

# Higgs BR study with new samples

ILC physics and software meeting

July 12 2013

H. Ono (NDU)

# Current status

- Sorry to be delayed my analysis...
- In addition, I still have problem on  $h \rightarrow cc$  accuracies worse than expected, not yet well understand.  
LCFIPlus c-tagging performance looks OK.
  - Affect from  $H \rightarrow WW$ , gg increase?
- Still under investigation

# Estimated BR accuracy at 250 GeV

Expected accuracies by extrapolating 120 GeV results to 125 GeV  
 only concerning signal rate difference  $\rightarrow$   $h \rightarrow gg/WW$  will contribute as  $h \rightarrow cc$  BG

250 GeV	LOI 120 GeV (250 fb <sup>-1</sup> )			125 GeV (250fb <sup>-1</sup> )		
	bb	cc	gg	bb	cc	gg
nnh	1.7%	11.2%	13.9%	1.8%	12.9%	11.2%
qqh	1.5%	10.2%	13.1%	1.6%	11.8%	10.5%
eeh	3.8%	26.8%	31.3%	4.0%	31.4%	25.3%
mumh	3.3%	22.6%	23.9%	3.5%	26.3%	19.1%
Combined	1.0%	6.9%	8.5%	1.1%	8.0%	6.8%

Higgs decay BR  
 difference can  
 affect to result  
 $h \rightarrow WW/ZZ$  increase

BR	120	125
BR(bb)	65.7%	57.8%
BR(cc)	3.6%	2.7%
BR(gg)	5.5%	8.6%

sigma	120	125
nnh	77.4	77.5
qqh	210.0	210.2
eeh	11.1	10.2
mumh	10.4	6.9

# Preliminary result with new samples

Several problems on  $h \rightarrow cc$  analysis. Now under investigation.  
Add cuts to suppress  $h \rightarrow$ others (WW/ZZ) and 4f

250 GeV	Extrapolated 125 GeV (250 fb <sup>-1</sup> )			Simulated 125 GeV (250fb <sup>-1</sup> )		
	bb	cc	gg	bb	cc	gg
nnh	1.8%	12.9%	11.2%	1.7%	18.4%	9.0%
qqh	1.6%	11.8%	10.5%	1.9%	34.8%	17.6%
eeh	4.0%	31.4%	25.3%	4.6%	89.0%	42.8%
mumuh	3.5%	26.3%	19.1%	3.6%	36.4%	19.1%
Combined	1.1%	8.0%	6.8%			

Very preliminary

BR	120	125
BR(bb)	65.7%	57.8%
BR(cc)	3.6%	2.7%
BR(gg)	5.5%	8.6%
BR(WW)	15.0%	21.6%

$h \rightarrow bb$  looks comparable at this moment

$h \rightarrow cc$  analysis should be improved.  
( $h \rightarrow$ others suppression?)  
qqh, eeh looks strange, still under investigation.