

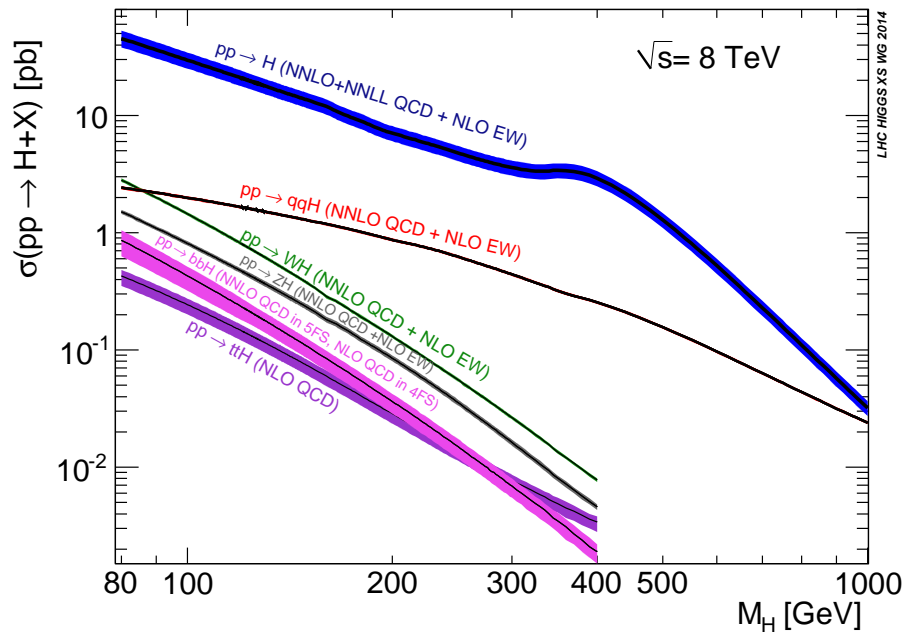
# $b\bar{b}H$ TASK FORCE

Michael Spira (PSI)

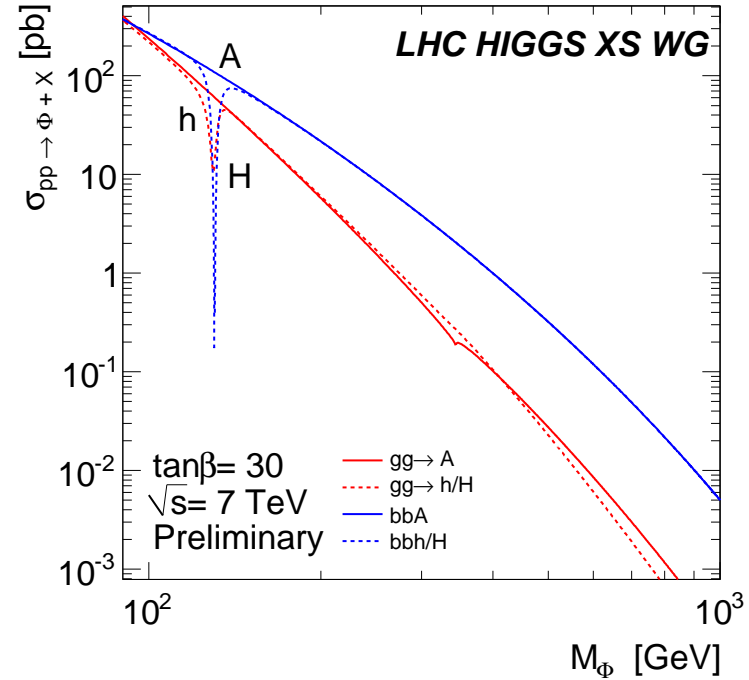
Theory convenor: Michael Spira

Experimental convenor: ???

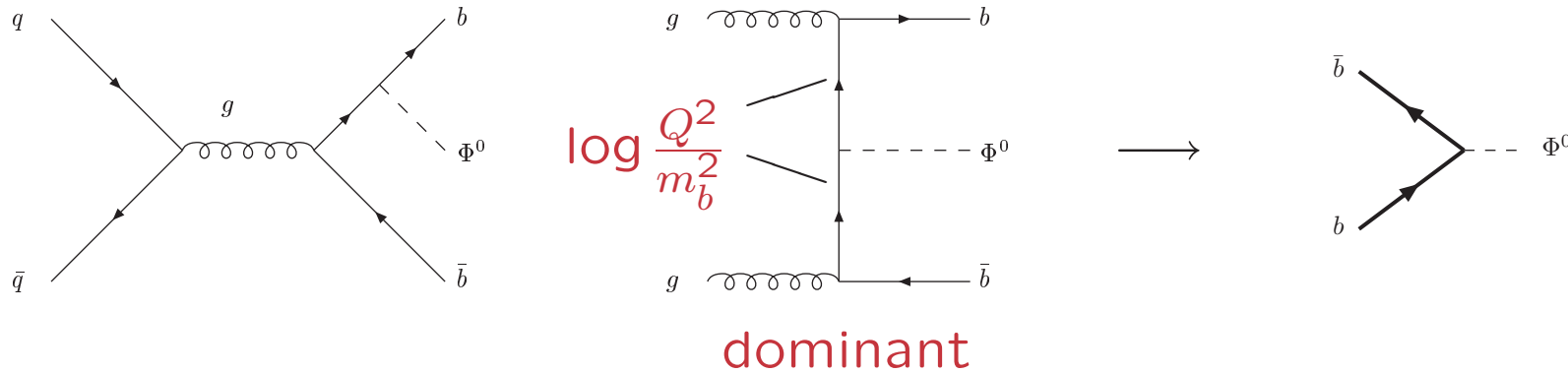
SM



MSSM



## $b\bar{b}$ +Higgs production



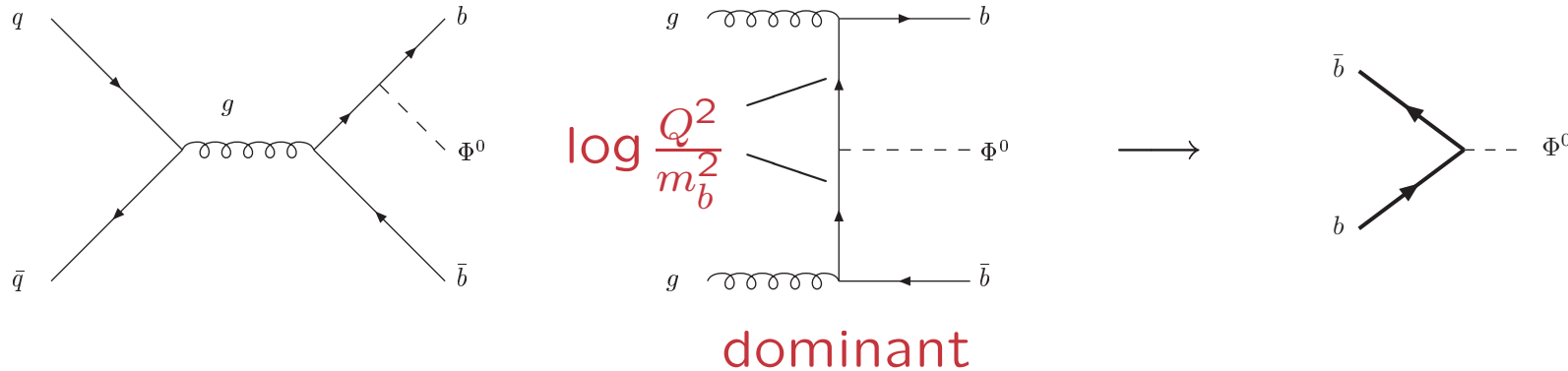
large logs from phase space integration  $\longrightarrow$  bottom PDF  
 resummation  $\equiv$  DGLAP evolution  $Q \sim \frac{1}{4} \dots \frac{1}{10} M_H$

### 5-Flavour Scheme

- massive top, gluinos and squarks decoupled from  $\alpha_s$   
 $\rightarrow$  5 active flavours
- PDF:  $\overline{\text{MS}}$  scheme [5 flavours]
- grids  $H, A$ : 80-200 GeV:  $\Delta = 5$  GeV, 200-1000 GeV:  $\Delta = 20$  GeV  
 scale uncertainties, PDF +  $\alpha_s$  uncertainties

$\Rightarrow$  SusHi

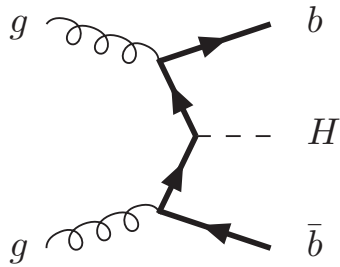
## $b\bar{b}$ +Higgs production



large logs from phase space integration  $\longrightarrow$  bottom PDF  
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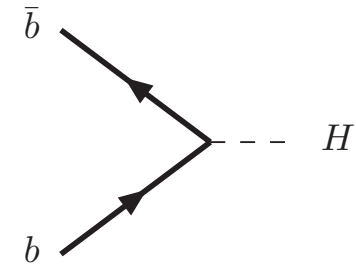
### 4-Flavour Scheme

- massive top, bottom, gluinos and squarks decoupled from  $\alpha_s$   
 $\rightarrow$  4 active flavours
- PDF:  $\overline{\text{MS}}$  scheme [4 flavours]  $\rightarrow$  no  $b$ -PDF
- grids  $H, A$ : 80-200 GeV:  $\Delta = 5$  GeV, 200-1000 GeV:  $\Delta = 20$  GeV  
 scale uncertainties



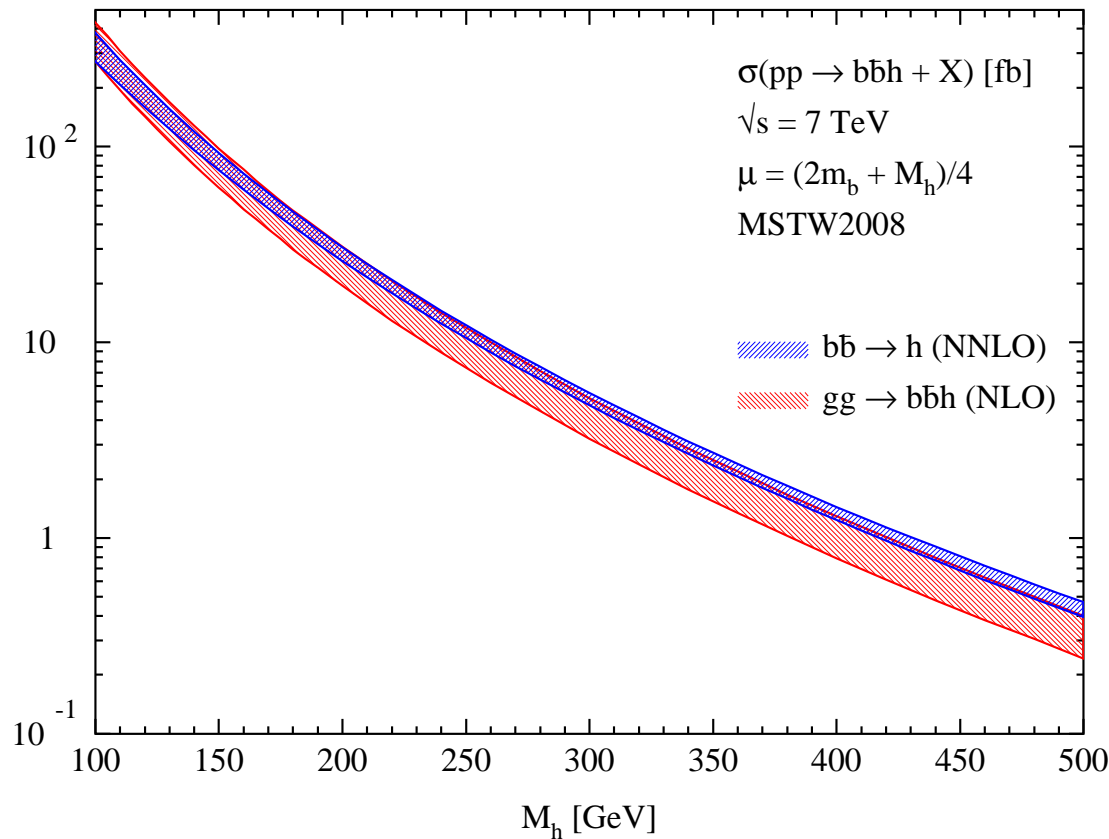
NLO

exact  $g \rightarrow b\bar{b}$  splitting & mass/off-shell effects  
no resummation of  $\log M_H^2/m_b^2$  terms



NNLO

massless/on-shell  $b$ 's, no  $p_{Tb}$   
resummation of  $\log M_H^2/m_b^2$  terms



Santander matching:

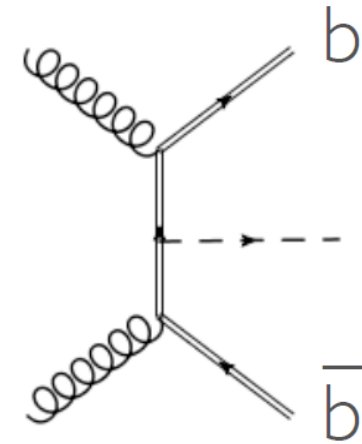
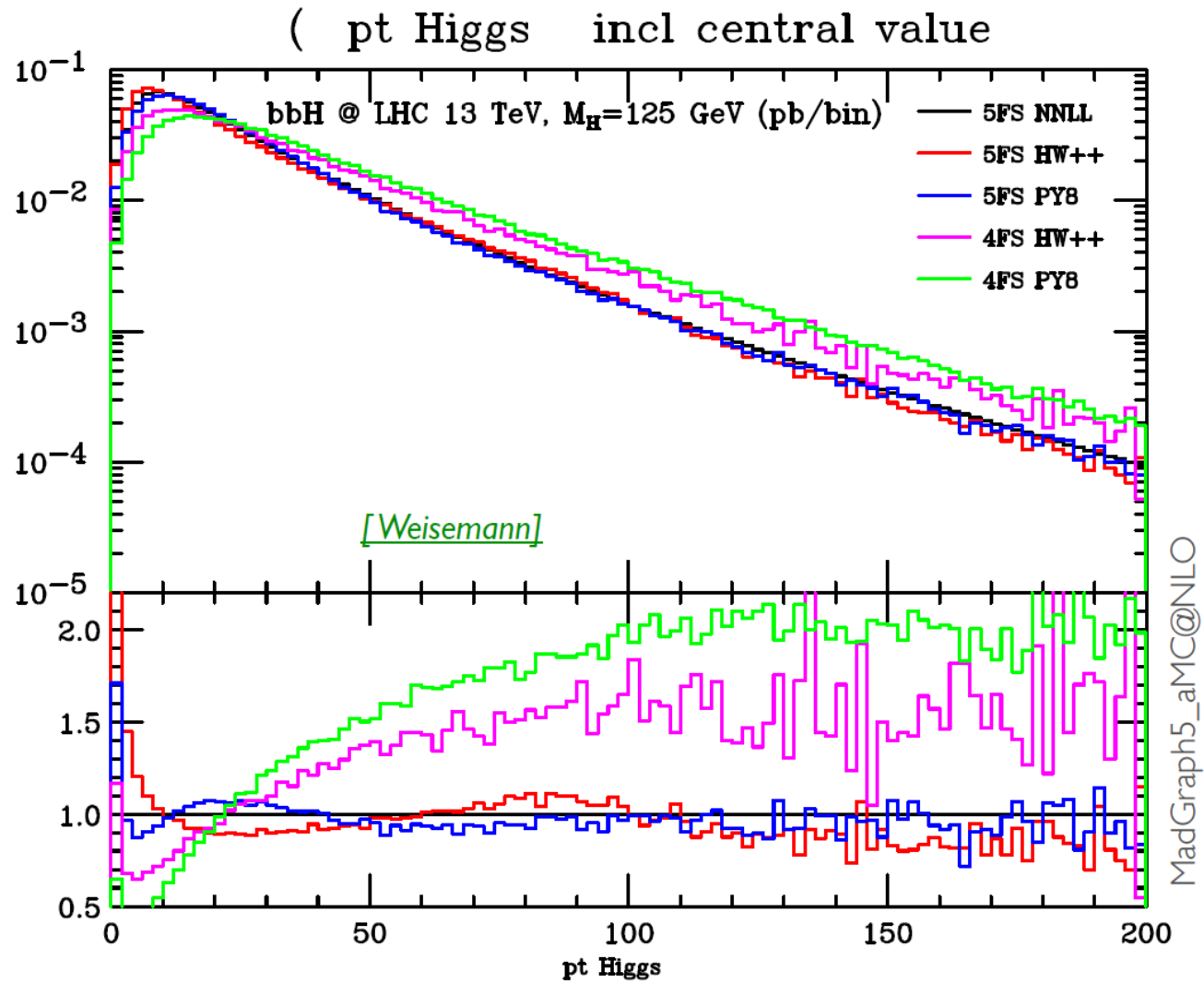
$$\sigma = \frac{\sigma^{4FS} + w\sigma^{5FS}}{1 + w}$$

$$w = \log \frac{M_H}{m_b} - 2$$

Harlander, Krämer, Schumacher

Dittmaier, Krämer, S.  
Dawson, Jackson, Reina, Wackerroth  
Harlander, Kilgore

# distributions



⇒ more to be done...