

Possible contributions to KEKB/SuperB

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Previous work

- Before this application I was involved with the MarkII/SLC, with Aleph, and with Cleo (with D. Cinabro)
- Interactions with machine issues and/or luminosity issues at every stop

Wayne State University

Unusually strong Machine Shop and building capabilities. The Spaghetti Calorimeter of E-869 (BNL), the STAR (BNL) EM calorimeter, the Cleo Instrumented Beam Pipe, and the CESR Large Angle Beamstrahlung monitor were ENTIRELY built at WSU

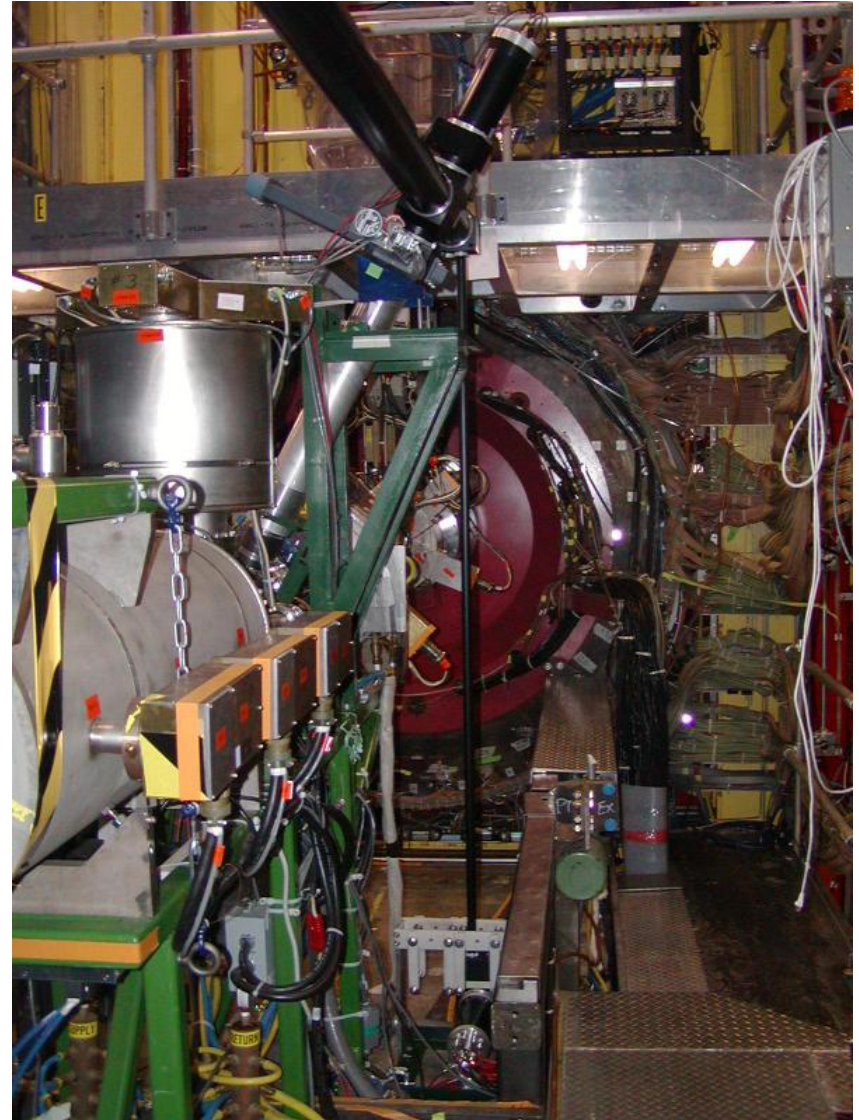
KEKB contributions

- Tomorrow I will present a possible Large Angle Beamstrahlung Monitor for KEK
- This device may fit in the lab plans, both for machine optimization and ILC R&D
- The design changes w.r.t. the original device at CESR are minimal, and the device itself will cost between 40 and 80k\$.

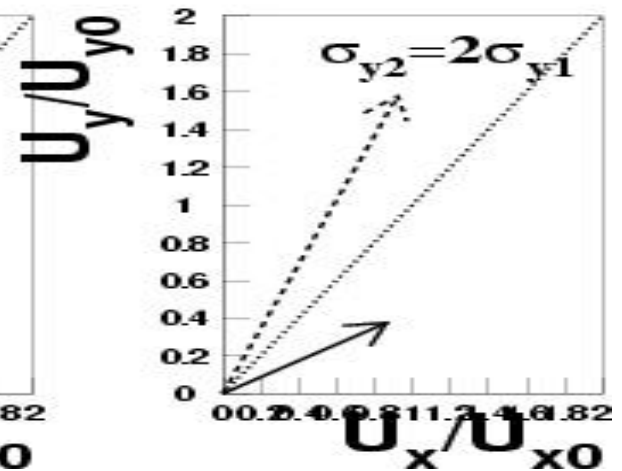
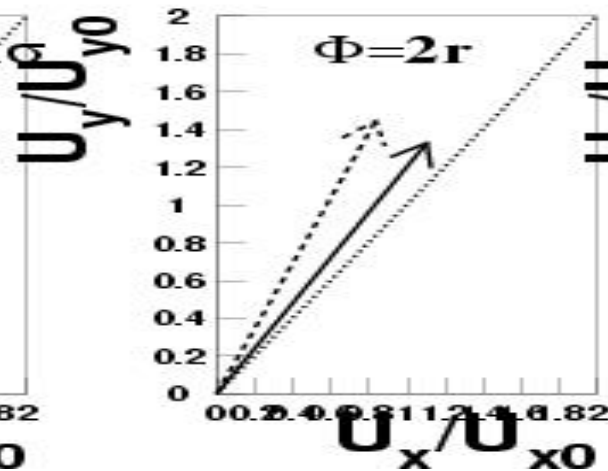
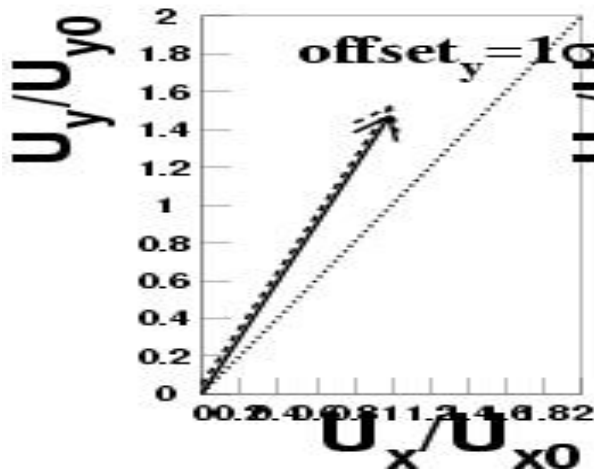
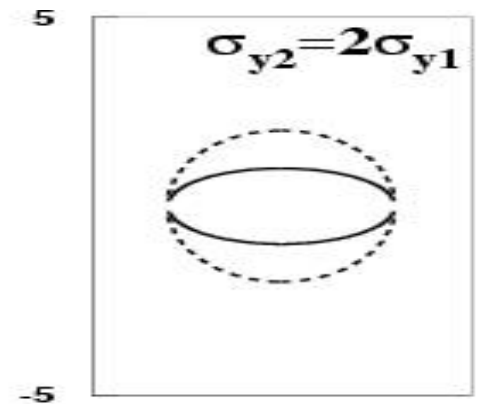
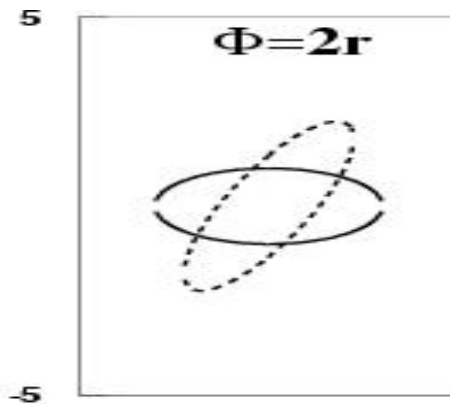
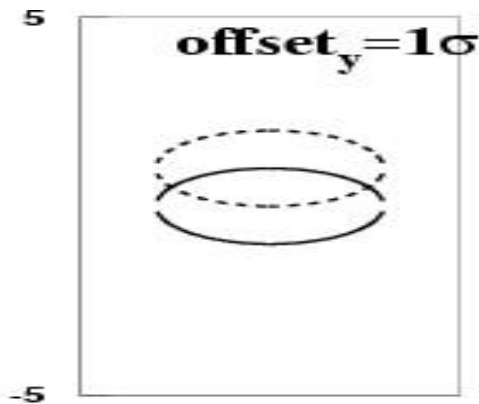
If the device is not of interest to the lab, I am open to other suggestions

Set-up general view

- East side of CLEO
- Mirrors and optic port ~6m apart from I.P.
- Optic channel with wide band mirrors

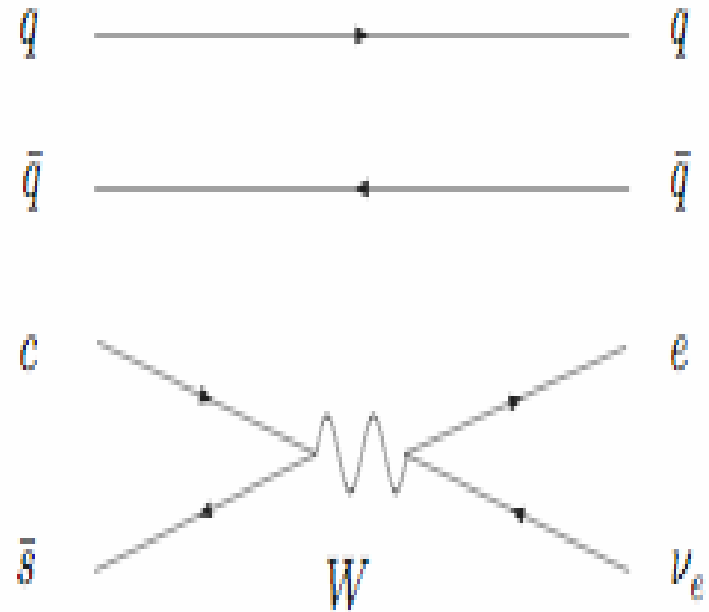


Some examples of Large Angle BMST pattern recognition



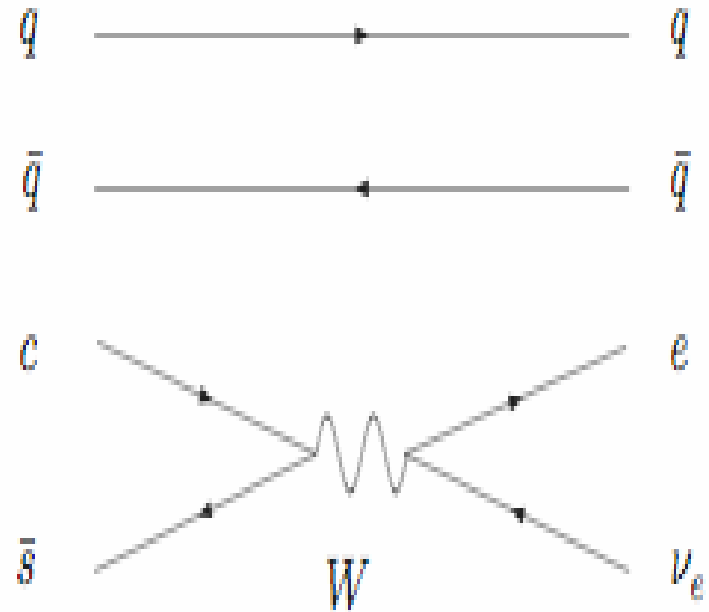
Physics interests

- The BELLE discoveries of a number of exotic charmonium states has proven that hadrons are superposition of Fock states. Sakurai Prize given to S. J. Brodsky in 2007
- But all hadrons should have such components
- My primary interest is the search for semileptonic decays where the valence quarks disappear



Physics interests contd.

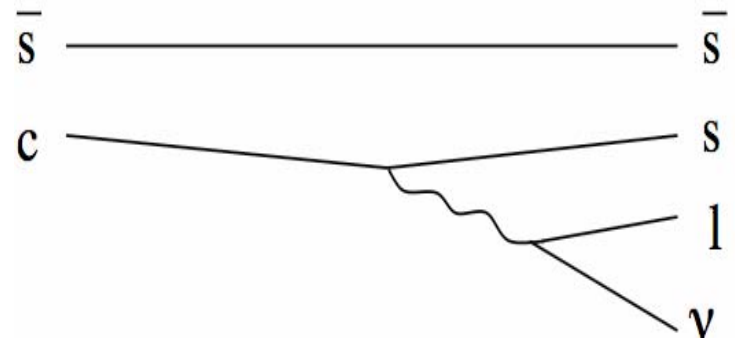
- The extra quark pair should be predominantly in a $l=0$ state
- If it is also in a $S=1$ state, flavor composition is certain, the scaling behavior of the Fock state scales with α_s^3 , and in S wave both quark pairs will have $S=1$, increasing the rate of valence quark annihilation by about two orders of magnitude
- One measurement alone proves nothing, because other models (e.g., $\omega\phi$ mixing) predict similar effect. But a combination of measurements should be able to decide what the underlying physics is



Physics contd

- Probably the measurement of $B^+ \rightarrow \phi l \nu$, coupled with a measurement of $D^+ \rightarrow \phi l \nu$, (and given the measured decays $D^+/B^+ \rightarrow \omega l \nu$), would be enough to decide whether $\omega\phi$ mixing or Fock states are present
- Other possibilities are $B^+ \rightarrow \psi l \nu$ and an improved measure of $D_s \rightarrow \omega l \nu$
- Currently I have two graduate students working on Cleo-c data. The first is looking for $D_s \rightarrow \omega l \nu$ (analysis almost complete) and the other is looking for $D^+ \rightarrow \phi l \nu$ (just started)

- There would remain some ambiguity as to the exact nature of the diagram (whose Fock states I am observing)



Funding

- The NSF is currently not ranking SuperB
- However summer panels will probably include wording about SuperB factories
- DoE/NSF both funded beamstrahlung research
- The bulk of the money came on a special Major Research Instrumentation NSF grant
- I will probably start with a one year grant (one graduate student plus travel and perhaps some hardware money)
- Probably funding situation will improve in one year