Status of summary table of Higgs couplings

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LCNote: http://www-jlc.kek.jp/jlc/sites/default/files/users/tianjp/HiggsCouplingsCombine.pdf

Update

- H-->ττ: new study at 500 GeV, extrapolation at 1 TeV refined accordingly.
- H-->WW*: new study ννH-->ννWW*-->ννlνqq @ 500 GeV.
- ttH, H-->bb: results have been re-calculated (previous method was not optimal).
- HHH: projections by including HH-->bbWW* and improving color-singlet jet-clustering.

250 GeV: 250 fb-1
500 GeV: 500 fb-1
1 TeV: 1000 fb-1

Independent Higgs measurements @ ILC

(MH = 125 GeV)

ECM	@ 250 GeV		@ 500 GeV		@ 1 TeV
luminosity · fb	250		500		1000
polarization (e-,e+)	(-0.8, +0.3)		(-0.8, +0.3)		(-0.8, +0.2)
process	ZH	vvH(fusion)	ZH	vvH(fusion)	vvH(fusion)
cross section	2.6%	-	-		
	σ·Br	σ·Br	σ·Br	σ·Br	σ·Br
H-->bb	1.2%	10.5%	1.8%	0.66%	0.32%
H-->cc	8.3%		13%	6.2%	3.1%
H-->gg	7.0%		11%	4.1%	2.3%
H-->WW*	6.4%		9.2%	2.6%-->2.4%	1.6%
H-->ττ	4.2%		5.4%	14%-->9.0%	3.5%-->3.1%
H-->ZZ*	19%		25%	8.2%	4.1%
H-->γγ	29-38%		29-38%	20-26%	7-10%
H-->μμ	-		-		31%

ttH, H-->bb	-	35%-->28%	7.8%-->6.0%
H-->Inv. (95% C.L.)	< 0.80%	-	

HHH Projections

Scenario A: HH-->bbbb, full simulation done
Scenario B: by adding HH-->bbWW*, full simulation ongoing,
expect ~20% relative improvement
Scenario C: color-singlet clustering, future improvement,
expected ~20% relative improvement (conservative)

HHH	500 GeV			500 GeV + 1 TeV		
Scenario	A	B	C	A	B	C
Canonical	104%	83%	66%	26%	21%	17%
LumiUP	58%	46%	37%	16%	13%	10%

Total width and absolute HVV, Hff coupling

MH = 125 GeV 250 fb^{-1} @ 250 GeV 500 fb^{-1} @ 500 GeV 1000 fb^{-1} @ 1000 GeV

P(e-,e+)=(-0.8,+0.3) @ 250, 500 GeV P(e-,e+)=(-0.8,+0.2) @ 1 TeV

coupling	250 GeV	250 GeV + 500 GeV	250 GeV + 500 GeV + 1 TeV
HZZ	1.3%	1.3%	1.3%
HWW	4.8%	1.4%	1.4%
Hbb	5.3%	1.8%	1.5%
Hcc	6.8%	3.0%-->2.9%	2.0%
Hgg	6.4%	2.5%-->2.4%	1.8%
Hττ	5.7%	2.5%-->2.4%	2.0%-->1.9%
Hγγ	18%	8.4%	4.1%
Hμμ	-	-	16%
Γ_0	11%	6.0%-->5.9%	5.6%
Htt	-	18%-->14%	4.0%-->3.2%

Br(H-->Inv.) 95% C.L.	< 0.80%	< 0.80%		< 0.80%	
HHH	-	104%	66%(*)	26%	17%(*)

(*): including H-->WW* and better jet-clustering

model independent fit

250 GeV: 1150 fb-1
500 GeV: 1600 fb-1
1 TeV: 2500 fb-1

Independent Higgs measurements @ ILC (MH = 125 GeV)

LumiUP

ECM	@ 250 GeV		@ 500 GeV		@ 1 TeV
luminosity · fb	1150		1600		2500
polarization (e-,e+)	(-0.8, +0.3)		(-0.8, +0.3)		(-0.8, +0.2)
process	ZH	vvH(fusion)	ZH	vvH(fusion)	vvH(fusion)
cross section	1.2%	-	-		
	σ·Br	σ·Br	σ·Br	σ·Br	σ·Br
H-->bb	0.56%	4.9%	1.0%	0.37%	0.20%
H-->cc	3.9%		7.2%	3.5%	2.0%
H-->gg	3.3%		6.0%	2.3%	1.4%
H-->WW*	3.0%		5.1%	1.4%-->1.3%	1.0%
H-->ττ	2.0%		3.0%	7.8%-->5.0%	2.2%-->2.0%
H-->ZZ*	8.8%		14%	4.6%	2.6%
H-->γγ	16%		19%	13%	5.4%
H-->μμ	-		-		20%

ttH, H-->bb	-	20%-->16%	4.9%-->3.8%
H-->Inv. (95% C.L.)	< 0.37%	-	

Total width and absolute HVV, Hff coupling

250 GeV: 1150 fb-1
500 GeV: 1600 fb-1
1 TeV: 2500 fb-1

MH = 125 GeV
P(e-,e+)=(-0.8,+0.3) @ 250, 500 GeV
P(e-,e+)=(-0.8,+0.2) @ 1 TeV

LumiUP

coupling	250 GeV	250 GeV + 500 GeV	250 GeV + 500 GeV + 1 TeV
HZZ	0.61%	0.61%	0.61%
HWW	2.3%	0.67%	0.65%
Hbb	2.5%	0.92%-->0.90%	0.75%-->0.74%
Hcc	3.2%	1.5%	1.1%
Hgg	3.0%	1.3%	0.94%-->0.93%
Hττ	2.7%	1.3%-->1.2%	1.0%-->0.99%
Hγγ	8.2%	4.5%	2.4%
Hμμ	-	-	10%
Γ_0	5.4%	2.9%-->2.8%	2.7%
Htt	-	9.8%-->7.8%	2.5%-->2.0%

Br(H-->Inv.) 95% C.L.	< 0.37%	< 0.37%		< 0.37%	
HHH	-	58%	37%(*)	16%	10%(*)

(*): including H-->WW* and better jet-clustering

model independent fit