Flavour physics sessions
Round-up

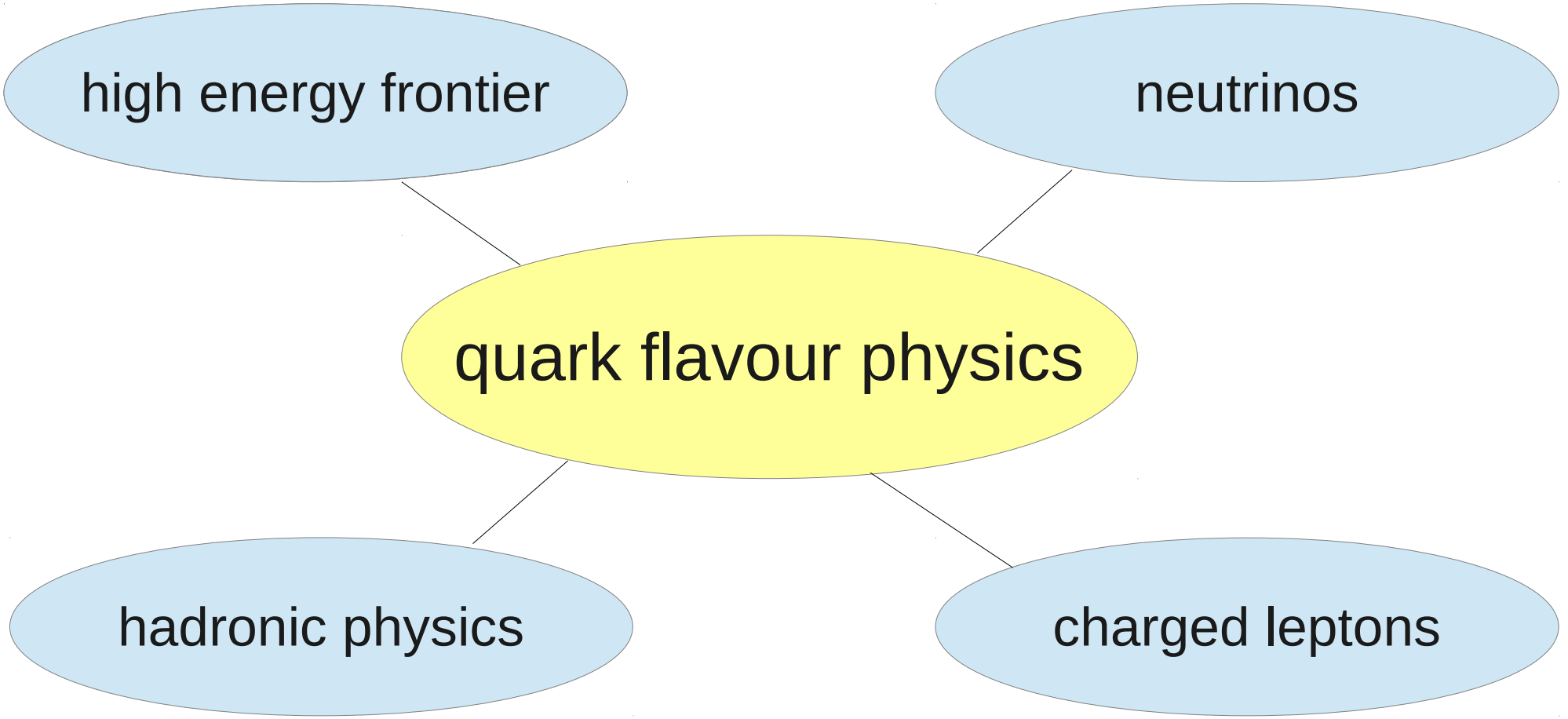
Tim Gershon (University of Warwick & CERN)
Alexander Lenz (CERN)

Standard Model @ LHC 2012
NBI, Copenhagen, 13 April 2012

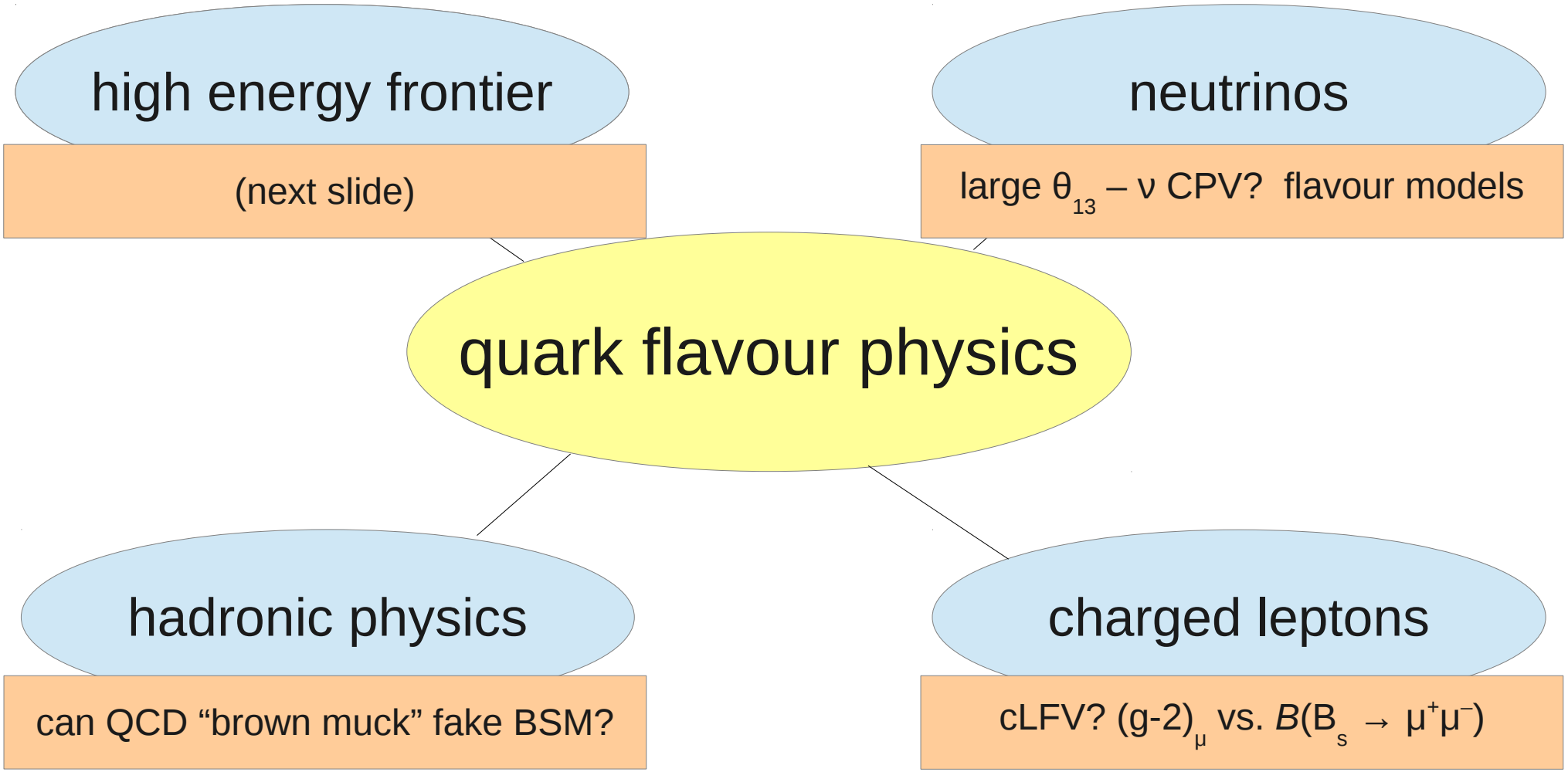
B physics theory overview	*MARTIN, Gorbahn*	
Aud. 2, HCØ institute	08:30 - 08:50	
phi_s measurements - LHCb	*FITZPATRICK, Conor*	
Aud. 2, HCØ institute	08:55 - 09:10	
gamma from B->DK	*MALDE, Sneha*	
Aud. 2, HCØ institute	09:15 - 09:30	
CPV in B->hh	*LI GIOI, Luigi*	
Aud. 2, HCØ institute	09:35 - 09:50	
b hadron properties and decays - ATLAS	*PUROHIT, Milind*	
Aud. 2, HCØ institute	09:55 - 10:10	
b hadron properties and decays - CMS	*SPANIER, Stefan*	
Aud. 2	10:10 - 10:25	
rare B decays - LHCb	*NICOL, Michelle*	
Aud. 2, HCØ institute	11:00 - 11:15	
B and D results from Tevatron	*BERTRAM, Iain*	
Aud. 2, HCØ institute	11:20 - 11:40	
D physics theory overview	*FAJFER, S*	
Aud. 2, HCØ institute	11:45 - 12:05	
charm results - LHCb	*THOMAS, Chris*	
Aud. 2, HCØ institute	12:10 - 12:25	

Thanks to all speakers
for excellent presentations

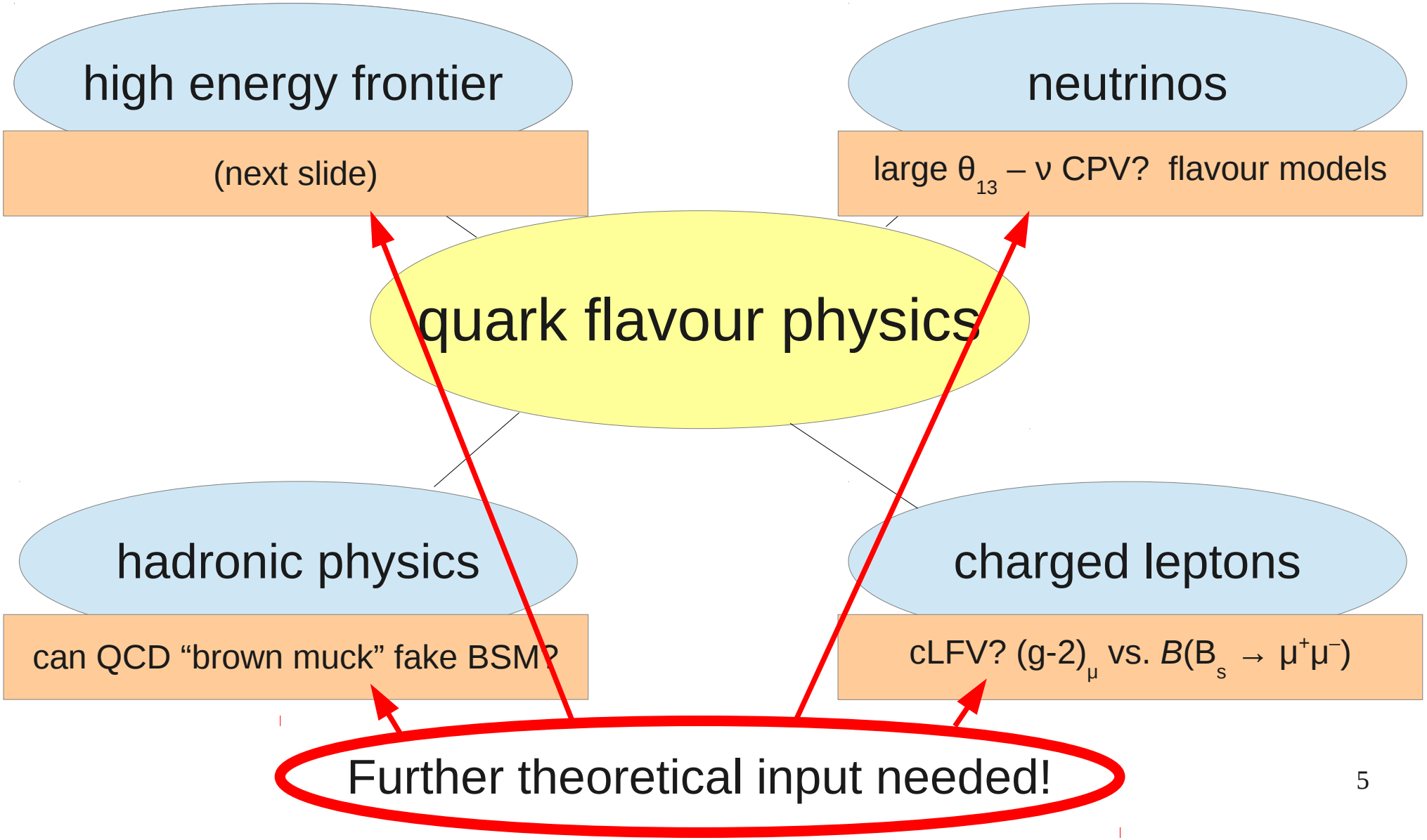
Connections



Connections



Connections



High energy ↔ flavour interplay

- If there is BSM physics at TeV-scale, why haven't its effects been seen in loop processes?
  - Can suppress loop effects in models (e.g. MFV)
  - Acceptable fine tuning?
  - Connection to origin of flavour symmetry breaking?
- Flavour results can suggest search strategies
  - e.g. anomalous results in charm → look for t→c FCNCs
- Interplay between high energy & flavour observables powerful approach to distinguish models

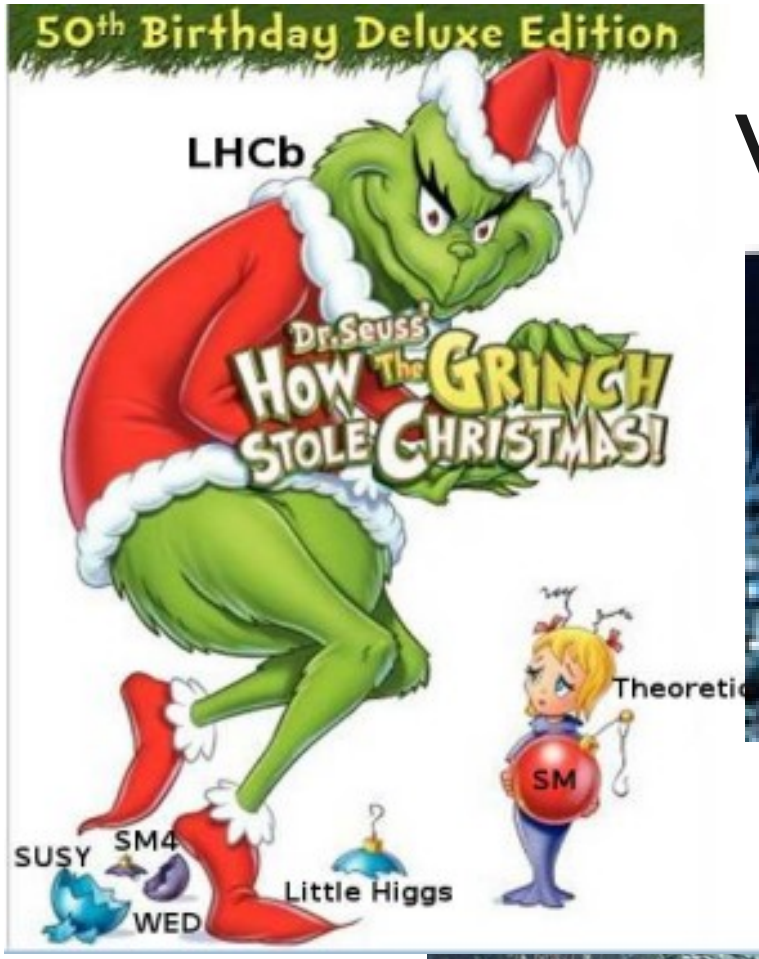
Flavour physics anomalies before LHCb

- $(g-2)_{\mu}$
- $\Sigma^{+} \rightarrow p\mu^{+}\mu^{-}$ (HyperCP)
- $B \rightarrow \tau\nu$ & CKM fit (BaBar & Belle)
- $B_s \rightarrow \mu^{+}\mu^{-}$ (CDF excess)
- φ_s (CDF & D0 hints of large value)
- A_{fs} (D0 evidence)
- $A_{CP}(B \rightarrow K\pi)$ puzzle (BaBar & Belle)
- $A_{FB}(B \rightarrow K^{*}\mu^{+}\mu^{-})$ (BaBar, Belle & CDF hints)
- $A_{I}(B \rightarrow K^{(*)}\mu^{+}\mu^{-})$ (BaBar, Belle & CDF hints)

Flavour physics anomalies ~~before LHCb~~ at start of 2012

- $(g-2)_\mu$ — tension with $B(B_s \to \mu^+\mu^-)$
- $\Sigma^+ \to p\mu^+\mu^-$ (HyperCP)
- $B \to \tau\nu$ & CKM fit (BaBar & Belle)
- $B_s \to \mu^+\mu^-$ (CDF excess) — consistent with SM so far
- φ_s (CDF & D0 hints of large value) — consistent with SM so far
- A_{fs} (D0 evidence) — stay tuned ...
- $A_{CP}(B \to K\pi)$ puzzle (BaBar & Belle)
- $A_{FB}(B \to K^*\mu^+\mu^-)$ (BaBar, Belle & CDF hints) — consistent with SM so far
- $A_I(B \to K^{(*)}\mu^+\mu^-)$ (BaBar, Belle & CDF hints) — stay tuned ….
- $\Delta A_{CP}(D \to KK,\pi\pi)$ — also seen by CDF

Viewpoints

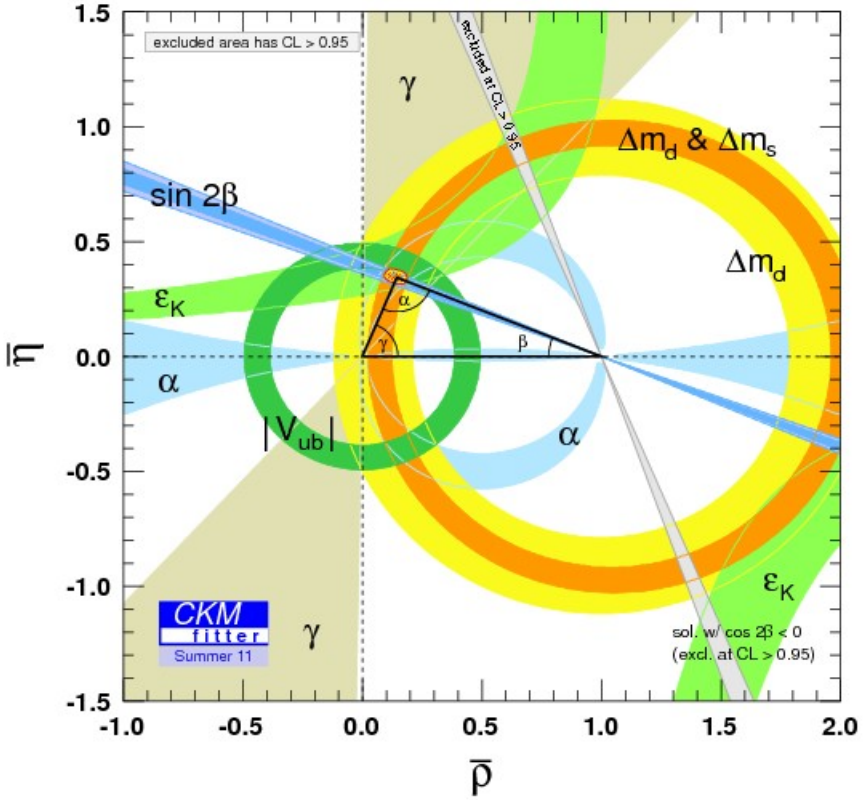


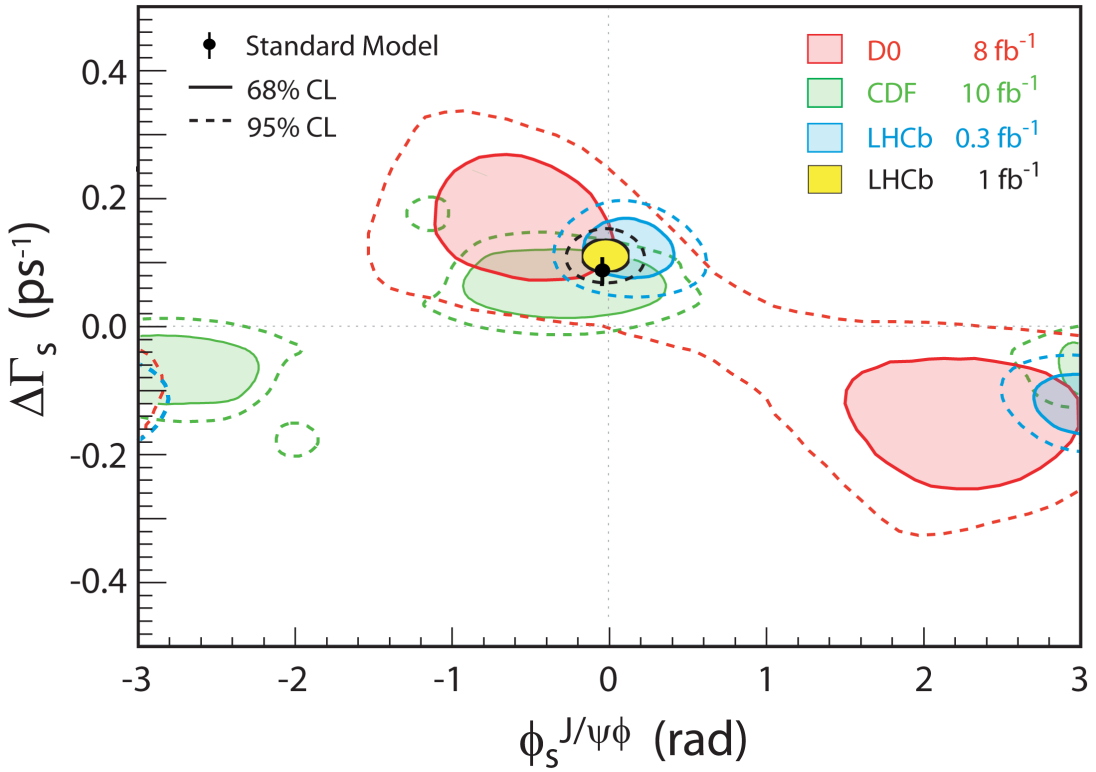
A.Lenz

G.Dissertori

H. Murayama

Beauty of confirming the SM





Finally 5σ observation of $\Delta\Gamma_s > 0$ – consistency with SM (HQE) prediction

Also τ(Bs)/τ(Bd) in SM (HQE) = 0.996 … 1.000

PDG 2012 data: (1.495 ± 0.015 ps)/(1.519 ± 0.007 ps) = 0.984 ± 0.011

Theoretical tools can be rigorously tested ↔ helps future NP searches

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Much to look forward to in 2012 and beyond

Huge potential for flavour physics at the LHC → LHCb upgrade in 2018

Standard Model @ LHC

Niels Bohr International Academy
and Discovery Center
10 - 13 April 2012

Experimental and Theoretical Results on:

QCD (soft, hard & PDFs)
Vector Boson Production
Higgs Search
Top Quark Physics
Flavour Physics

Local Organizing Committee:
Simon Badger
Alberto Guffanti
Donal O'Connell
Troels Petersen

Karl Jakobs
Frank Krauss

Thanks to the organisers
for enjoyable meeting + great hospitality!