Third Workshop on the CKM Unitarity Triangle

We are organizing the third CKM workshop on 15–18 March 2005 at the University of California, San Diego. The goal of these workshops is to provide a forum to discuss the measurements related to the Cabibbo-Kobayashi-Maskawa matrix elements, These workshops facilitate dialog between theorists and experimentalists to discuss the latest developments in the field.

The first CKM workshop was held at CERN in February 2002 with the participation of about 200 physicists and focused on results from LEP, SLD, CLEO, and the Tevatron. The summary of this workshop is available as CERN Yellow Report `CERN-EP/2003-002-rev` and `hep-ph/0304132`. At this workshop it was acknowledged that a new working group was necessary to continue the averaging activities of the LEP–SLD working groups. This led to the birth of the Heavy Flavor Averaging Group (**HFAG**, `http://www.slac.stanford.edu/xorg/hfag/`), which was established at the FPCP conference in Philadelphia in 2002 and includes representatives from BaBar, Belle, CLEO, CDF, D0, and LEP experiments.

The second CKM workshop was organized in Durham, UK in April 2003. It focused on the new measurements from the B-factories and in particular on the theoretical modeling employed in the interpretation of the experimental results such as $|V_{ub}|$ and $|V_{cb}|$.

A new working group dedicated to the measurement of the angles of the Unitarity Triangle prompted new analyses with novel techniques. The proceedings of the second workshop are available at `http://www.slac.stanford.edu/econf/C0304052/` and consist of about 85 individual contributions and summary reports from each of the six working groups. Additional information about the first two workshop are available at `http://ckm-workshop.web.cern.ch/ckm-workshop/`.

The third CKM workshop will take place at a time when many new techniques are under development and the B-factories are accumulating statistics at a terrific pace. The precise results from these experiments have begun accurate probes of New Physics scenarios.

In the last year, new ideas have been explored for the measurement of both the angles and the sides of the Unitarity Triangle including angle γ from direct CP violation in $B \to DK$ decays, angle α from $B \to \rho\rho$ decays, spectral moments and precision measurement of $|V_{cb}|$, and many new strategies for the measurement of $|V_{ub}|$. In addition, first results on $\mathrm{B_s^0} - \bar{\mathrm{B}}_\mathrm{s}^0$ oscillations are expected from the Tevatron. CLEO-C is off to a terrific start with first results on charm meson decay constants and exclusive semileptonic decays. Precise new experimental results on semileptonic and rare kaon decays have also re-ignited theoretical activity in the kaon sector. This workshop will provide a forum to discuss the impact of the kaon results on the CKM Unitarity Triangle. All these measurements play an important role as inputs for the CKM physics. The major goals for the CKM2005 workshop are:

- Review recently developed techniques and results in experiments and theory. Isolate the assumptions embedded in experimental measurements such as $\sin(2\beta+\gamma)$ and $|V_{ub}|$.
- Update the current understanding of the parameters of the Unitarity Triangle by implementing new constraints that are now becoming available such as those from the measurements of $\sin(2\beta+\gamma)$ and γ, and CP asymmetries in $B \to \pi\pi, \rho\rho$.

- Provide a critical review of the impact of the current theoretical and experimental knowledge on tests of the Standard Model in the flavor sector. Investigate processes where New Physics is more likely to appear, emphasize the sensitivity of the different observables, and investigate new strategies made possible by the improved precision of the experimental measurements.

- Encourage the lattice community to form representative working groups with the task of combining lattice results and providing "world averages" for the relevant theoretical parameters. This is an idea (the Lattice Data Group) proposed at the first CKM workshop and it is timely to discuss and understand the new opportunities offered by the recent unquenched simulations.

The HFAG will play a central role in this workshop by contributing to the understanding of measurements used as input for the computation and the world averages. In order for the workshop to ensure the exchange between experimentalists (in particular Belle and BaBar Collaborators) and theorists, the format will emphasize mutual discussion over presentation of the results. The activities of the working groups should start well ahead of the meeting and the workshop must provide the ideal venue to finalize the studies.

The proceedings of this workshop will be organized in the form of mini-reviews based on the common and coherent work of the different working groups. The working groups conveners will act as editors of the working group reviews.

Proposed Format:
The workshop will take place at UC San Diego on 15–18 March 2005. The structure of the workshop is as follows.

The workshop will be organized with a few plenary talks intended as an introduction and "provocateur" to the working group parallel sessions. At the request of the conveners some working groups will divide in sub-groups for more specific discussions. The working-group reports and the summary of the workshop will take place on the last day. The six working groups are:

- **WG I**: Determination of Cabibbo angle through V_{ud} and V_{us},

- **WG II**: Determination of V_{cb} and V_{ub} using semileptonic B decays,

- **WG III**:V_{td} and V_{ts} through mixing and rare decays,

- **WG IV**: α,β and γ using charmless decays,

- **WG V**: β and γ using charm and Charmonium decays,

- **WG VI**: CKM Fits and constraints on New Physics.