$p\,p \to h_{125}\,H$ [A. Papaefstathiou, T. Robens, J. Zurita, in preparation]

Real scalar extension of SM $\Rightarrow$ 2 scalars

$$m_H = 166\,\mathrm{GeV},\ m_h = 125\,\mathrm{GeV}$$

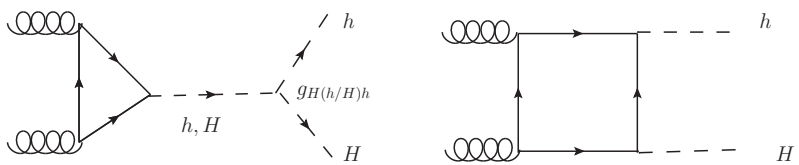
- pp production cross section: $1\,\mathrm{fb}$ @ $13\,\mathrm{TeV}$; $107\,\mathrm{fb}$ @ $100\mathrm{TeV}$

  ($pp \to \{H : 240\,\mathrm{fb}$ @ $13\,\mathrm{TeV},\ h\,h :\ 11$ / $530\,\mathrm{fb}$ @ 13 / $100\,\mathrm{TeV}$; $H\,H :\ 3\,\mathrm{fb}$ @ $100\,\mathrm{TeV}\}$,
  e^+e^- at 1 TeV (ZH): 1 fb; $\mu^+\mu^-$ at 10 TeV (VBF): 80 fb)

- additional input parameters: ration of vevs and mixing angles

  [$\sin\alpha = 0.315$, $\tan\beta \equiv \frac{v}{v_S} = 0.844$] [current bound: 125 GeV signal strength]

$\Rightarrow$ **non-resonant production**



[implemented into Herwig7.2]

$\Rightarrow$ dominant decays:

$b\,\bar{b}\,W^+\,W^-(57\%),\ W^+\,W^-\,W^+\,W^-(20\%),\ W^+\,W^-\,g\,g(8\%),\ldots$