Higgs production at the LHC: an update

Higgs production at the ℓHC:

- $\sqrt{s} = \epsilon \times 14$ TeV, $0 \lesssim \epsilon \lesssim 1$,
- latest PDFs, m_t value,
- include recent HO results,
- evaluate theory uncertainties,
- prospects at ℓHC as $f(\mathcal{L})$,
- "check" Tevatron bounds...

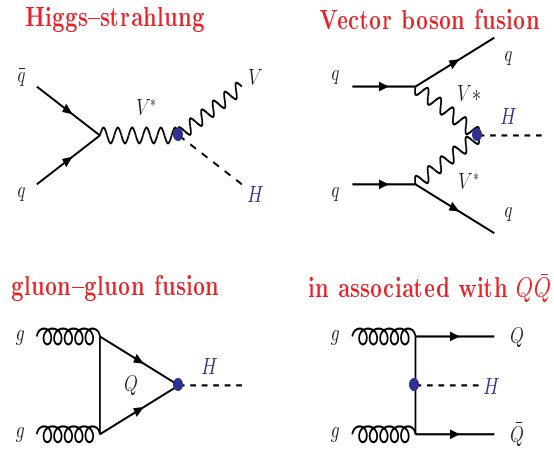
$t\bar{t}H$ resurection at the LHC:

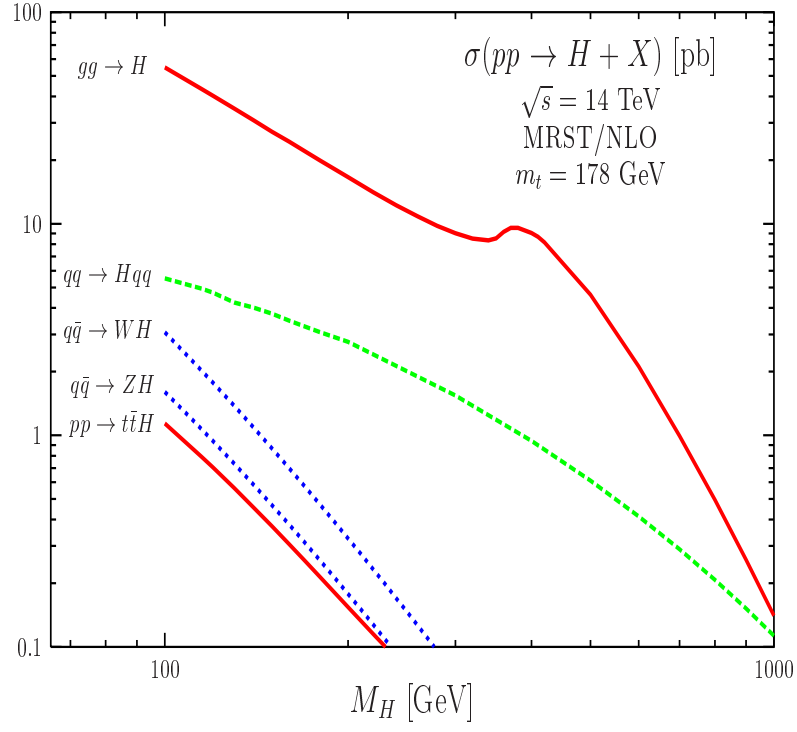
- present: hopeless (ttjj bkg),
- new ideas (Plehn et al),
- try new kinematical variables:

because of Higgs spin-0 nature

$\sigma(ttH)$ peaks near threshold;

$\longrightarrow$ see how m_{ttjj} can be useful.





The constrained NMSSM at the LHC

- **NMSSM solves MSSM μ problem:**

$\mu \mathbf{H_1 H_2} \rightarrow \lambda \mathbf{S H_1 H_2}$ **with** $\mu_{\mathbf{eff}} \equiv \lambda \mathbf{s}$.

- **Retain nice mSUGRA $\rightarrow$ cNMSSM:**

4 free parameters: $\mathbf{M_{\frac{1}{2}}, m_0, A_0, \lambda}$.

- **Collider+cosmology $\rightarrow$ one input!**

$\mathbf{m_0 \sim 0, \lambda \lesssim 10^{-2}, A_0 \sim -\frac{1}{4} M_{\frac{1}{2}}}$.

- **Peculiar spectrum $\neq$ usual mSUGRA:**

– vanishing $\mathbf{m_0}$ **(**$\mathbf{m_{\tilde{g}} > m_{\tilde{q}}}$**),**

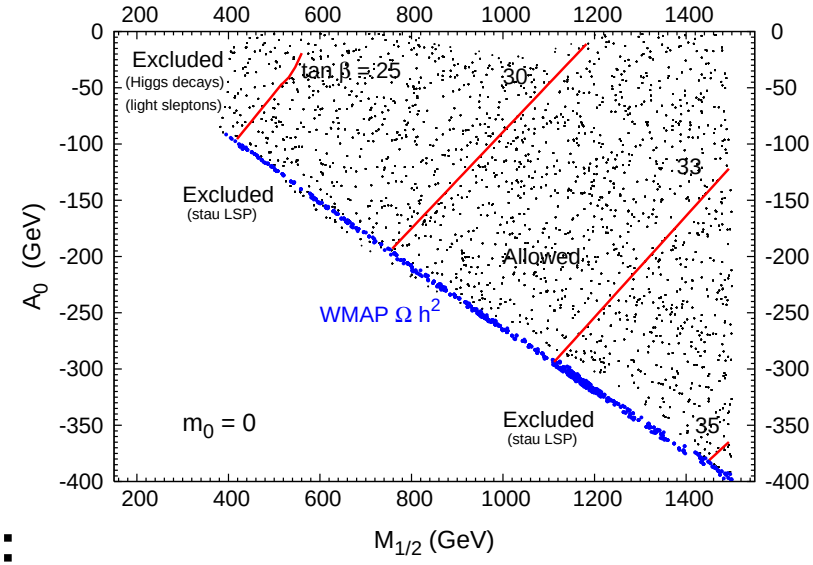
– **singlino** χ_1^0 **LSP decoupled,**

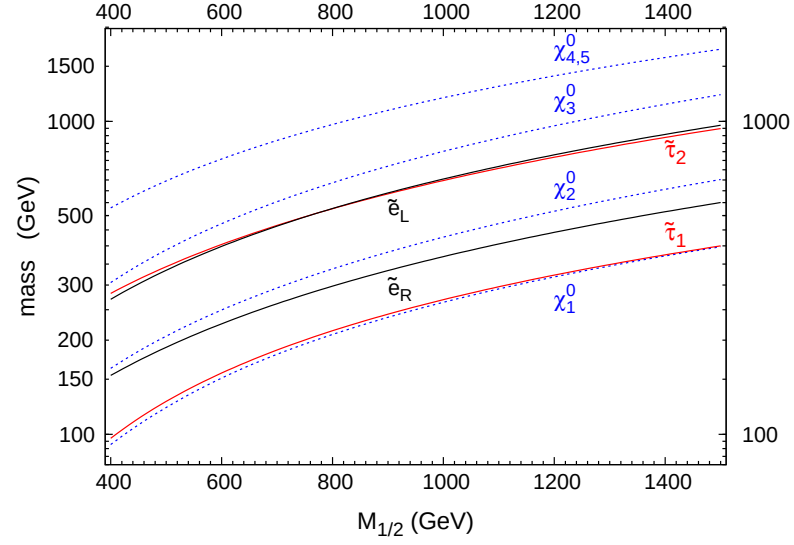
– longlived $\tilde{\tau}_1$ **degenerate with** χ_1^0

(sometimes H sector also different).

- **But $\approx$ mSUGRA with EW scale** $\tilde{\mathbf{G}}$

with small $\mathbf{m_0}$**, same** $\mathbf{M_{\frac{1}{2}}, A_0}$**, etc..**





Question: how can we discriminate between the two scenarii?