Workshop on Flavor Physics and QCD

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DATES: May 11 (Wed) – May 14 (Sat), 2005

Topics in B-physics where some knowledge of QCD and interface between experiment and theory are crucial

Format:
- 4 units/day (9:00-10:30, 11:00-12:30, 2:00-3:30, 4:00-5:30), coffee served in between
- Each unit = 45-55 min scheduled for talks; 35-45 min left free for discussion
- We are expecting to utilize three different formats for the sessions: 1) a couple of experimental talks and a couple theory talks mixed with discussion; 2) a set of short talks on controversial topics; 3) round table with a few 10min/3 slide presentations to address specific questions.

Summary of Topics

1. Semileptonic decays (Wed. AM, Wed. PM)(3 units)

   Theme: If we don't understand semileptonic, we won't understand nonleptonic

   - Inclusive $b \to u, c$: Comparison of various approaches to measuring V_{ub} from inclusive decays (m_X, q^2, $E_\ell \dots$). Can we constrain shape fns. from $b \to c\ell\nu$ moments? What can we learn from $b \to u\ell\nu$ and $b \to s\gamma$ moments? Electromagnetic corrections?
   - Exclusive $b \to u$: Factorization for $B \to \pi/\rho\ell\nu$ form factors, validity of $B \to \pi/\rho\ell\nu$ and $B \to K^{(*)}\ell^+\ell^-$ form factor relations, Lattice precision for Vub? What can we learn with $B \to \pi/\rho\ell\nu$ q^2 spectra measured with the present accuracy?

2. $b \to c$ nonleptonic (Wed. PM, Thur. AM)(3 units)

   Theme: if we don't understand (some) $b \to c$, we won't understand $b \to u$

   - Status of factorization in $b \to c$ nonleptonic decays: color-allowed, color-suppressed
   - Testing $SU(3)$; wrong sign charm; annihilation, etc.
   - Determinations of $2\beta + \gamma$ (or $\gamma - 2\beta_s$ in B_s decay); ways of estimating the doubly suppressed amplitude.

3. γ from $B \to$ charmed final states (Thurs PM)(2 units)

   Theme: it would be nice to know γ from pure tree-level decays

   - $B \to DK$ followed by 2- and 3-body D decays
   - Theory errors, role of models, experimental status/prospects), methods with dynamical inputs, color suppression, SU(3), etc. Are we considering all modes of interest? Anything from inclusive approaches?
   - Role of B_s decays (such as $B_s \to KK$)

4. $b \to u$ nonleptonic (Fri AM)(2 units)

   Theme: it would be nice to get redundant clean CKM information

   - $B \to \pi\pi$, $K\pi$, KK: What is the status of factorization and the accuracy of isospin analysis? Probes for new physics versus testing power expansions with the data. Role of electroweak Penguins. Is there a Kπ puzzle or not?
   - $B \to \pi\pi\pi, \rho\pi, \rho\rho \ldots$: how clean are these measurements? How well are we measuring α? How well do we understand strong phases in Dalitz analyses? Accuracy of the isospin analysis and background issues in the $\rho\rho$ modes? Role of FSI?

5. Free Afternoon (Fri PM)

   Theme: Hiking in the local mountains? Bike touring? Kayaking on the bay? Free time for more physics?

6. Phenomenology of $B \to$ charmless (Sat AM)(2 units)

   Theme: Its a big topic and we're not done yet

   - $B \to PV$: continue the γ and α related discussion
   - $B \to \rho\rho, \ldots$: polarization, backgrounds, (revist factorization, SU(3), annihilation)
   - $B \to VV$ (ϕK^*, etc.): polarization and triple products. Which new physics can we probe?

7. New Physics and null-observables (Sat PM)(2 units)

   Theme: how our (lack of) knowledge of QCD limits sensitivity

   - $\sin(2\beta)$: ϕK_S, $\eta(')K_S$, KKK, ... — expectation for time dependent CP asymmetries, including errors?
   - new physics in $b \to s\gamma, s\ell^+\ell^-$; CP violation in inclusive/exclusive $b \to s\gamma$, polarization, null observables in SM.

Participants who have confirmed:

Theory :

Christian Bauer, Marco Ciuchini, Paolo Gambino, Michael Gronau, Ben Grinstein, Gudrun Hiller, Andre Hoang, Alex Kagan, Y.Y. Keum, Zoltan Ligeti, Cai-Dian Lu, Mike Luke, Thomas Mannel, Matthias Neubert, Dan Pirjol, Helen Quinn, Iain Stewart, Daniel Wyler, Sean Fleming, Tom Mehen,

Experiment :

BaBar: Jeff Berryhill, Bob Cahn, Gianluca Cavoto, Riccardo Faccini, Andrei Gritsan, Andreas Hoecker, Hassan Jawahery, Owen Long, Masahiro Morii, Jim Olsen, Soeren Prell, Aaron Roodman, Vivek Sharma, Jim Smith

Belle: Elisabetta Berberio, Alex Bondar, Paoti Chang, Tim Gershon

CDF: Rob Harr

CLEO: Anders Ryd