



Diego Tonelli
Fermilab - for the CDF and DØ collaborations

When Run II will be terminated?

Tevatron reach in key flavor measurement assuming to run through 2011.

Not even 2010 is officially approved. 2011 probably being discussed with funding agencies.

My take: very unlikely NOT to have 2010 running. Too early for any statement on 2011.

Also: note that funding comes in “fiscal years”, (FY) - October to September - and so are projected sample sizes.



Data extrapolations

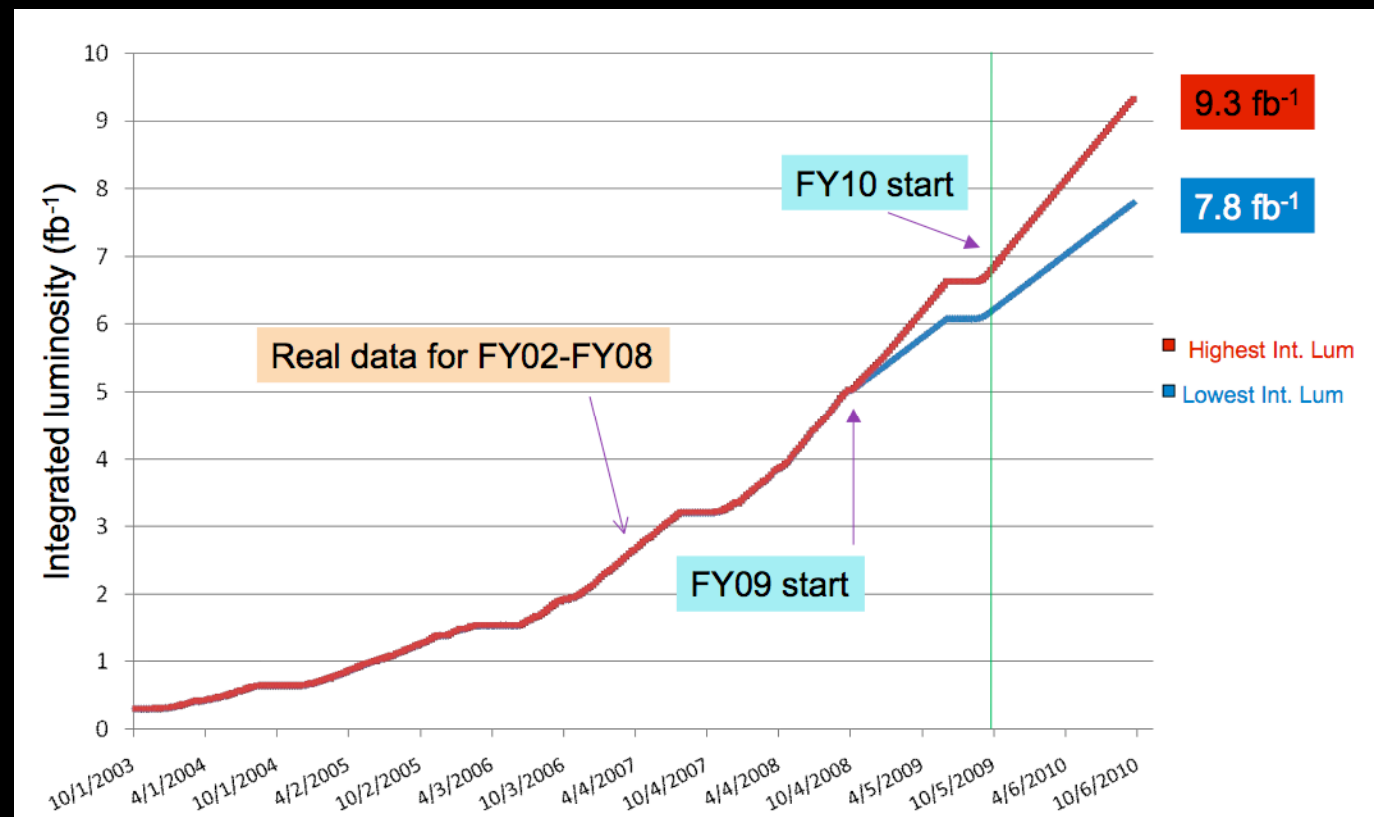
Plot shows “delivered” data. Multiply by 80% to know size of physics-quality samples. Allow 1-2 years after collection for results of analysis

Actual performance is following the red curve: 2/fb of quality-data per year:

6/fb by Oct09

8/fb Oct10

10/fb Oct11





$$B_s^0 \rightarrow \mu^+ \mu^-$$

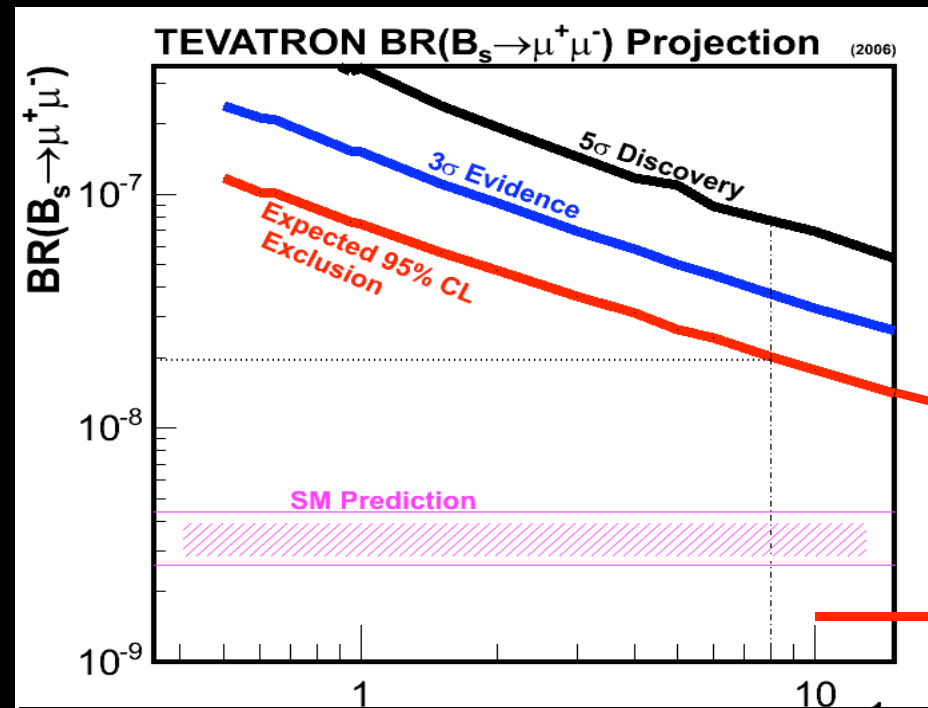
No improvements assumed
 $< 2 \times 10^{-8}$ ($5 \times \text{SM}$) at 10/fb per
 experiment.

Combined: 3-4 \times SM. Near to
 closing up the SUSY-
 allowed space. Remaining
 range promising for
 observation

Improvements in progress

CDF: recover +20%
 acceptance.

DØ working on adding
 single-muon trigger

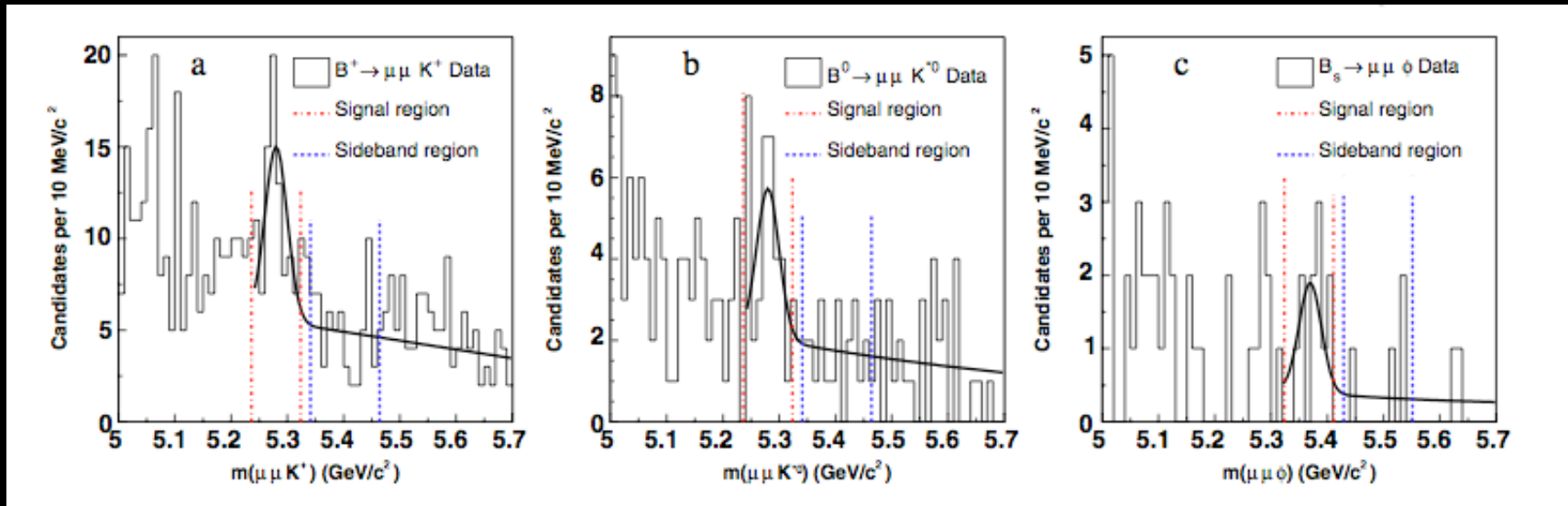


Total (CDF+DØ) integrated luminosity



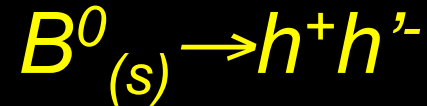
$$b \rightarrow s \mu^+ \mu^-$$

Extrapolate to 10/fb yields observed in 1/fb.



150-200 $B^0 \rightarrow K^* \mu\mu$ in 10/fb (CDF only)

50-100 $B_s^0 \rightarrow \phi \mu\mu$ in 10/fb - first observation already at 5/fb (CDF only)



$$R = \frac{\Gamma(\bar{B}^0 \rightarrow K^- \pi^+) - \Gamma(B^0 \rightarrow K^+ \pi^-)}{\Gamma(\bar{B}_s^0 \rightarrow K^+ \pi^-) - \Gamma(B_s^0 \rightarrow K^- \pi^+)} = -0.83 \pm 0.41(\text{stat.}) \pm 0.12(\text{syst.}) \quad (1/\text{fb})$$

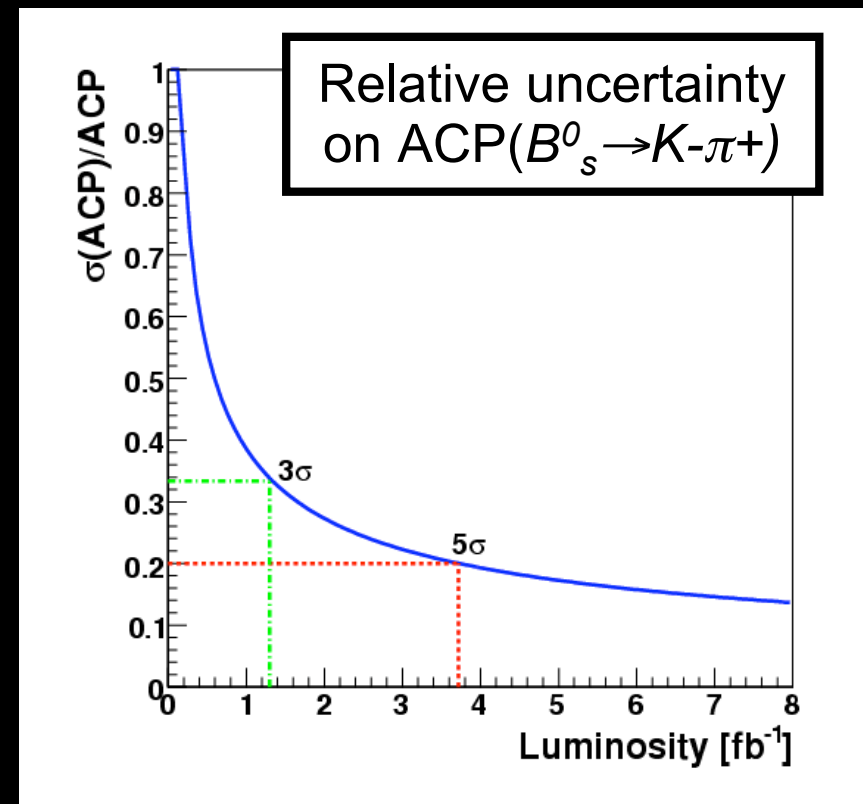
= 1 in the SM

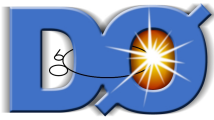
$\sigma_R \sim 15\%$ (stat) in 2011

10% on direct A_{CP} in $B_s^0 \rightarrow K^- \pi^+$

<1% on direct A_{CP} in $B^0 \rightarrow K^+ \pi^-$

Will extract γ at loop-level from time-dependent analysis of $B_s^0 \rightarrow K^+ K^-$





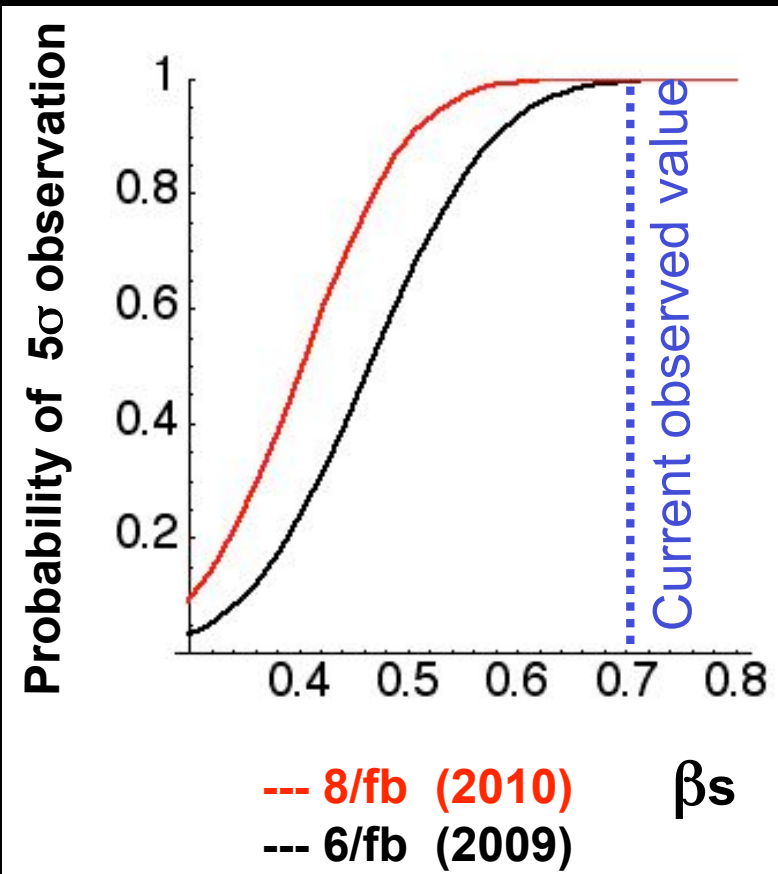
B^0_s mixing-phase

% of CDF+DØ 'clones' that would observe a 5σ -effect, as a function of β_s

Assumptions

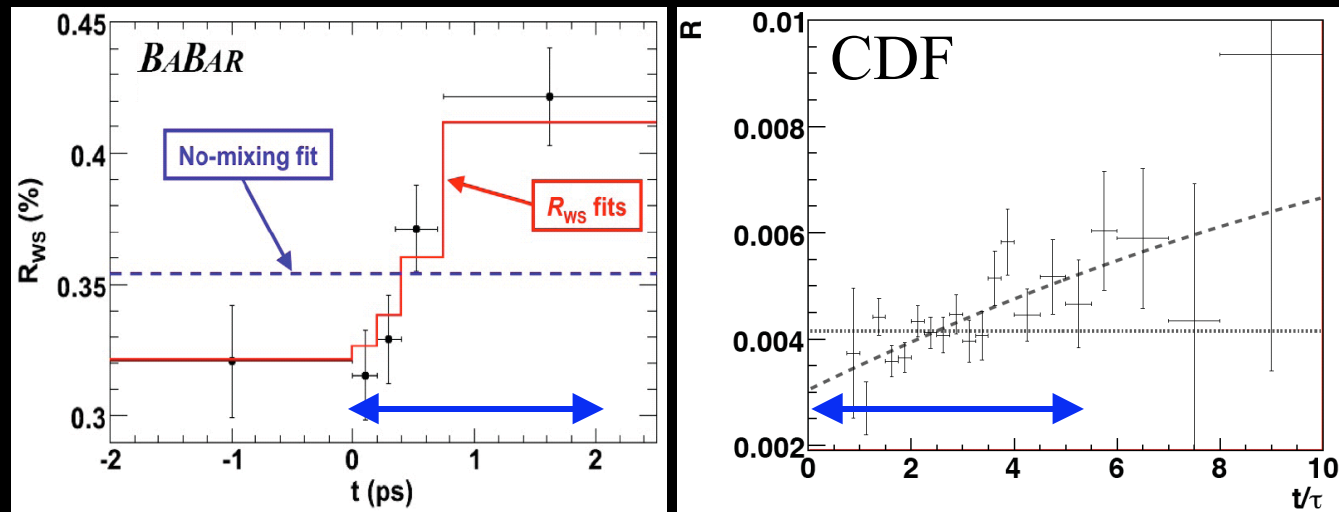
- ✓ $\Delta\Gamma_s = 0.1 \text{ ps}^{-1}$
- ✓ Constant data-taking efficiency
- ✓ No analysis improvements.
- ✓ No external constraints (A_{SL} , lifetimes) used.

Future will be better than that.





Charm mixing



$$\frac{f_W}{f_R} = q + mt = (B + R_D) + \sqrt{R_D} y' t + \frac{x'^2 + y'^2}{2} t^2$$

- 10-20M. World's largest samples. Longer lever-arm in lifetime than B-factor.
- no experiment has yet obtained a 5σ observation;
 - may observe CPV in charm sector for 1st time;
 - sensitivity to the *quadratic* term ($\Rightarrow x'^2$) thanks to long lever-arm;
 - may provide best determinations of D^0 mix parameters for years to come.

Discussion

