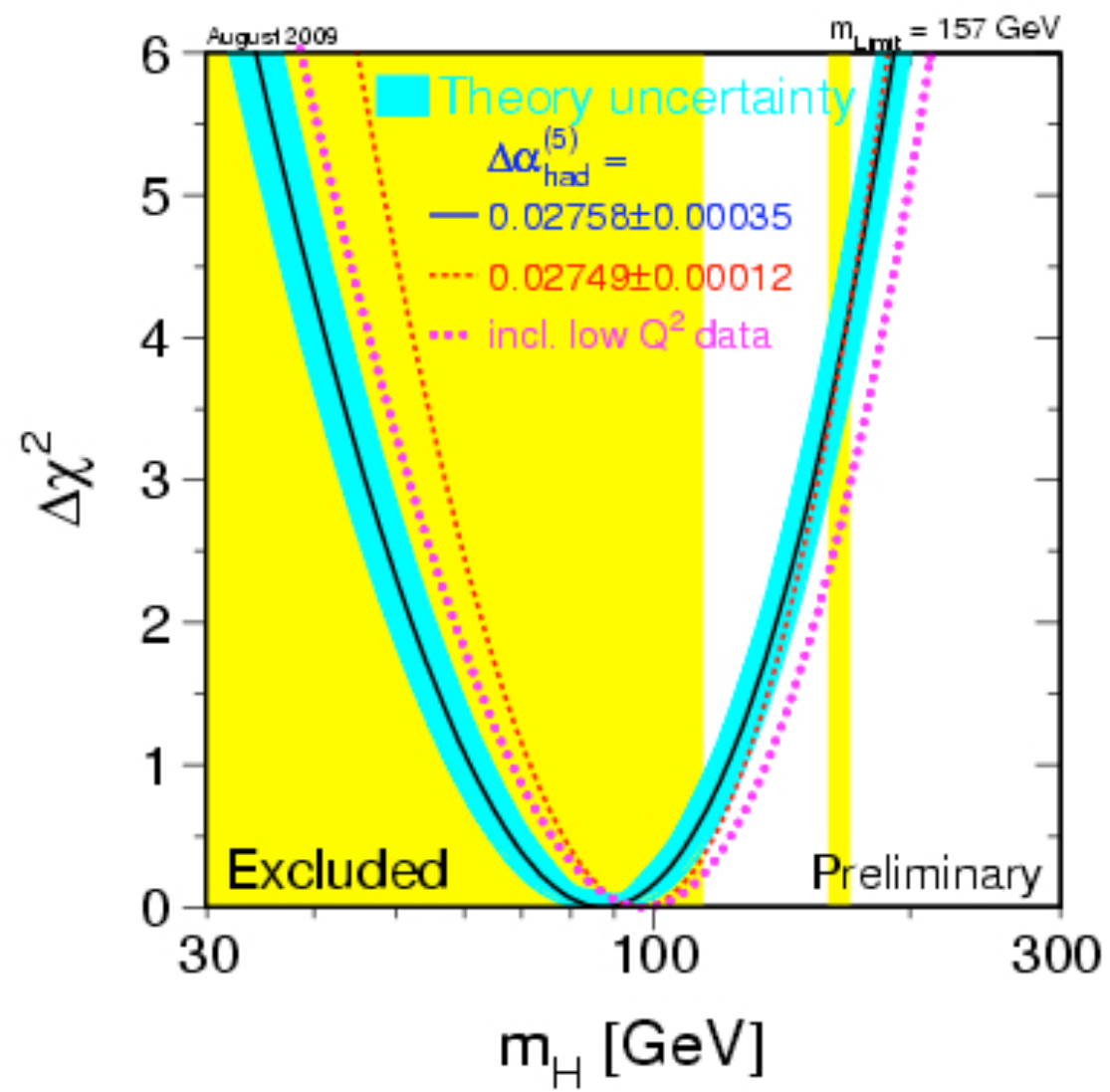
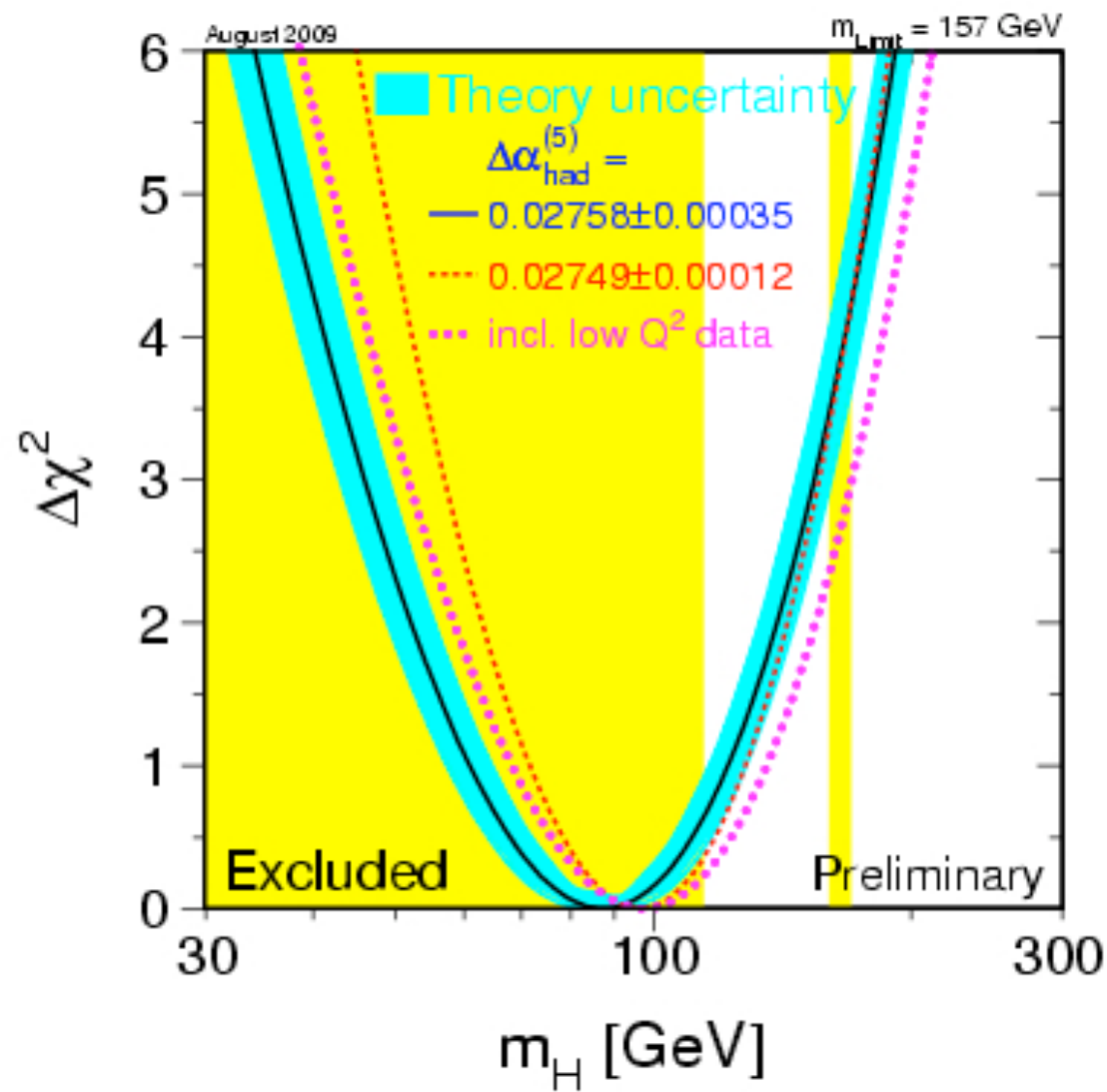


# SUMMARY

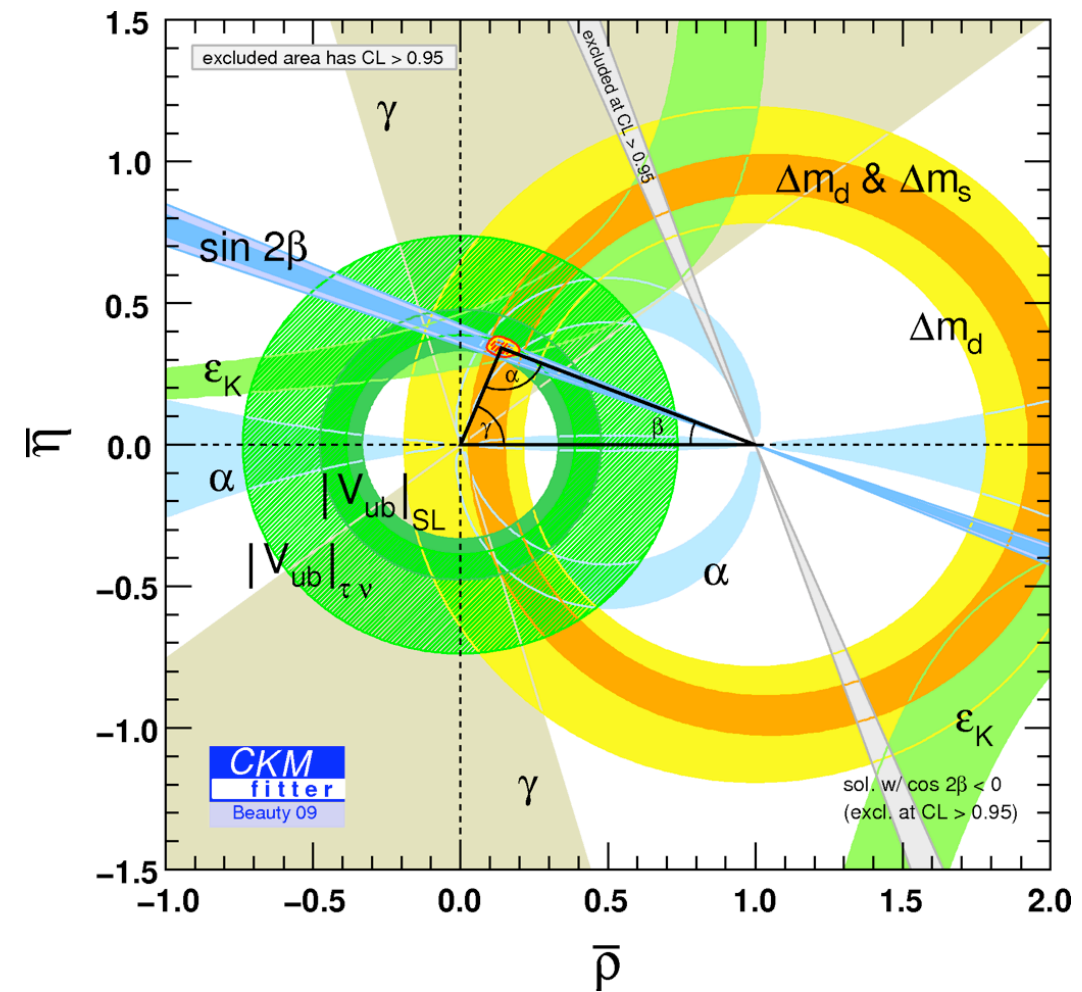
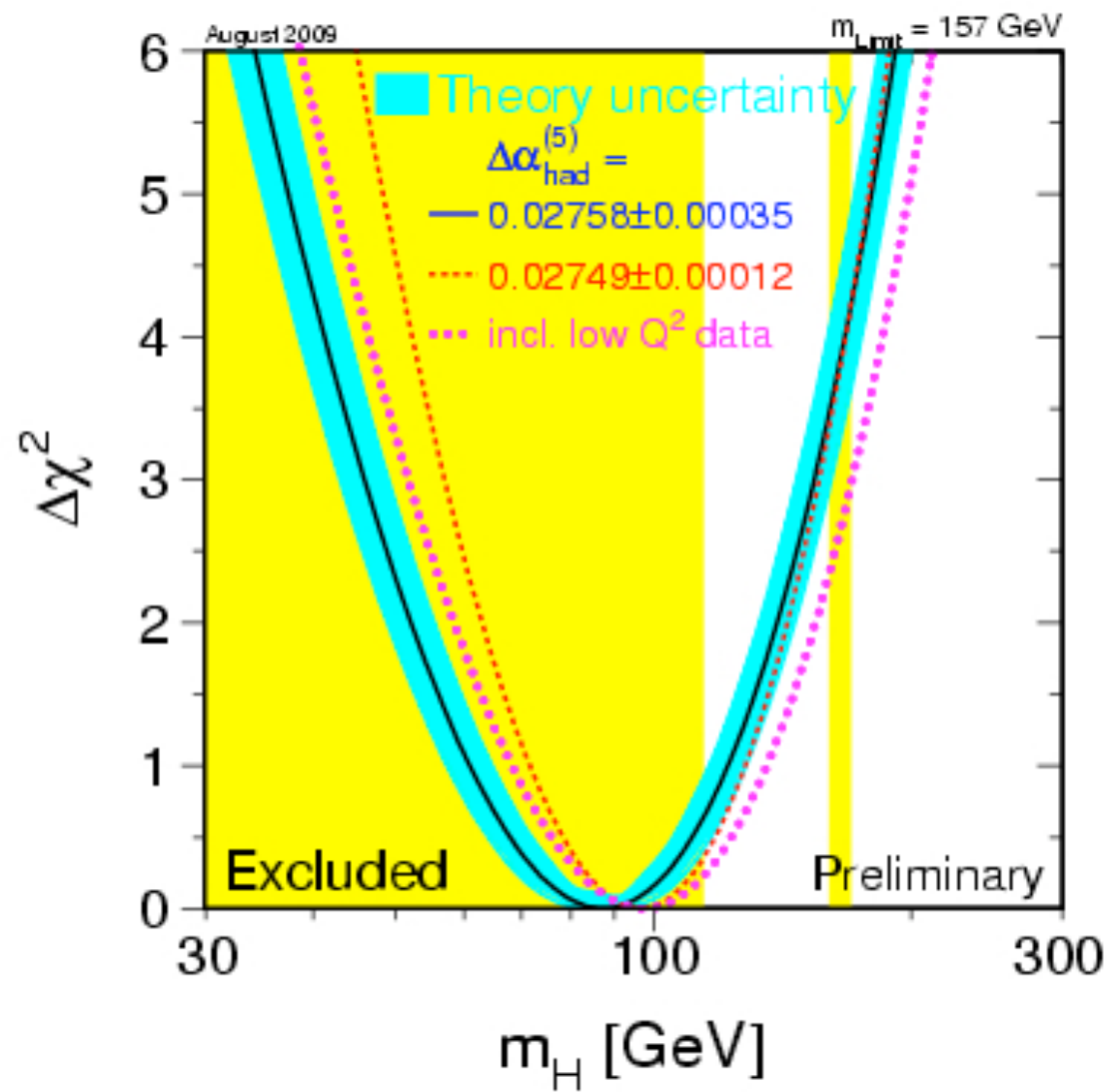
Thomas Mannel,  
Univ. of Siegen



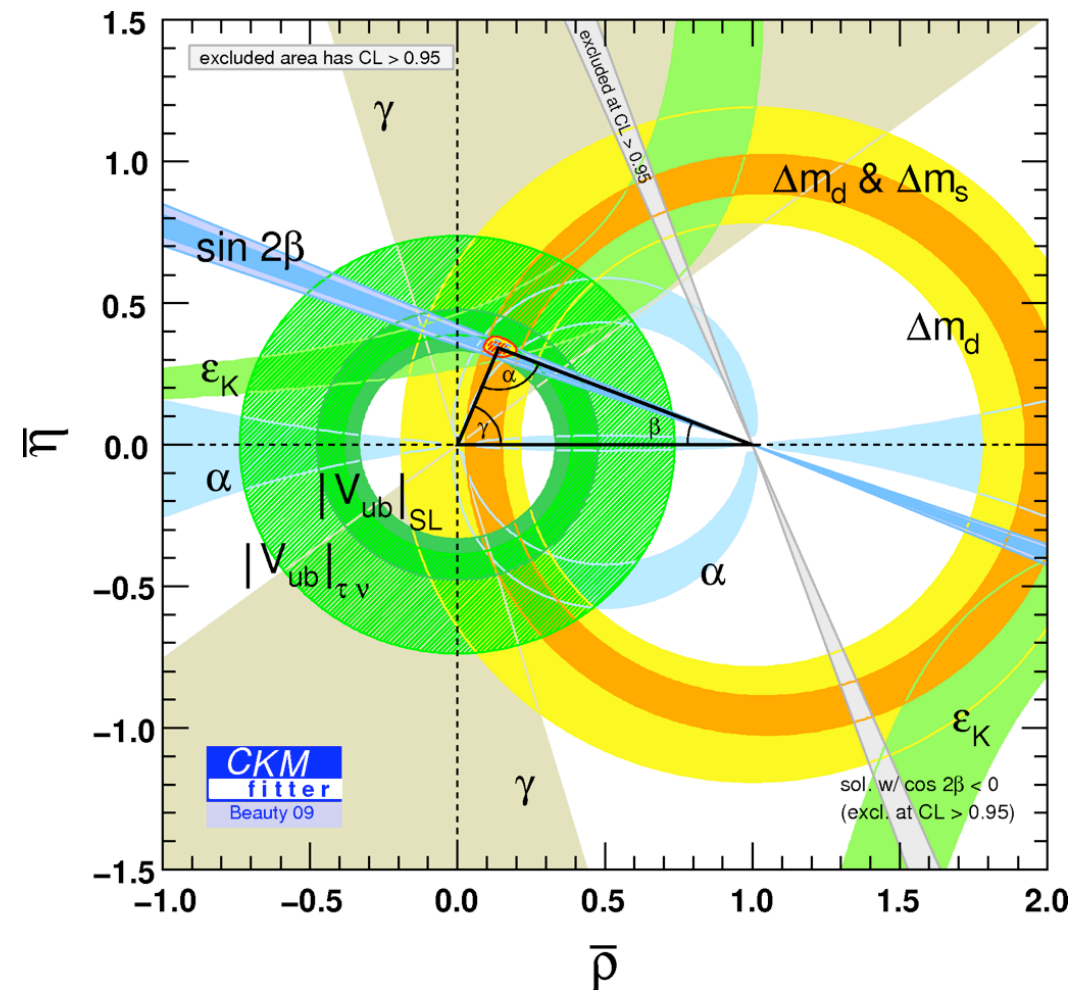
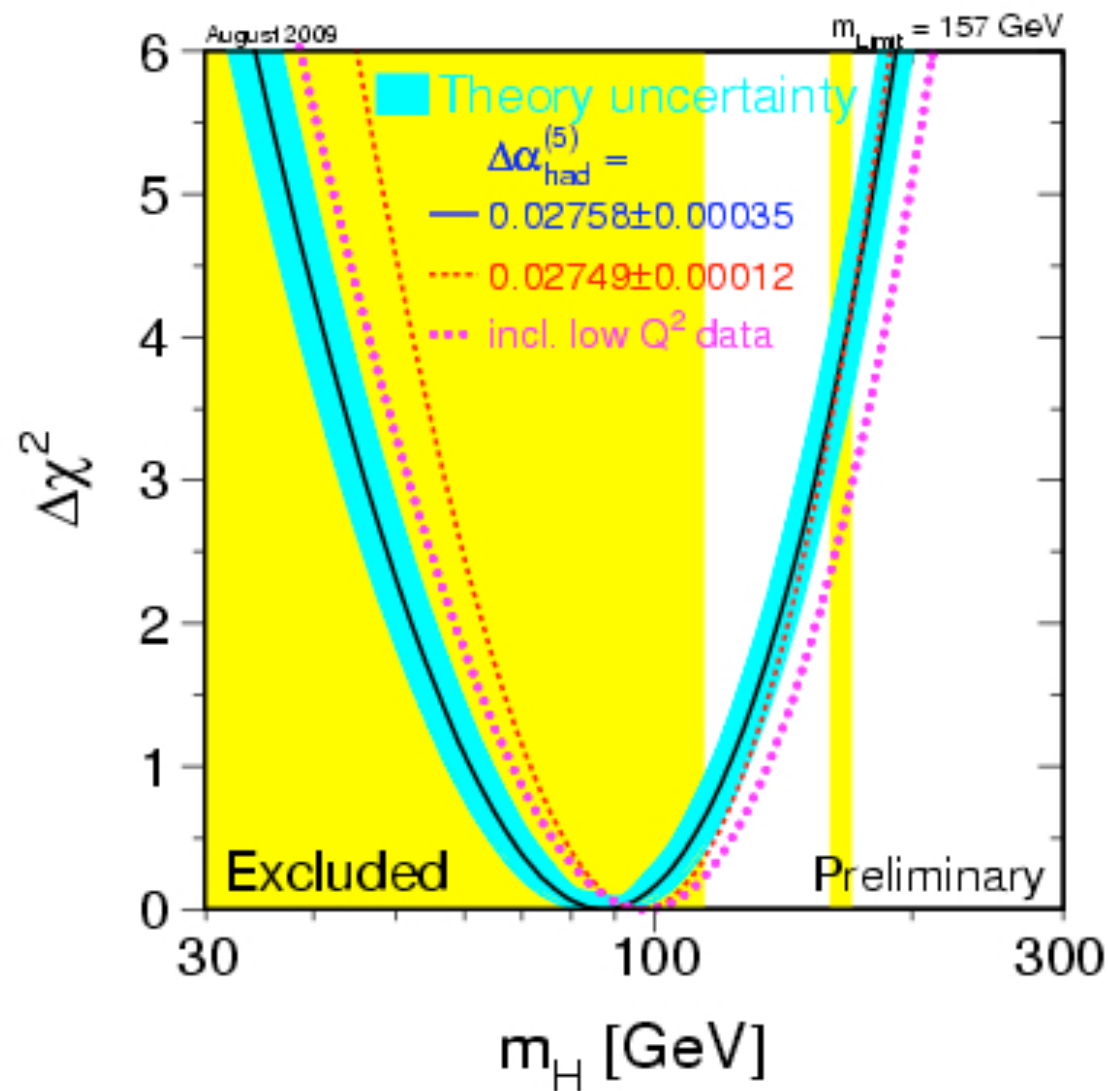




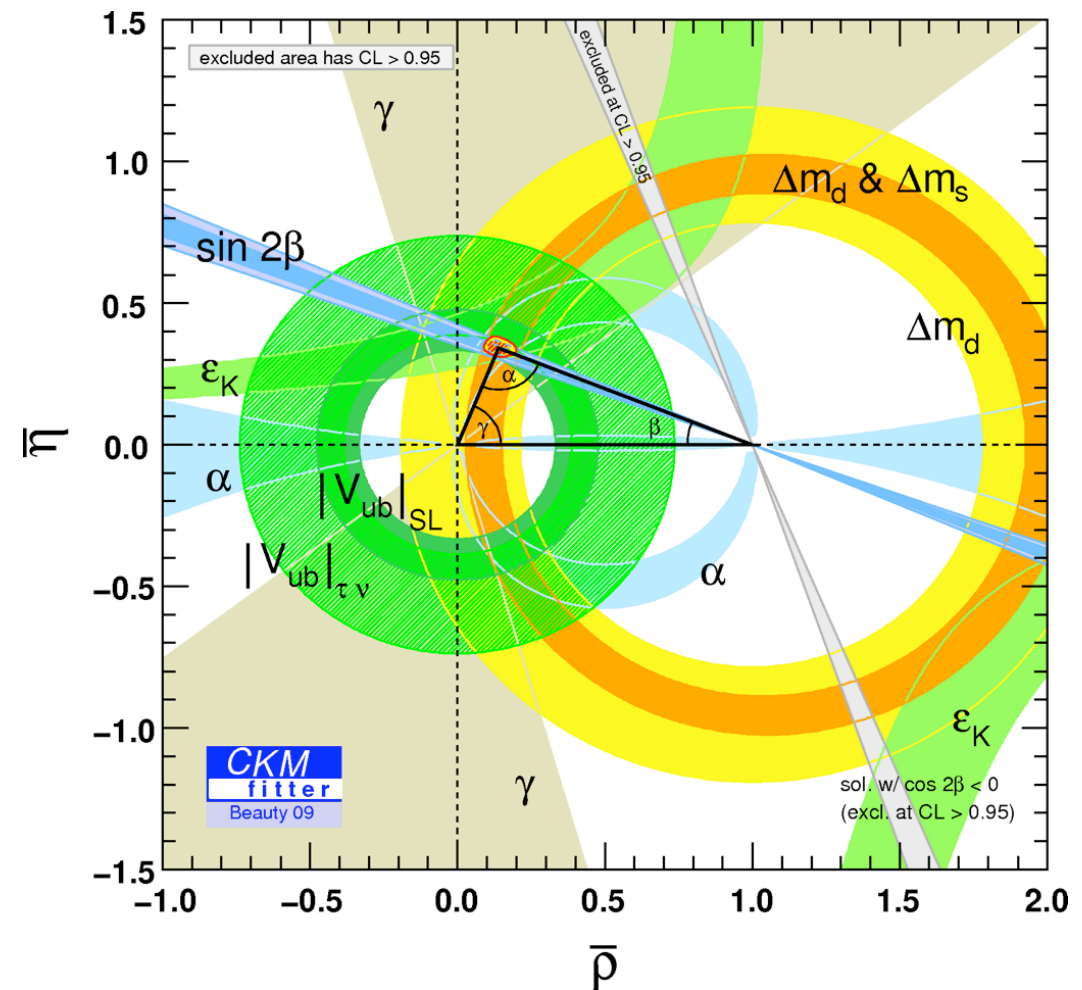
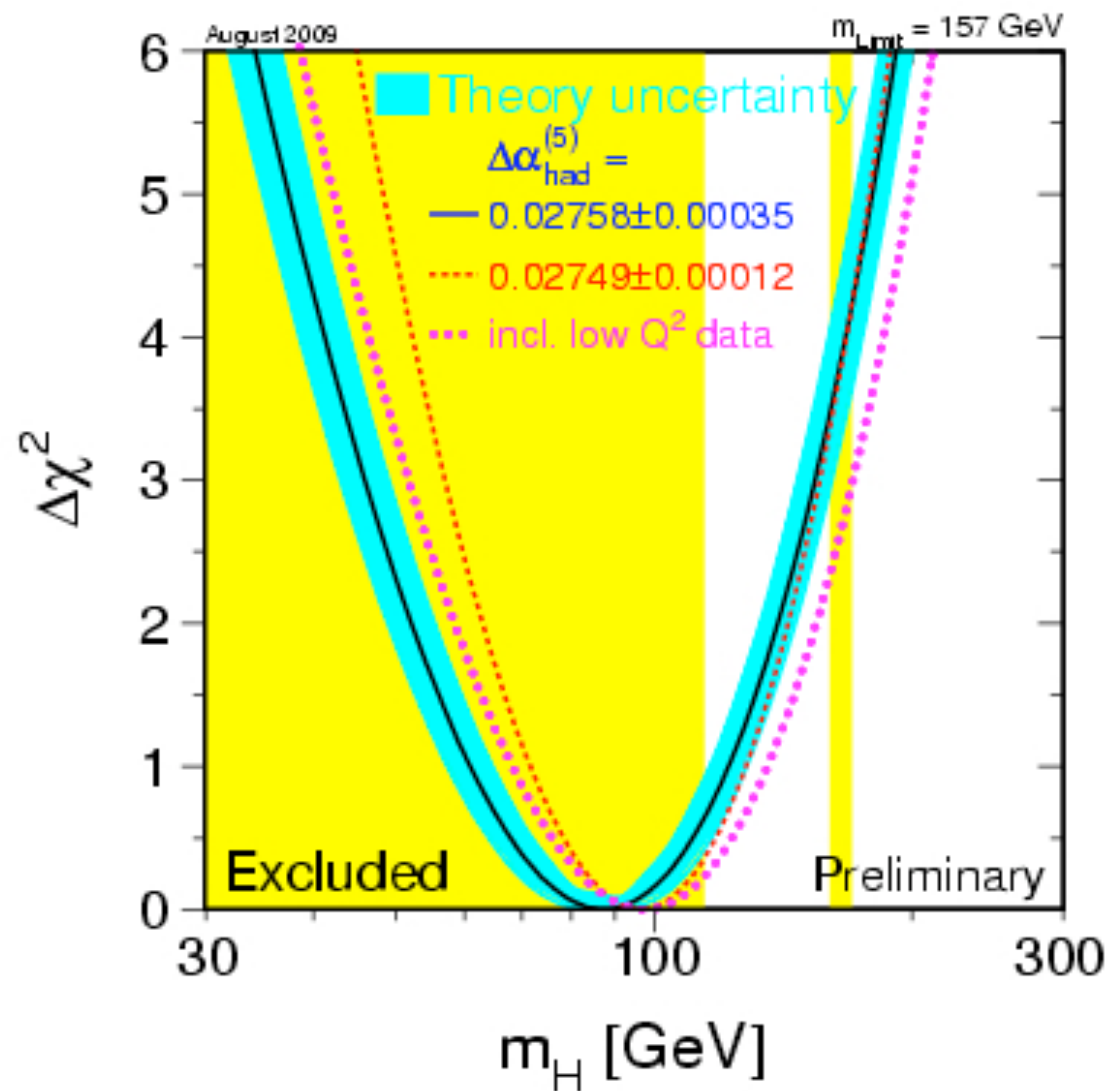
- LEP (and others) have tested the gauge structure of the Standard Model



- LEP (and others) have tested the gauge structure of the Standard Model



- LEP (and others) have tested the gauge structure of the Standard Model
- The B Factories have tested the Flavour Structure of the Standard Model



- LEP (and others) have tested the gauge structure of the Standard Model
- The B Factories have tested the Flavour Structure of the Standard Model
- Good Motivation for a Summary



# The plan ....

## Contents

|   |            |
|---|------------|
| <b>The facilities</b>   | <b>1</b>   |
| 1 The B-factories . . . . .                                   | 1          |
| 2 The detectors and collaborations . . . . .                  | 21         |
| <b>Tools and methods</b>                                      | <b>43</b>  |
| 3 Flavor tagging . . . . .                                    | 43         |
| 4 Vertexing . . . . .   | 65         |
| 5 Recoil $B$ -meson reconstruction . . . . .                  | 74         |
| 6 Multivariate discriminants . . . . .                        | 94         |
| 7 Maximum likelihood fitting . . . . .                        | 112        |
| 8 Dalitz analysis . . . . .                                   | 127        |
| 9 Analysis optimization . . . . .                             | 142        |
| 10 Blind analysis . . . . .                                   | 149        |
| <b>The results and their interpretation</b>                   | <b>158</b> |
| 11 $B$ -physics . . . . .                                     | 158        |
| 11.1 $V_{ub}$ and $V_{cb}$ . . . . .                          | 158        |
| 11.2 $V_{td}$ and $V_{ts}$ . . . . .                          | 180        |
| 11.3 $\phi_1$ . . . . .                                       | 194        |
| 11.4 $\phi_2$ . . . . .                                       | 218        |
| 11.5 $\phi_3$ . . . . .                                       | 229        |
| 11.6 Radiative and electroweak penguin decays . . . . .       | 251        |
| 11.7 Leptonic decays . . . . .                                | 268        |
| 11.8 Hadronic $B$ to charm decays . . . . .                   | 294        |
| 11.9 Charmless $B$ decays . . . . .                           | 318        |
| 11.10 Baryonic $B$ decays . . . . .                           | 340        |
| 11.11 Mixing, $CPT$ violation, and EPR correlations . . . . . | 357        |
| 12 Quarkonium physics . . . . .                               | 369        |
| 12.1 Conventional charmonium . . . . .                        | 369        |
| 12.2 Exotic charmonium-like states . . . . .                  | 387        |
| 12.3 Bottomonium . . . . .                                    | 412        |
| 13 Charm physics . . . . .                                    | 440        |
| 13.1 $D$ -mixing and $CP$ violation . . . . .                 | 440        |
| 13.2 Charmed meson spectroscopy and decays . . . . .          | 467        |
| 13.3 Charmed baryon spectroscopy and decays . . . . .         | 483        |
| 14 Tau physics . . . . .                                      | 499        |
| 15 QED and initial state radiation studies . . . . .          | 524        |
| 16 Two-photon physics . . . . .                               | 541        |
| 17 $\Upsilon(5S)$ physics . . . . .                           | 558        |
| 18 QCD-related physics . . . . .                              | 577        |
| 18.1 Fragmentation . . . . .                                  | 577        |
| 18.2 Pentaquark searches . . . . .                            | 595        |
| 19 Global CKM fits . . . . .                                  | 614        |

- already written, so you can all go home
- set up in three unequal parts:
  - The facilities
  - Tools and methods
  - The results and their interpretation
- Tools ... divided into  $\approx$  equal chapters: methods and tools that are used across more than one field
- Results divided into very unequal chapters
  - “natural” divisions of the physics
  - overlaps and cross-references are foreseen
- {chapter,section} editors
- The division is a straw man: we will iterate as a result of discussion








- This has been a productive workshop
- Discussions highlighted the need to have small modifications of the straw man plan
- Setting up a style guide
  - Some decisions on style to be blessed by the collaborations
  - Hypernews accounts working
  - Start of a collaboration in the experimental community

# Role of theorists

- Give some help to sort out the theoretical input
- Find the balance in cases where strong theoretical opinions exist
- In practical terms:
  - Contact theory colleagues to give some theoretical guidance
  - Write some paragraphs with theoretical background information

# Timeline of the project

- 
- October 2009: 1<sup>st</sup> meeting to launch the project.  


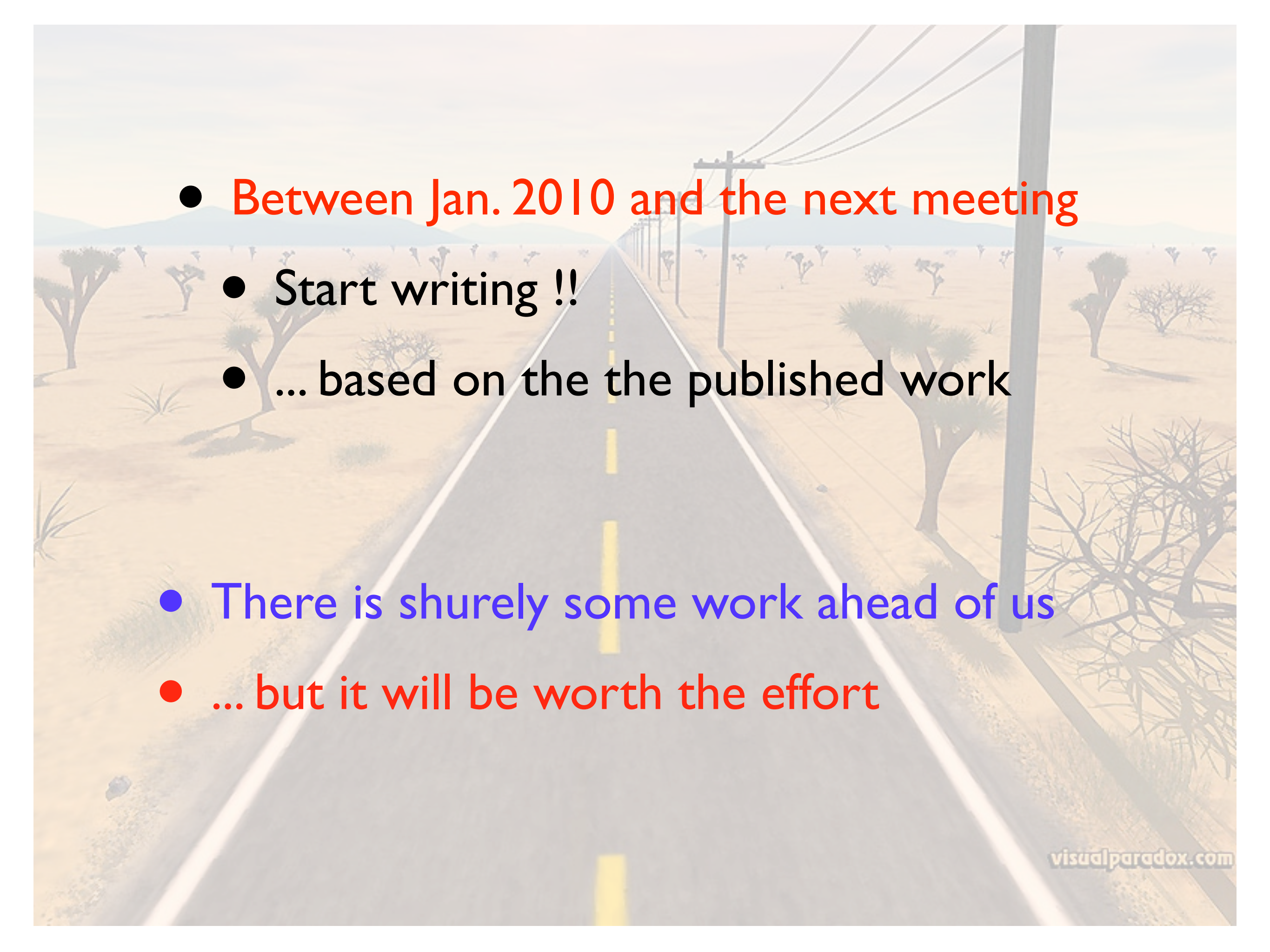
Develop a detailed plan for the content of the book and inter-relations between sections. Also deploy a style guide and lines of communication.
  - January 2010: Start writing.
    - Many results are already finalised.
    - Many results are still being worked on.
      - We hope these will be finalised during the writing of the book.
    - Are there results that are not being worked on that would be desirable to complete for the Legacy Book?
      - Part of the homework given to section editors...
  - December 2011: Finish writing.  


Final Proof Reading Stage During the last 6 months.
  - Mid 2012: publish the book.

# Next steps

- Between now and the end of the year:
  - Finalizing the style guide
  - Activation of the SLAC accounts for the contributors
  - SVN repository and LaTeX Templates set up
  - Complete the web page
  - Refining and freezing the skeleton, in particular resolve the identified overlaps
  - Define the subsections (Section Editors)
  - Phone meetings of the co-editors



- 
- Between Jan. 2010 and the next meeting
    - Start writing !!
    - ... based on the the published work
  - There is shurely some work ahead of us
  - ... but it will be worth the effort



# Thanks to ...

- Sarodia and Donna
- SLAC Computing
- SLAC for the hospitality
- Convenors and Sumary SPeakers