Higgs BR study

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Current status

- Template fitting stability test with different data sets of template and data
  - Fitted parameters are fluctuated by different statistics between the data and template

- qqH background reduction (qq background)
  - Large fluctuation from the limited statistics
- Different Higgs mass physics study
  - BR, recoil mass

Higgs BR with different mass

Aim: Update Higgs BR measurement accuracy plot after LOI
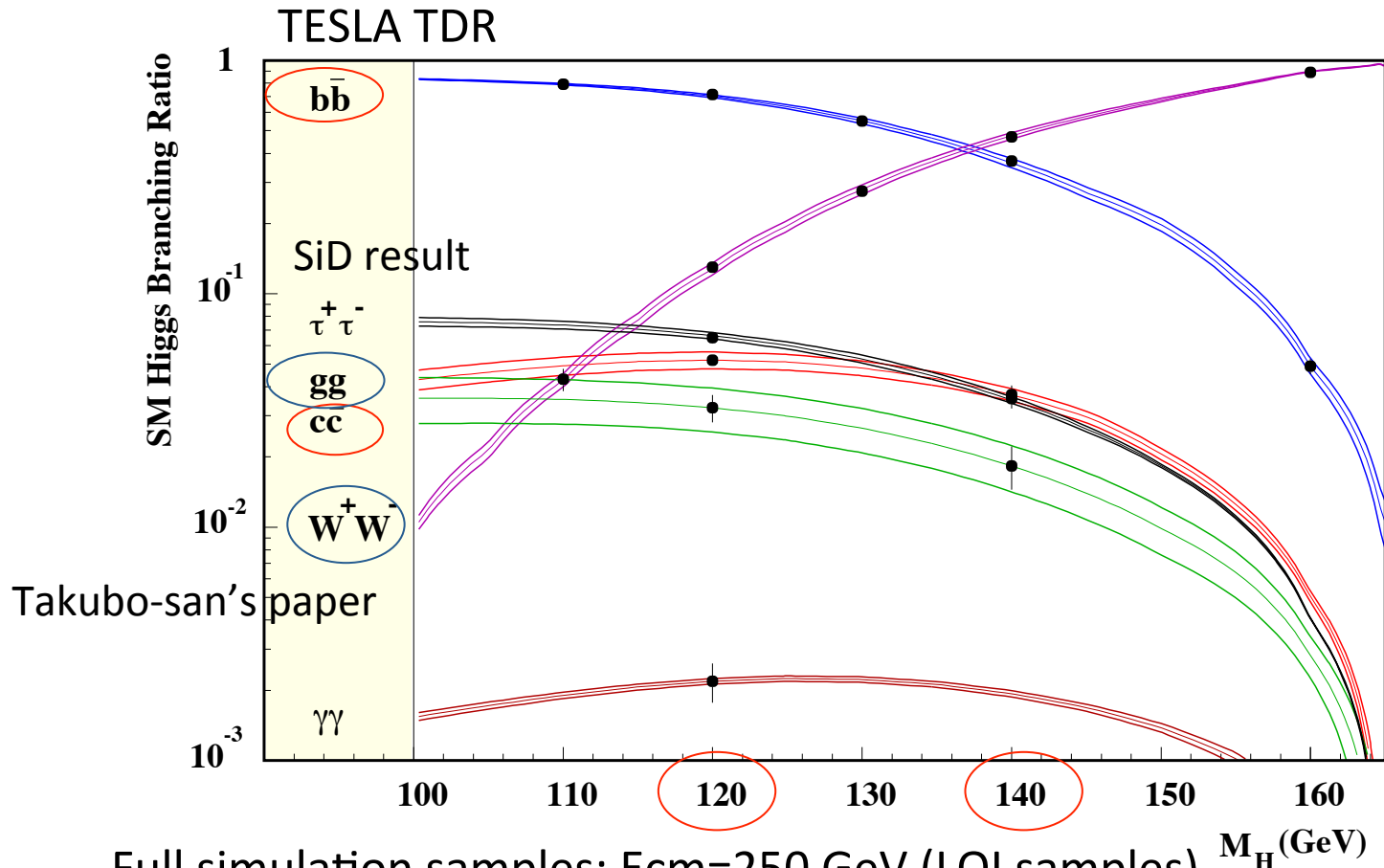
Full simulation samples: Ecm=250 GeV (LOI samples)
Signal : Mh=120 GeV, 130 and 140 GeV (Generated by Miyamoto-san)

Summary table of Higgs BR

Higgs mass	120 GeV		Mh=140 GeV	
Higgs decay	BR	ΔBR/BR	BR	ΔBR/BR
H→bb	66.5%	2.1%, 4.8%	33.0%	
H→cc	2.9%	6.7%, 8.4%	1.5%	
H→WW*	13.6%	15.7%	49.2%	
H→gg	8.2%	12.2%	5.7%	
H→ττ	6.8%		3.5%	

My result is preliminarily

H→WW* result is obtained from the Takubo-san's analysis
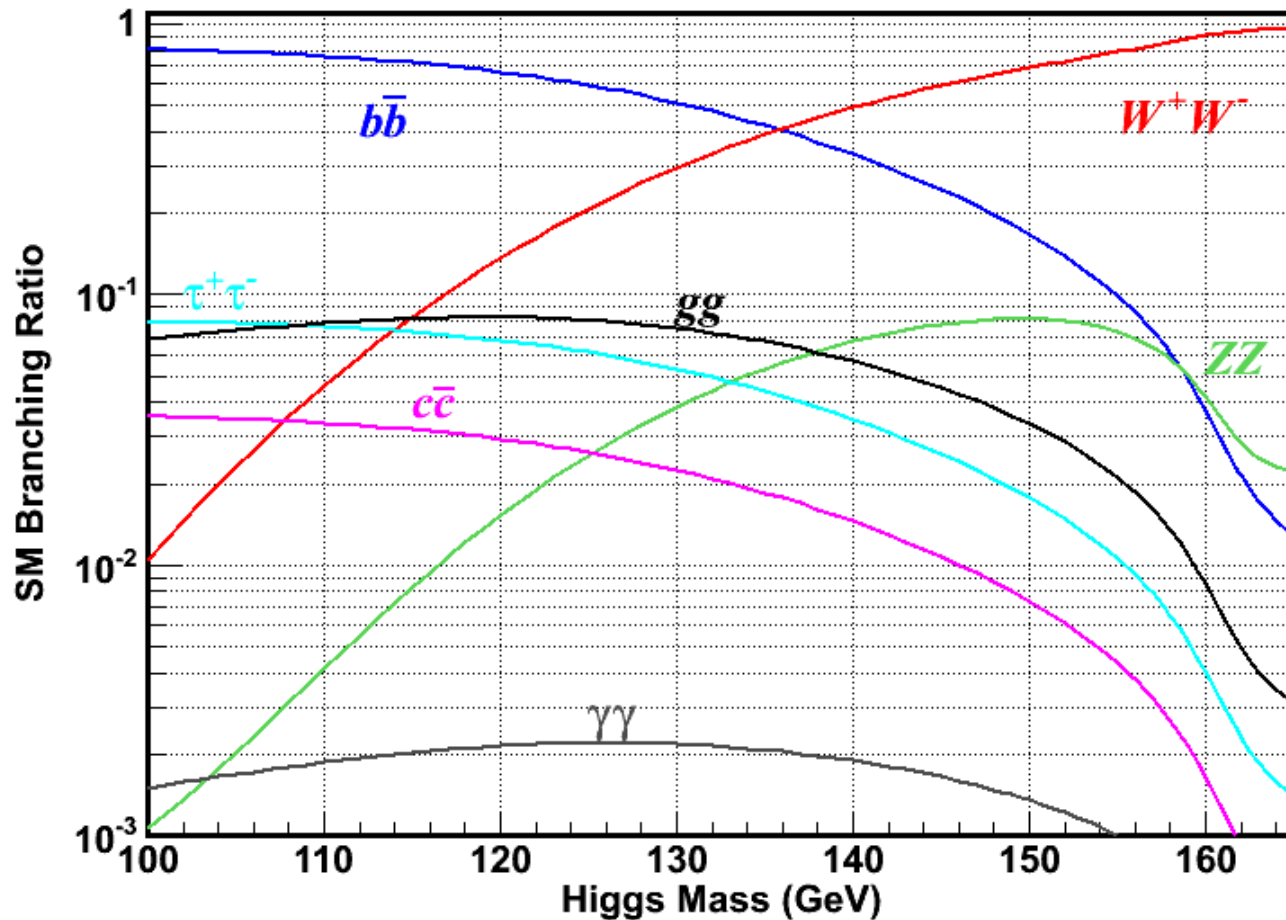H→gg was studied at SiD (combined results of vvH and qqH by SiD)
Each analysis include the σ_{ZH} accuracy of 2.5% from recoil mass study.
SiD include 4.7% uncertainty of σ_{ZH}

SiD ZH sutdy: Physical Review D 82, 03013 (2010)
H→WW* anomalous coupling 1011.5805v2

Need to add the error bars on this plot generated by HDECAY

Fitted parameter r_{xx} definition

Current definition of fitted template sample   rxx includes BR

$$N_{ijk}^{template} = \sum_{s=bb,cc,oth} r_s \left(\frac{N^{Hall}}{N^s} \right) \cdot N_{ijk}^{s} + r_{bkg} \cdot N_{ijk}^{bkg}$$

$$r_{oth} = 1 - r_{bb} - r_{cc} \qquad r_{bkg} = 1 \text{ or free}$$

Possibility to reduce the fitting fluctuation fixed to $r_{bkg} = 1$,
which assume the SM backgrounds are well understand in the template samples

Definition of fitted r_{xx}

$$r_{xx} = \varepsilon_{xx}/\varepsilon_{all} * BR(xx)$$

Extract absolute BR from the fitted parameter r_{xx} and ε_{xx} (cut efficiency)