PWG3 meeting,
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B_d mixing - first estimate

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Status:

- PDG world average $\Delta m_d = 0.464 \pm 0.018\ \hbar$ ps
- CDF $\mu\mu$ final state
  $\Delta m_d = 0.506 \pm 0.064 \pm 0.071\ \hbar$ ps
  (Feb. 22, 1999, preprint)
- where could we get with HERA-B?

First attempt: channel $B^0 \to \mu c, b \to \mu c$

Assume 40 MHz rate, 12 nb $b\bar{b}$ production cross section

-> B^0 rate: 30 Hz

Semileptonic BR=0.1
Trigger efficiency=0.1 (J/ψ trigger)

In one year expect:

$10^7 \cdot 30 \cdot 0.1^2 \cdot 0.1 = 3 \cdot 10^5$

CDF has 6k events. If no further cuts were needed, we would have a statistical error on Δm_d of order

$0.064\sqrt{6k/300k} = 0.1\ \hbar$ ps

comparable to the world average error.

Backgrounds:

$c\bar{c}$ dimuon decays after trigger
order 10^6 events

$b \to \mu, c \to \mu$ decays after trigger
order 10^5 events

...

cut e.g. on lepton p_T for both leptons, require more secondary vertices?

-> do some work for the next meeting