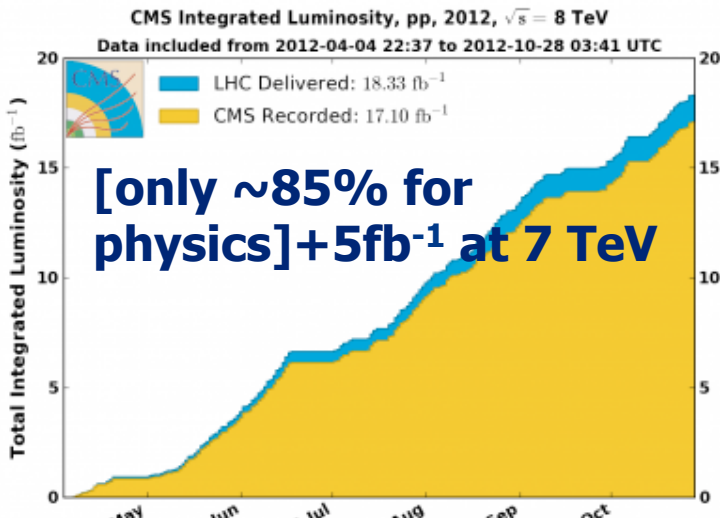




Calendar



CMS:

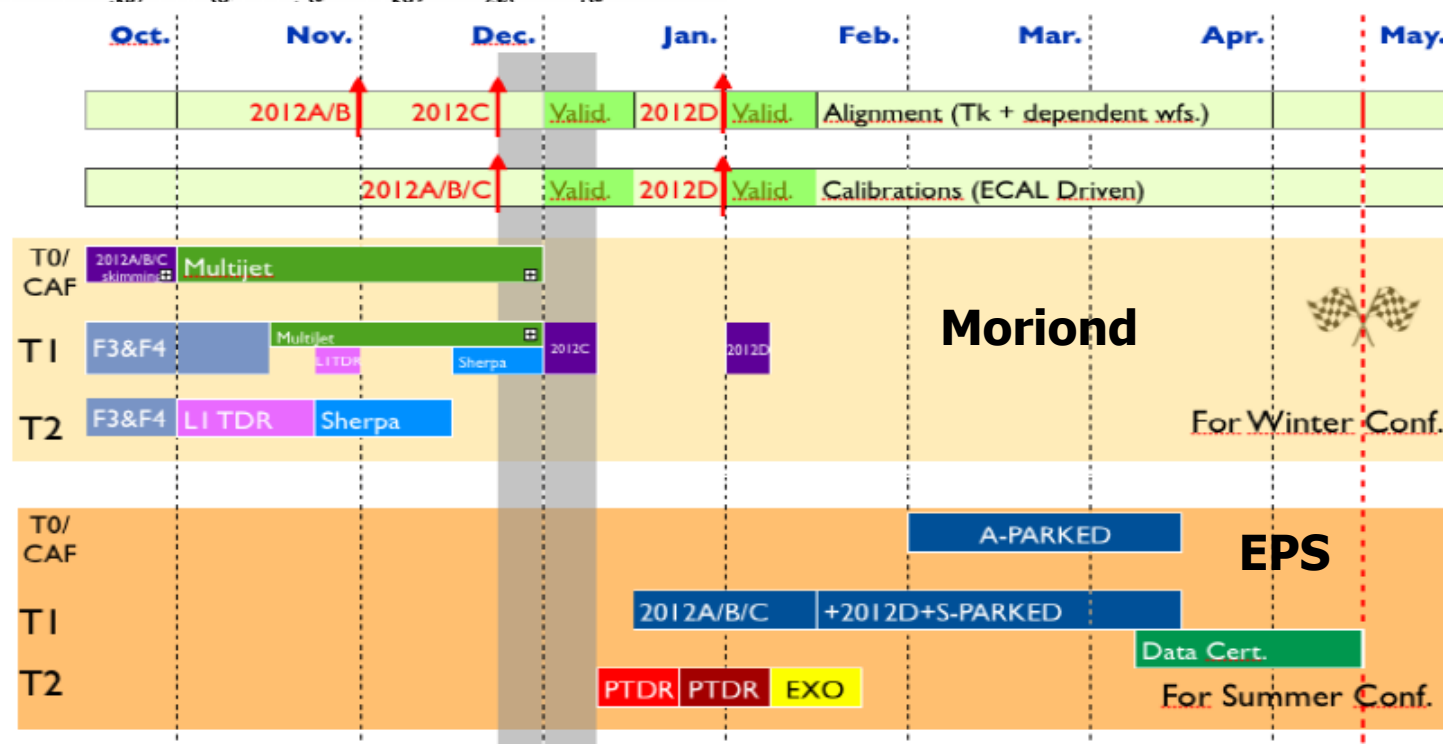
Stop pp data taking: 17December 2012

“Restart data taking”: 5 November 2014

[Normally end of data taking 1st December 2014]

Restart collisions April 2015

End of Jose thesis: 31st October 2015



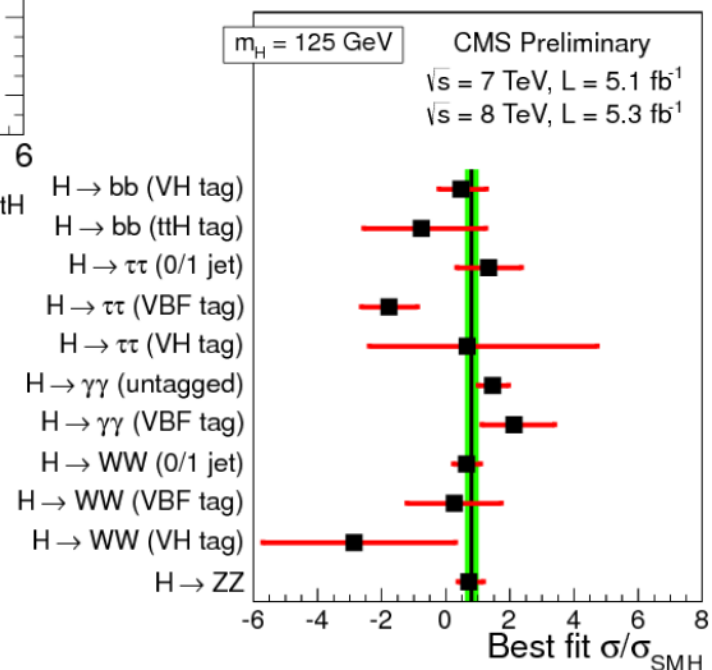
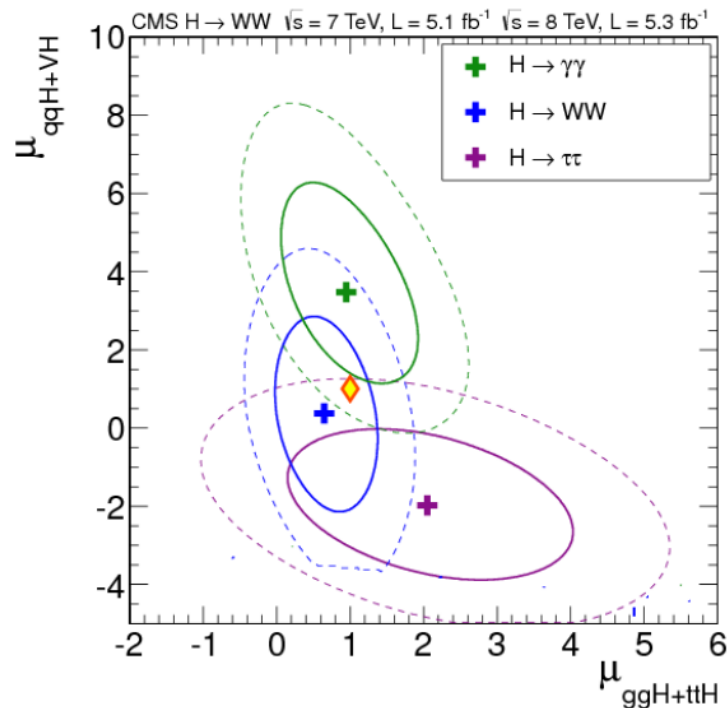


New Boson Status

2D compatibility for $\sigma/\sigma_{\text{SM}}$

Allow separate scaling for the ggH and the VBF+VH cross sections.

Compared to the 1D plots in previous slide, takes into account signal contamination in the various final state topologies.



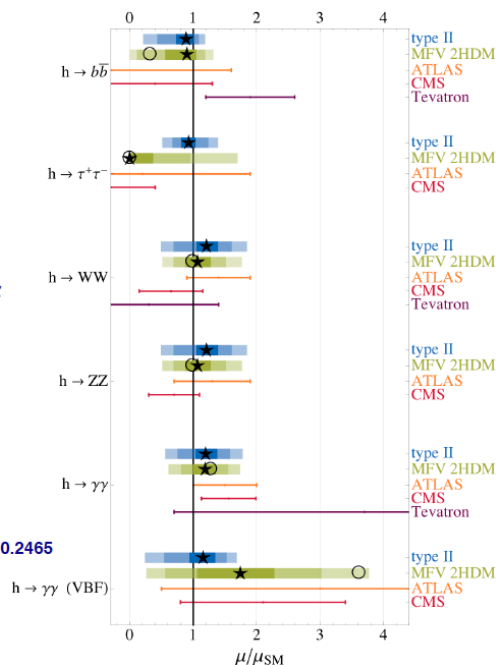


Discussion CMS - Theory

Another example: a Minimal Flavor Violating 2 Higgs Doublet Model

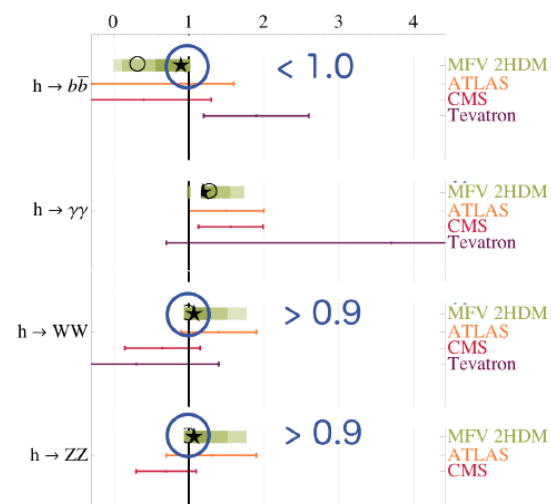
Compared to usual 2HDM, $H_{\tau\tau}$ tends to be suppressed, and $H_{\gamma\gamma}$ enhanced

W. Altmannshofer, S. Gori, G. Kribs, arXiv:1210.2465



There are correlations that make narrow predictions once you determine, e.g. that

$$\sigma \times \text{BR}(h \rightarrow \tau\tau) > 1.2$$



By the end of 2012, will probably be able to rule out (using HZZ) that the Higgs-like boson is a pure pseudoscalar

Scenarios where the Higgs is a CP mixture are important: could be telling you e.g. about baryogenesis

Suppose your boson is 80% scalar and 20% pseudoscalar – what happens in HZZ?

- Extracted signal strength tells you that something is wrong, but not what
- Study of the 4-lepton decay amplitude can tell you the answer, but it is a small effect

There are already 562 theory papers discussing the possibility that the Higgs is our only unsuppressed direct portal to the dark sector

via the coupling $H^\dagger H \phi^\dagger \phi$

If ϕ gets a vev, it mixes with the Higgs

If ϕ is light, the Higgs decays into it

How much can CMS results say ultimately about the Higgs portal?



What are the plans...

For 2013 and beyond: Not too much yet in Exotica/Beyond Two Generations/Susy

Exotica 2012:

Search for LQ with top+tau pairs: $LQ3 \rightarrow \text{top} + \text{tau}$

Search for LQ3 with b+tau: $LQ3/\text{stop} \rightarrow \text{b} + \text{tau}$

Stopped Particles

ST scaling in l+jets: Model-independent search in events with lepton+jets using ST scaling

Susy:

Light Stop searches



What are the plans...

B2G:

Name	Code	Data
Search for t' pair production in the dilepton channel	B2G-12-001	2012
t' dilepton Rel. to Analysis: EXO-11-050	Search for massive vector-like quarks coupling to light quarks	B2G-12-016
Search for baryon-number violating top decays into 2 jets and 1 lepton	search for vector-like top partners in pair and single production, where $QQ, Qq \rightarrow q'V$ (no b-quarks in final states) Notes	2012
baryon number violation in top decays Rel. to Analysis: EXO-11-078 Notes	Search for top quark partners with kinematic reconstruction in si ...	B2G-12-017
Search for a heavy partner of the top quark with charge 5/3	vector-like t' pair production search including mass reconstruction, in lepton+jets	2012
Search for $T5/3$ pairs Rel. to Analysis: EXO-11-085 Notes: AN-2011/41	Search for vector-like top quark partners produced in association ...	B2G-12-018
Search for b' pair production in the lepton + jets channel	vector-like t' pair production search with explicit Higgs boson reconstruction including for example $H \rightarrow \gamma \gamma$	2012
Journal: JHEP $b' \rightarrow tW$ with one lepton only Rel. to Analysis: EXO-11-086	Search for vector-like bottom quark partners in single-lepton fin ...	B2G-12-019
Search for $tt\bar{b}$ resonances in boosted all-hadronic final state	vector-like b' pair production search in l+jets	2012
$Z'(tt\bar{b})$ in all-hadronic channel for 8 TeV data Rel. to Analysis: EXO-12-040	Search for bottom quark partners in multi-lepton final states	B2G-12-020
Search for $tt\bar{b}$ resonances in semileptonic final state	search for vector-like b' pair production in di/tri lepton final states	2012
$Z'(tt\bar{b})$ in semileptonic channel for 8 TeV data Notes: AN-2012/277	Search for a vector-like bottom quark partner decaying to bZ	B2G-12-021
Search for $tt\bar{b}$ resonances in dileptonic final state	search for vector-like b' pair production, bump hunt in $b+Z$ spectrum	2012
$Z'(tt\bar{b})$ in dileptonic channel for 8 TeV data	Search for new physics in single top + missing transverse energy ...	B2G-12-022
Search for pair production of new physics resonances decaying to ...	monotop search	2012
Excited tops to top + jet, RPV sbottom to top + jet Notes: AN-2012/280	Search for baryon-number violating top decays into 2 jets and 1 lepton	B2G-12-023
Search for $t + b$ resonances in all-hadronic final state	BNV tops in $tt \rightarrow blbjj$ final states	2012
W' to $t+b$, boosted all-hadronic with 8 TeV data	Search for displaced tops from stop and bottom	B2G-12-024
Search for $t + b$ resonances in leptonic final state	Search for displaced top quarks that can arise from various natural and less-than-natural SUSY models	2012
W' to $t+b$, leptonic final state with 8 TeV data	Model Independent Search for Resonances with Top Quarks in 2D Mas ...	B2G-12-025
Search for $tt\bar{b}$ events with small MET		NONE
Search for anomalous $tt\bar{b}$ events with small MET using novel kinematic reconstruction techniques		
Search for $T5/3$ top partners in same-sign di-lepton final state	B2G-12-012	2012
Search for $T5/3$ top partners in same-sign di-lepton final state		
Inclusive search for top-quark partners in the all hadronic final ...	B2G-12-013	2012
All-hadronic final state with substructure techniques and b-tagging.		
Search for pair production of new physics resonances decaying to ...	B2G-12-014	2012
Excited tops to top + jet, RPV sbottom to top + jet in the lepton+jets channel		
Inclusive search for top partners in single- and multiple-lepton ...	B2G-12-015	NONE
Single- and multiple-lepton final states with BDT techniques		