

Implications of LHCb measurements and future prospects

Welcome and Introduction

J. Ellis, T. Gershon, G. Isidori,
G. Perez, F. Teubert, G. Wilkinson

16 April 2012

Purpose of the workshop

- Follow on from successful previous workshop, [Nov.10-11, 2011](#)
 - many new results using full 2011 1.0/fb dataset
- Satellite of series of workshops on “Implications of LHC results for TeV-scale physics” ([March 26-30 2012](#), [13-17 July 2012](#))
- Develop new ideas for future analysis
 - further refine physics case for LHCb upgrade

Structure of the workshop

- As last time, three “streams”
 - charm mixing and CP violation:
 - Silvia Borghi, Marco Gersabeck, Patrick Spradlin
 - B mixing and CP violation:
 - Angelo Carbone, Moritz Karbach, Yuehong Xie
 - rare decays:
 - Johannes Albrecht, Tom Blake, Diego Martinez Santos
- New this time
 - interplay session

09:00

Belarus
 Filimonov Plati (CPN) 09:00 - 09:30

BCPV
 Angela Caldeira, Tili Maria Kambouchi, Yurkang Shi

09:30

Interplay
 Tom Drobny, Prabhat Tiwari, Guy Wilkinson, Chris Isler, Jennifer...

Filimonov Plati (CPN) 09:00 - 09:30

09:30

BCPV
 Angela Caldeira, Tili Maria Kambouchi, Yurkang Shi

Filimonov Plati (CPN) 09:00 - 09:30

09:30

11:00

Coffee

Filimonov Plati (CPN) 10:45 - 11:00

Rare decays
 Johannes Albrecht, Thomas Walz, Diego Martinez Santos

11:00

Coffee

Filimonov Plati (CPN) 10:45 - 11:00

Rare decays
 Johannes Albrecht, Thomas Walz, Diego Martinez Santos

11:00

Coffee

Filimonov Plati (CPN) 10:45 - 11:00

Charm
 Mirza Bogdan, Marco Gonzalez, Patrick Spinelli

11:00

13:00

Filimonov Plati (CPN) 12:45 - 13:00

Lunch

13:00

Filimonov Plati (CPN) 12:45 - 13:00

Lunch

13:00

Filimonov Plati (CPN) 12:45 - 13:00

Coffee

Filimonov Plati (CPN) 12:30 - 13:00

13:00

14:00

Filimonov Plati (CPN) 13:00 - 14:00

Charm
 Mirza Bogdan, Marco Gonzalez, Patrick Spinelli

14:00

Filimonov Plati (CPN) 13:00 - 14:00

Charm
 Mirza Bogdan, Marco Gonzalez, Patrick Spinelli

14:00

Colour code

16:00

Filimonov Plati (CPN) 15:45 - 16:00

Coffee

Filimonov Plati (CPN) 15:45 - 16:00

Rare decays
 Johannes Albrecht, Thomas Walz, Diego Martinez Santos

16:00

Filimonov Plati (CPN) 15:45 - 16:00

Coffee

Filimonov Plati (CPN) 15:45 - 16:00

BCPV
 Angela Caldeira, Tili Maria Kambouchi, Yurkang Shi

16:00

Rare Decays

B CPV

Charm

18:00

Filimonov Plati (CPN) 17:45 - 18:00

Charm

Filimonov Plati (CPN) 17:30 - 18:00

18:00

Filimonov Plati (CPN) 17:45 - 18:00

18:00

Interplay

09:00

Welcome
 Filistion Plans (CPV) 09:00 - 09:30
BQV
 Angela Caldeira, Tili Maria Kebabchi, Yifeng Shi

Interplay
 Tom Drobos, Prabhat Tiwari, Guy Wilkinson, Chris Isler, Jennifer...

BQV
 Angela Caldeira, Tili Maria Kebabchi, Yifeng Shi

11:00

Filistion Plans (CPV) 09:30 - 10:00
Coffee
 Filistion Plans (CPV) 10:00 - 10:30
Rare decays
 Johannes Albrecht, Thomas Walz, Diego Martinez Santos

Filistion Plans (CPV) 09:30 - 10:00
Coffee
 Filistion Plans (CPV) 10:00 - 10:30
Rare decays
 Johannes Albrecht, Thomas Walz, Diego Martinez Santos

Filistion Plans (CPV) 09:30 - 10:00
Coffee
 Filistion Plans (CPV) 10:00 - 10:30
Charm
 Mirza Baghi, Marco Gonzalez, Patrick Spinelli

13:00

Filistion Plans (CPV) 12:30 - 13:00
Lunch

Filistion Plans (CPV) 12:30 - 13:00
Lunch

Filistion Plans (CPV) 12:30 - 13:00
Coffee
 Filistion Plans (CPV) 13:00 - 13:30

14:00

Filistion Plans (CPV) 13:30 - 14:00
Charm
 Mirza Baghi, Marco Gonzalez, Patrick Spinelli

Filistion Plans (CPV) 13:30 - 14:00
Charm
 Mirza Baghi, Marco Gonzalez, Patrick Spinelli

Colour code

16:00

Filistion Plans (CPV) 15:30 - 16:00
Coffee
 Filistion Plans (CPV) 16:00 - 16:30
Rare decays
 Johannes Albrecht, Thomas Walz, Diego Martinez Santos

Filistion Plans (CPV) 15:30 - 16:00
Coffee
 Filistion Plans (CPV) 16:00 - 16:30
BQV
 Angela Caldeira, Tili Maria Kebabchi, Yifeng Shi

Rare Decays

18:00

WELCOME DRINK!
 Filistion Plans (CPV) 18:30 - 19:00

Filistion Plans (CPV) 18:30 - 19:00

B CPV

Charm

Interplay

Outcome of the workshop

- Work has started to prepare a document that will serve as basis for input to the European Strategy Preparation Group
- Emphasise the potential for flavour physics (*) at the LHC, and the need to exploit fully all opportunities provided by the machine
 - (*) not only flavour! Unique kinematic region accessed by LHCb
- Your input to this document very welcome
 - please contact the session organisers, who are also responsible for editing the relevant sections
 - ... otherwise, expect that they may contact you
 - N.B. timescale to prepare the document rather short

Latest results

- Previous meeting was characterised by
 - excellent talks
 - lively discussion
 - excitement over new results (charm ΔA_{CP})
- We hope for the same this time
 - several anomalies squashed by LHCb results, but new ones emerge ...

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

- $(g-2)_\mu$
- $\Sigma^+ \rightarrow p\mu^+\mu^-$ (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)
- $A_1(B \rightarrow K^{(*)}\mu^+\mu^-)$ (BaBar, Belle & CDF hints)
- $\Delta A_{CP}(D \rightarrow KK, \pi\pi)$

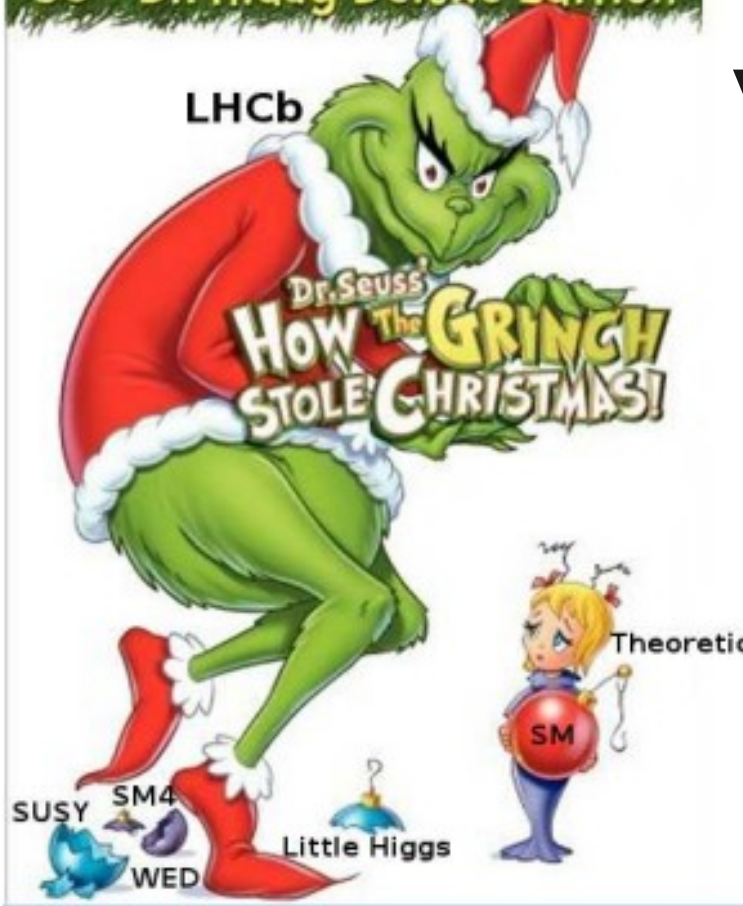
tension with $B(B_s \rightarrow \mu^+\mu^-)$

consistent with SM so far
consistent with SM so far
stay tuned ...

consistent with SM so far
stay tuned ...
also seen by CDF

50th Birthday Deluxe Edition

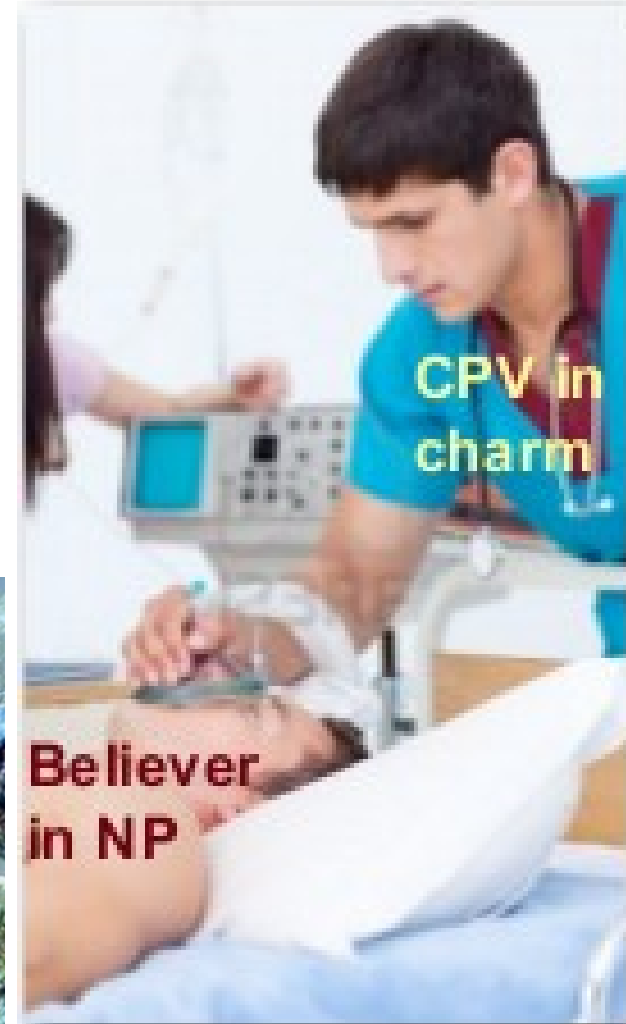
LHCb



Viewpoints



G.Dissertori



A.Lenz



H. Murayama

Outcome of the workshop

- Work has started to prepare a document that will serve as basis for input to the European Strategy Preparation Group
- Emphasise the potential for flavour physics (*) at the LHC, and the need to exploit fully all opportunities provided by the machine
 - (*) not only flavour! Unique kinematic region accessed by LHCb
- Your input to this document very welcome
 - please contact the session organisers, who are also responsible for editing the relevant sections
 - ... otherwise, expect that they may contact you
 - N.B. timescale to prepare the document rather short
- **Hope for some analogies with some better films!**