

Discussion on “Prospects Run 2 and Beyond”

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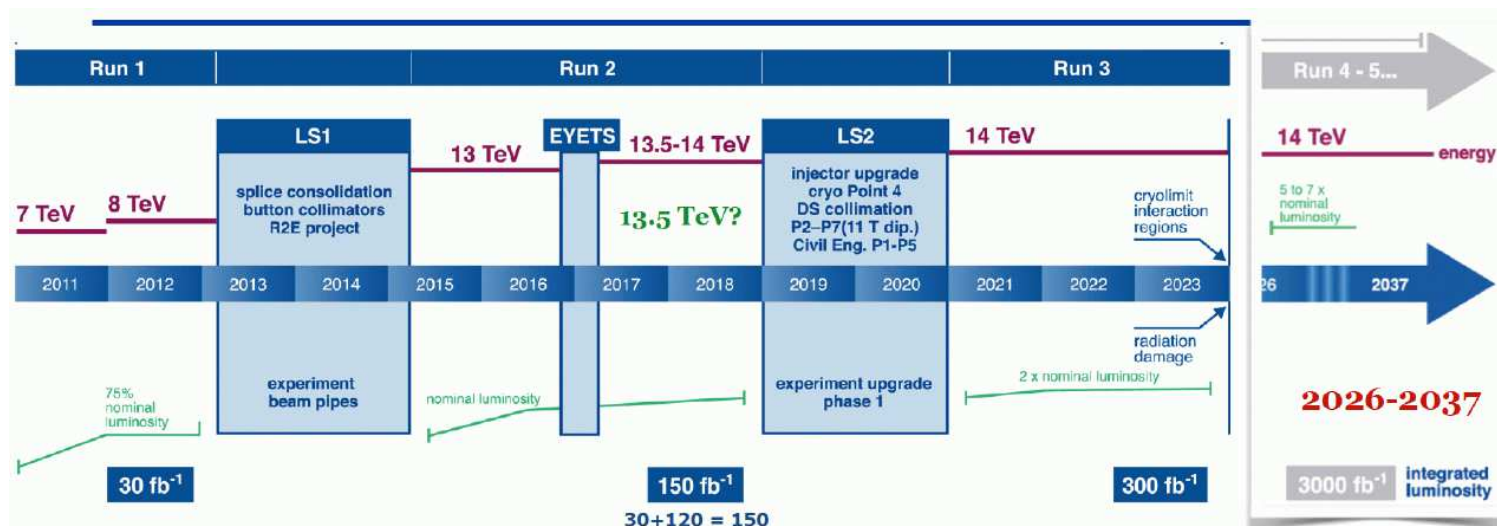
Paris, 09/2016

⇒ no full ATLAS – CMS comparison ...

⇒ just three (personally biased) examples ...

⇒ What do we want? Is it worth it?

Perhaps slightly provocative ... :-)



SM Higgs couplings:

$\kappa_W, \kappa_Z, \kappa_t, \kappa_b, \kappa_\tau, \kappa_\gamma, \kappa_g$:

End of Run 3 (300 fb⁻¹): 5-15% uncertainty on couplings
HL-LHC (3000 fb⁻¹): 4-8% uncertainty on couplings

⇒ no really strong improvement ...

⇒ do we expect new physics here?

Anomalous couplings:

Generic amplitude of $H \rightarrow ZZ$ for spin-0 particle can be written as:

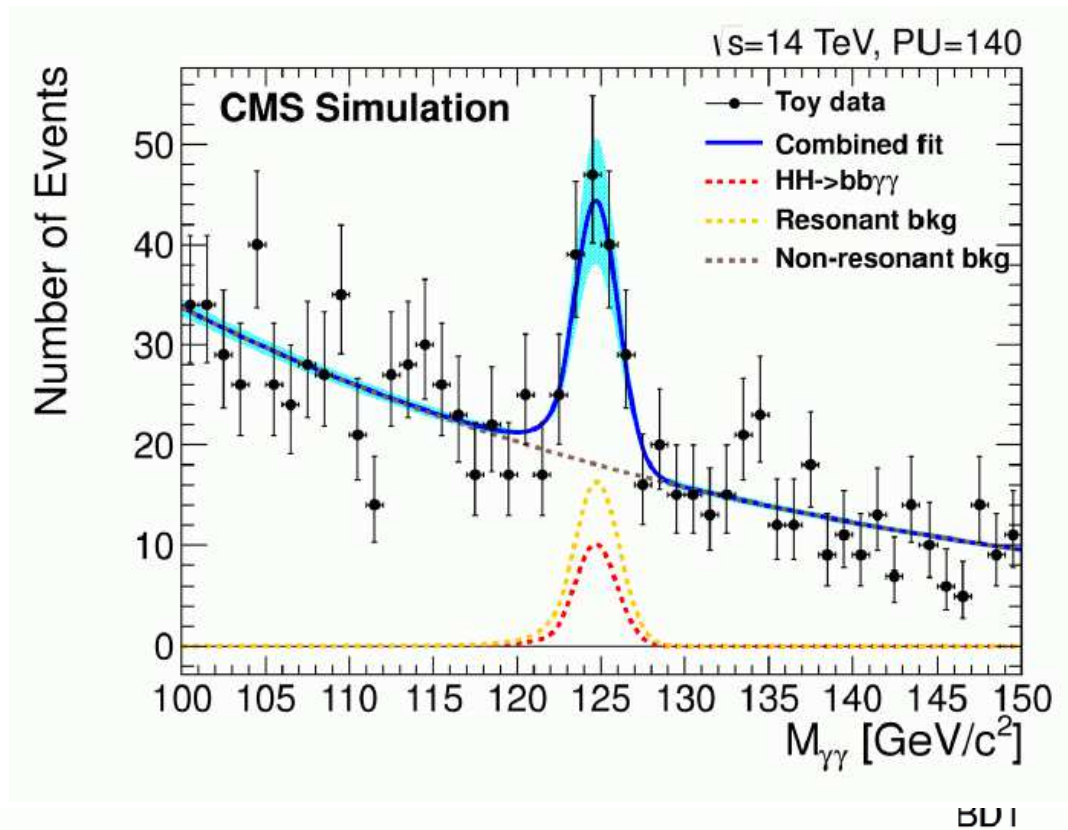
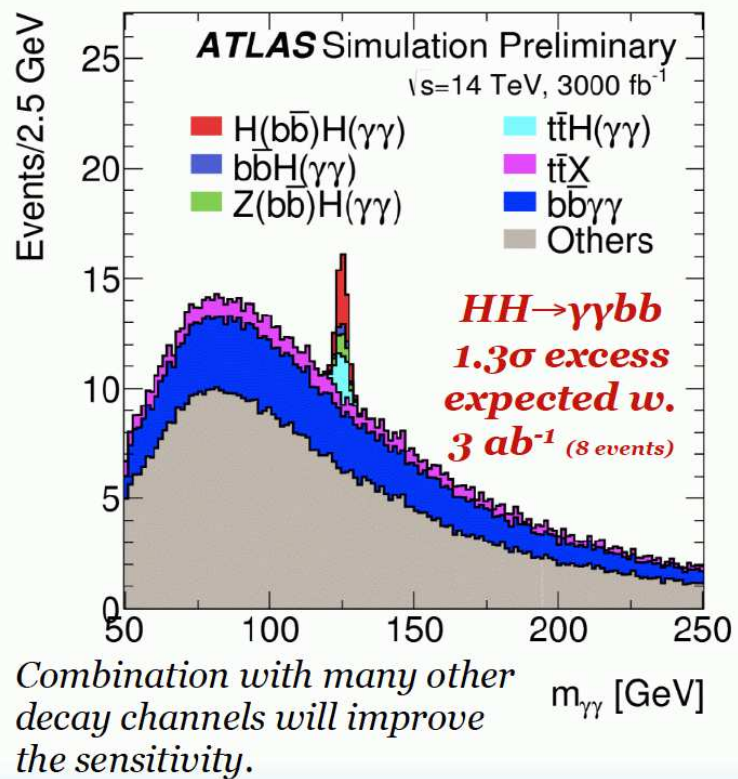
$$A(\text{HVV}) \sim \left[a_1^{\text{HVV}} + \frac{\kappa_1^{\text{HVV}} q_{V_1}^2 + \kappa_2^{\text{HVV}} q_{V_2}^2}{(\Lambda_1^{\text{HVV}})^2} \right] m_{V_1}^2 \epsilon_{V_1}^* \epsilon_{V_2}^* + a_2^{\text{HVV}} f_{\mu\nu}^{*(1)} f^{*(2)\mu\nu} + a_3^{\text{HVV}} f_{\mu\nu}^{*(1)} \tilde{f}^{*(2)\mu\nu}$$

Can test for **anomalous CP-odd coupling a_3**

→ Expect to constrain fraction $f_{a_3} < 0.13$ (0.04) 95% CL with 300 fb⁻¹ (3000 fb⁻¹)

⇒ we do not expect new physics here!

SM HHH coupling:



BDI

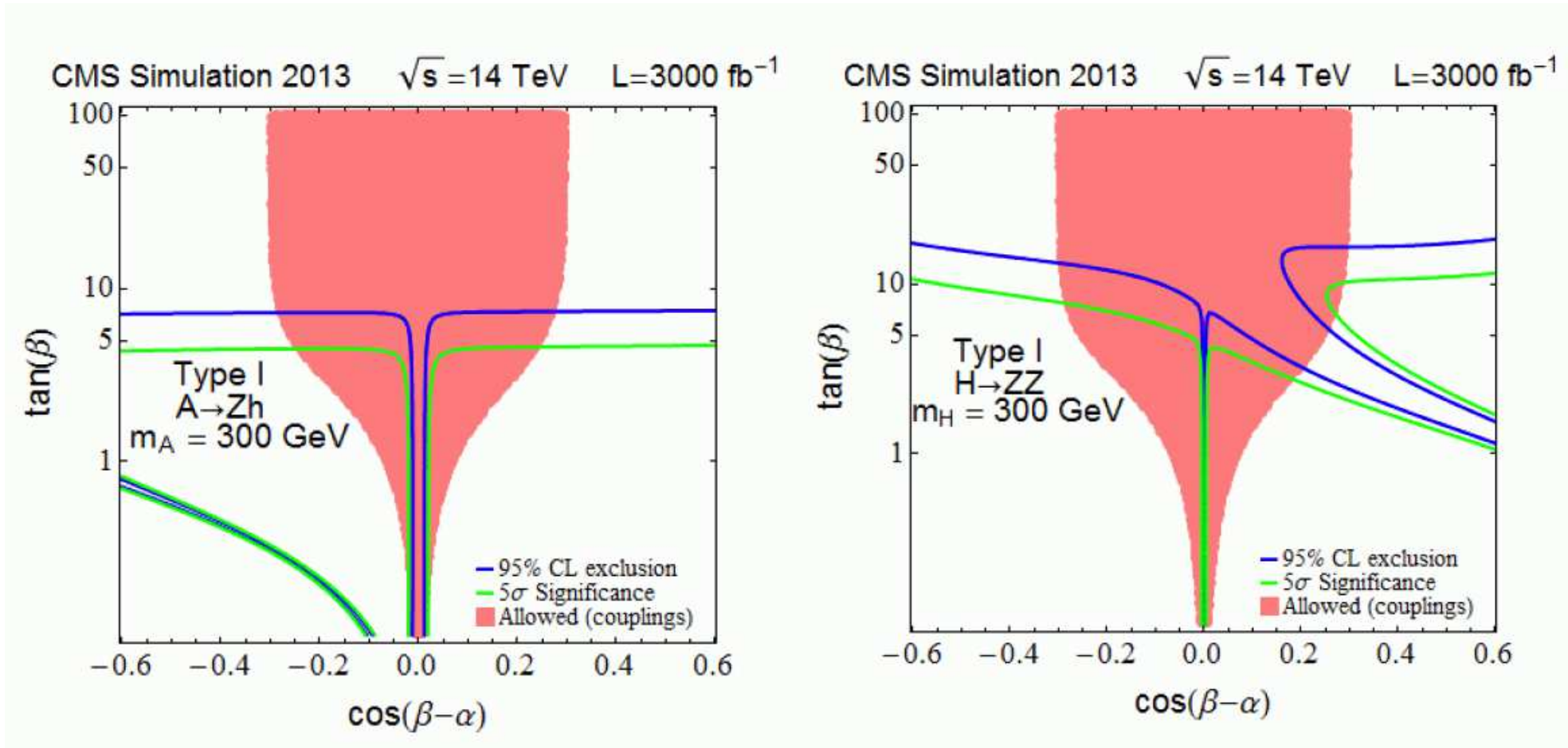
HL-LHC (3000 fb^{-1}): $\sim 2\sigma$ significance, $\sim 54\%$ unc. on cross section

Many other channels available, hopefully can have 3σ evidence in CMS alone

⇒ Compatible?

⇒ Expectations believable?

BSM Higgs searches



\Rightarrow large areas remain unexplored ...

\Rightarrow what can be done to improve this?