decays. The limitations and ways to overcome them will be discussed, as well as new approaches and high statistics projections. We will concentrate on ways to estimate the SM uncertainties in all these modes and theoretical and experimental ways to reduce them.

- $\phi2$ (α) modes: two body decays ($\pi\pi$), quasi-two-body (Q2B) B decays ($\rho\rho$ $\rho\pi$) and Dalitz analyses ($\pi\pi\pi$).
  - New results ? New modes ?
  - How can we get to f2(α) from the different measurements? How good is the Q2B approximation? How important are S-wave contribution (and other interference) in modes involving ρ?
  - How large are isospin breaking effects? Are there ways that these errors can be reduced?
  - How trustable are theoretical calculations of the penguin pollution?
- $\phi1$ (β) modes: ϕK0, η'K0, f0K0, π0 KS, K+K-KS, KSKSK0 and more.
  - New results ? New modes ?
  - Possible deviation from sin 2f1 (sin2β) within the SM? What are the methods one can use to calculate them and how these methods can be checked?
  - Can the sign of the deviation be obtained ?

- Are there correlations between the deviation in these modes? Are there observables or combinations of observables that have smaller SM uncertainties (sums, ratios etc.) ?

- $\phi 3$ (γ) from charmless decays. Interpretation of other charmless decays
  - Understanding of the πK modes (γ, electroweak penguins).
  - What can be learnt in addition from πK^* and ρK^* modes?
- Comparison and assessment of theoretical approaches based on factorization and/or flavour symmetries
  - What are the theoretical assumptions?
  - Which amplitudes are included in the calculations, and what is the estimated theoretical error?
  - Perform comparative studies for "benchmark" modes.
  - How predictive are data-driven fits?

WG5: Angles from B decays with charm

Conveners: 2(exp.) + 2(theory)

exp: G.Cavoto (Rome), K.Trabelsi (KEK)

theory: J.Zupan (CMU), R.Fleisher (CERN)

The main goal is the measurement of the angles f3γ and β from B decays involving D or Charmonium mesons. The limitations and ways to overcome them will be discussed, as well as new approaches and high statistics projections

- Measurement of $\phi 1$ (β) in B decays to Charmonium
  - measurements of $\phi 1(\beta)$ and $\cos 2\phi 1$ ($\cos 2\beta$)
  - CPT/T parameters
- Measurements of $\phi 3$ (γ) in B $\rightarrow$ D(*)K(*) decays
  - GLW and ADS methods
  - Dalitz methods (model dependent/independent)
- Measurements of $2\phi 1+\phi 3$ ($2\beta+\gamma$) in B$\rightarrow$D(*)π,ρ decays and related BF measurements (Dsπ,Dπ0, and D(*)K(*))

WG6: CKM Fits and New Physics

Conveners: 2(exp.) + 2(theory)

exp: P.Koppenburg (London), R.Itoh (KEK)

theory: G.Isidori (Frascati), Y.Grossman (Technion)

The main goals are global fits to the CKM parameters using different statistical methods, and search for, or constrain, the new physics contribution, using data from the B factories, Tevatron, and the future B facilities.

- Global fit to Unitarity Triangle parameters using all the experimental and theoretical inputs from all the other WGs
  - Comparison between direct and indirect determinations of different quantities, for instance, UT angles, hadronic parameters.
  - $f_B * |V_{ub}|$ from $B \rightarrow \tau \nu$, $|V_{ub}/V_{td}|$ from $B \rightarrow \tau \nu$ and Δm.
- Constraint to New Physics from
  - FCNC processes such as $B \rightarrow Xs\gamma$, Xsll, $Xs\nu\nu$, $K \rightarrow \pi\nu\nu$ etc.
  - B decays to a final state with τ, such as $B \rightarrow D \tau \nu$, $\tau \nu$.
  - Decays via Higgs mediation, such as $Bs \rightarrow \mu^+\mu^-$.
  - Others.