



The Project Status & Goals

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QMUL September 13, 2011

1st SuperB Collaboration Meeting

Outline

- Since Elba 2011



- Progress on Consortium
- Summer Conferences

- Next steps and goals

- On Consortium
- On Physics
- TDR

Consortium

End July 2011-

The INFN Board of Directors and independently the University of Tor Vergata have approved the Consortium :

Laboratorio N. Cabibbo (Cabibbo Lab).

Site of Consortium is Tor Vergata.

Goal: Build the SuperB accelerator and host the HEP experiment and the S R facilities on site.

Consortium

Consortium is the temporary legal entity of Cabibbo to evolve into a ERIC.

Cabibbo Lab Consortium has ordinary members and associate members. All members participate to the Consortium assembly, only ordinary members can vote.

Organs of Cabibbo Lab are: Director General, Scientific and Technical committee, Finance advisory Committee.

Director General and Area Directors are forming the Directorate. One INFN designated person is also attending the Directorate meetings.

The four areas are: Accelerator, Science, Light and Administration & Finance.

The approval of Consortium by the Minister of Research is expected soon.

The we can start to be operational in the construction phase .

Summer Conferences

THE GLORIOUS TRIUMPH

of the

Standard Model

Summer Conferences

LHC is performing very well

AS THE

EXPERIMENTS

Summer Conferences

The Higgs mass seems
confined in a corner at low
energy.

Between 115 and 140 GeV

Summer Conferences

The Higgs mass is
confined in a narrow range at low
energy

As Expected in SM

Between 115 and 140 GeV

Peskin – Conclusion Talk @LP11

Already, early in the LHC experimental program, we have tantalizing hints of a Higgs boson at a mass of about 140 GeV. Both experiments see small excesses consistent with this hypothesis.

ATLAS and CMS expect that a Higgs boson of mass 140 GeV can be discovered (5σ) with 5 fb⁻¹ of data. That should be achieved this year.....

..... ATLAS and CMS have added a **broad exclusion** of the SM Higgs boson covering most of its mass range. **Either** ATLAS **or** CMS excludes the SM Higgs at 95% conf. for **all** masses in the range

~~45~~ GeV – ~~46~~ GeV except 288 GeV – 296 GeV

Thus, there is strong evidence that either

the Higgs boson is light, consistent with precision electroweak predictions, and with theoretical prejudice

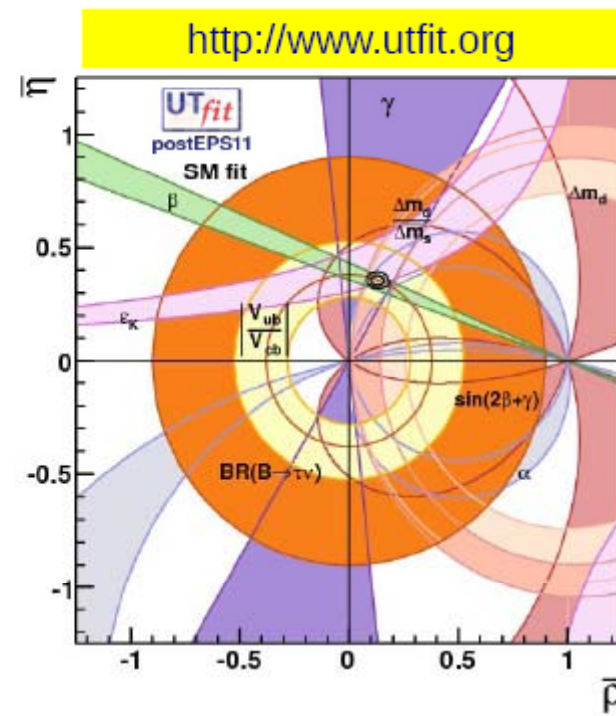
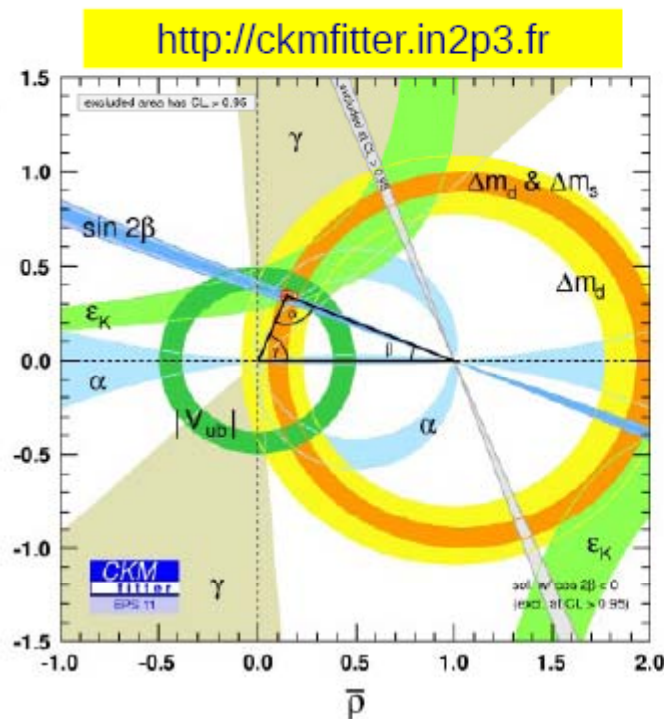
or, **the Higgs boson is very heavy** and strongly self-coupled

Low mass ($< 1\text{TeV}$) Super Symmetric particles have not been seen by LHC experiments.

Need to look at higher mass scale.

Triumph of CKM from LHCb data

Good agreement no evident discrepancy or “tension”, even with different statistical analysis



$$\bar{\rho} = 0.144^{+0.027}_{-0.018} \text{ (CKMfitter)} = 0.132 \pm 0.020 \text{ (UTfit)}$$

$$\bar{\eta} = 0.343 \pm 0.014 \text{ (CKMfitter)} = 0.353 \pm 0.014 \text{ (UTfit)}$$

T.Gershon @LP11

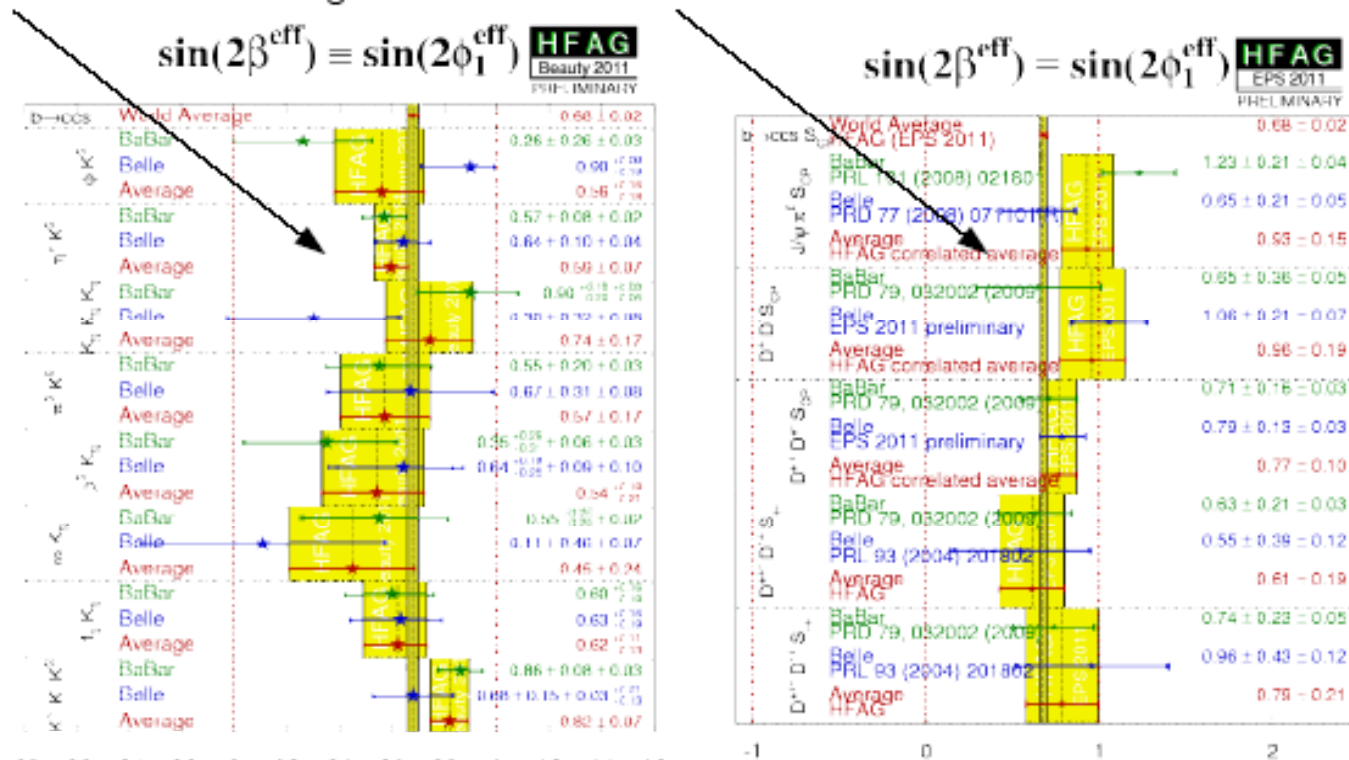
Penguins vs. Tree

T.Gershon @LP11

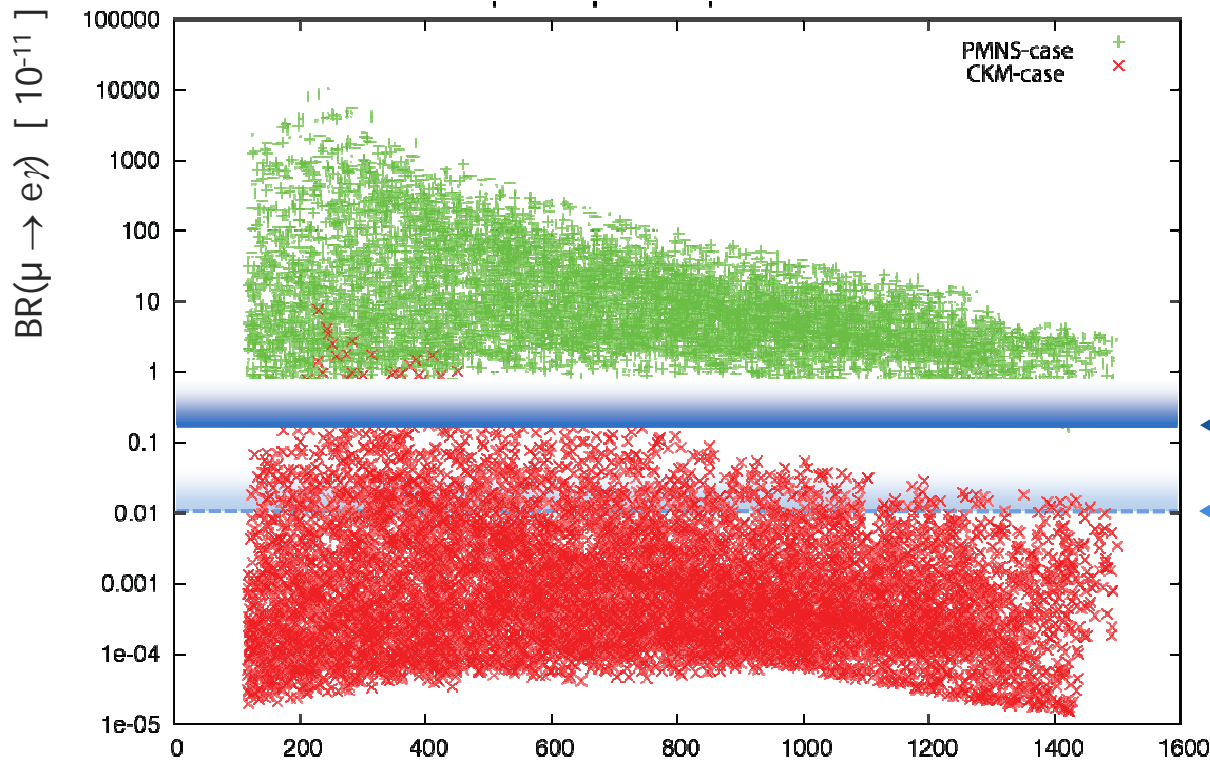
Initial discrepancies diminished

Compare $b \rightarrow c\bar{c}s$ transitions (e.g. $B^0 \rightarrow J/\psi K_S$) with

$b \rightarrow s\bar{s}s$ (e.g. $B^0 \rightarrow \eta' K_S$), $b \rightarrow c\bar{c}d$ (e.g. $B^0 \rightarrow D^+ D^-$), or $b \rightarrow c\bar{u}d$ (e.g. $B^0 \rightarrow D_{CP} \pi^0$)



MEG results



Interpretation in terms of SUSY-GUT SO(10) MSUGRA models:

- CKM case: min. mixing
- PMNS case: max. mixing

← MEG 2009+2010

← MEG 2009-2012

90% CL (Feldman-Cousins) upper limit:

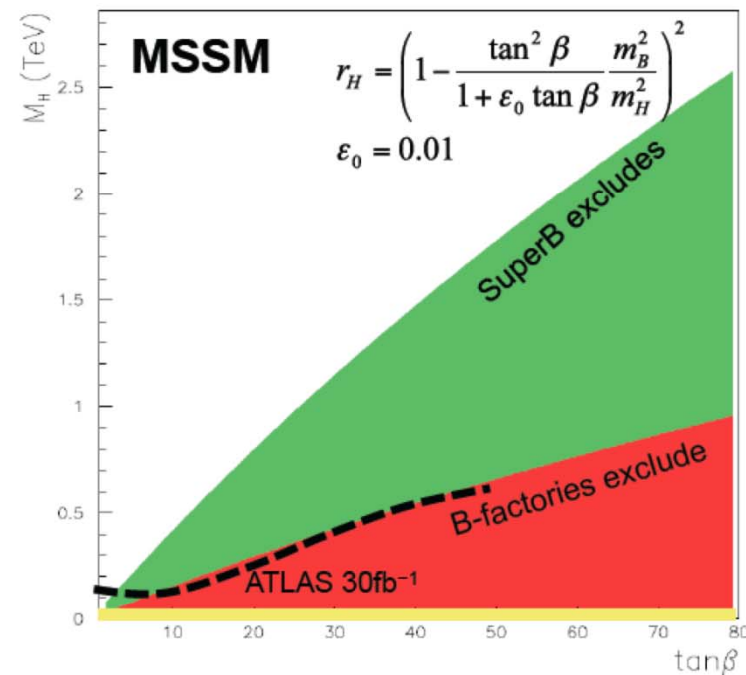
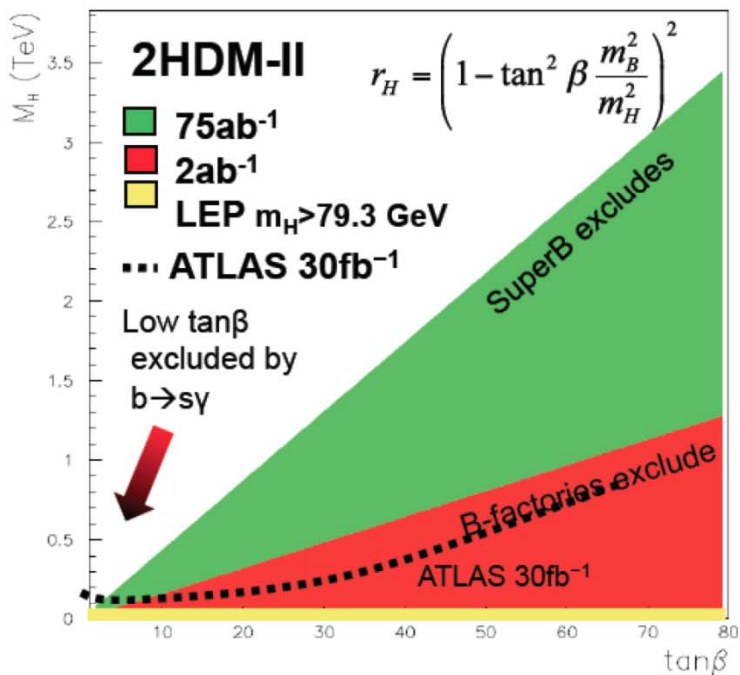
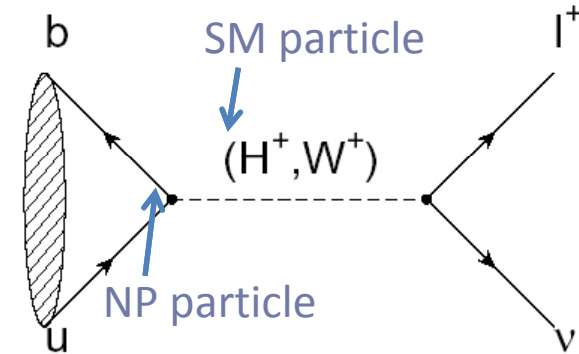
$$BR(\mu^+ \rightarrow e^+ \gamma) < \begin{cases} 2.4 \cdot 10^{-12} & \text{(observed)} \\ 1.6 \cdot 10^{-12} & \text{(expected for no signal)} \end{cases}$$

$B_{u,d}$ physics: Rare Decays still there!

- Example: $B^\pm \rightarrow \tau^\pm \nu$

– Rate modified by presence of H^+

$$r_H = \frac{\mathcal{B}_{SM+NP}}{\mathcal{B}_{SM}}$$



Next steps

Consortium, after the Minister approval :

- move to filling boxes with names
- Recruit people for accelerator/infrastructures
- Widen the membership (es: IIT + other partners.....)

Next steps -Physics

Revisit the physics case on the basis of 2011 results. Push on Tau and Charm (Mind the charm threshold workshop in Beijing –October2011), prepare ad hoc topical preprints.

Sharpen on B physics the potentiality of SuperB to explore high mass scale through insertions, already in the white paper and in the other SuperB physics documents.

Focus the attention of December 11-12 physics workshop our potentiality compared with LHC/LHCb results of summer 2011 conferences.

Next steps -Physics

Keep active and consolidate our physics organization with the successful cooperation of theorists and experimentalists.

Evaluate the possibility of 2 workshops in a year (winter and summer) for updating physics with reports.

Start the preparation of the Physics Book .

Adrian, Marco and John will keep the community informed.

Next steps -Physics

We are not aiming to a Physics TDR.

A Physics introduction to the Detector TDR is however useful and needed.

In addition a clear explanation of the Physics motivation of the particular accelerator choices (polarization, possibility of running at tau-charm threshold) is also needed in the Accelerator TDR.

Goals of the week

The SuperB Governance Committee is in place, it is chaired by F.Ferroni and will meet here.

La lista del Gov. Comm. e' la seguente:

ferroni@roma1.infn.it, Francesco.Forti@pi.infn.it,
kravchen@slac.stanford.edu, Livio.Lanceri@ts.infn.it,
leith@SLAC.Stanford.EDU, mauro.morandin@pd.infn.it,
[moneymoney@uvic.ca](mailto:money@uvic.ca), smithajs@Princeton.EDU,
stocchi@lal.in2p3.fr, F.F.Wilson@rl.ac.uk

They received the charge that was circulated and endorsed by the Steering Committee and they will meet today at 17.00.

Charge of the SuperB Detector Collaboration Governance Committee

The Governance Committee shall propose to the SuperB Detector Collaboration the Constitution of the collaboration, to be ratified by the assembly of the Collaboration PIs (proto-council).

The Constitution will define the governance structure and the by-laws of the collaboration. The development of this Constitution should take full advantage of the broad experience that the international HEP community has developed with many similar successful endeavors world-wide, in particular with the BaBar collaboration.

The committee should also take into consideration the specific environment that the Detector Collaboration will have to work within. For the short term this means the Cabibbo Laboratory and its internal management structure defined by the Consortium. Later, the Consortium may evolve into a European Research Infrastructure Consortium, (ERIC) with its own structure and rules. It is vital that the Cabibbo Laboratory and the SuperB Detector Collaboration work together smoothly and effectively. Therefore, the Governance Committee must establish and maintain, in its activity, permanent contacts with the Cabibbo Laboratory management.

The Committee should aim at producing the first draft of this Constitution before the SuperB December collaboration meeting.

The Committee should also propose a minimal set of by-laws for the operation of the proto-council by the September collaboration meeting to be adopted and followed until the final Constitution gets approved.

Goals of the week

The proto Collaboration council will meet tomorrow and will start approving its rules, moving toward a “normal “ Council operation.

Goals of the week: DETECTOR

The most relevant activity of the week, and this is the main reason why we are convened here (accelerator is not present), is devoted to the Detector for the TDR preparation.