

Higgs BR study

ILC physics and software meeting

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Current status

- Paper work
 - llH with $H \rightarrow gg$ results is also summarized
- Next step to do
 - Prepare $H \rightarrow WW^* (ZZ^*, \gamma\gamma)$ reconstruction code
 - For DBD analysis including semi-leptonic
 - Study Higgs with different mass (recoil plot)
 - $m_h=130, 140$ GeV samples analysis

Summary of BR measurement accuracy

	vvH		qqH		Combined	
Ecm (GeV)	250	350	250	350	250	350
r_{bb}	1.00 ± 0.016	1.00 ± 0.012	1.00 ± 0.015	1.00 ± 0.015	1.00 ± 0.012	1.00 ± 0.010
r_{cc}	1.00 ± 0.12	1.00 ± 0.10	1.00 ± 0.12	0.99 ± 0.11	1.00 ± 0.09	1.00 ± 0.07
r_{gg}	0.99 ± 0.14	1.00 ± 0.10	1.00 ± 0.13	1.00 ± 0.13	1.00 ± 0.10	1.00 ± 0.08
$\sigma BR(bb) / \sigma^{SM}$	$65.7 \pm 1.1\%$	$65.7 \pm 0.8\%$	$65.7 \pm 1.0\%$	$65.7 \pm 1.0\%$	$65.7 \pm 0.7\%$	$65.7 \pm 0.6\%$
$\sigma BR(cc) / \sigma^{SM}$	$3.59 \pm 0.43\%$	$3.60 \pm 0.35\%$	$3.61 \pm 0.44\%$	$3.58 \pm 0.39\%$	$3.60 \pm 0.31\%$	$3.59 \pm 0.26\%$
$\sigma BR(gg) / \sigma^{SM}$	$5.46 \pm 0.76\%$	$5.48 \pm 0.53\%$	$5.48 \pm 0.76\%$	$5.49 \pm 0.74\%$	$5.47 \pm 0.54\%$	$5.48 \pm 0.43\%$
$\Delta BR / BR(bb)$	3.0%	2.8%	2.9%	2.9%	2.7%	2.7%
$\Delta BR / BR(cc)$	12.2%	10.1%	12.3%	11.2%	8.9%	7.7%
$\Delta BR / BR(gg)$	14.2%	9.9%	14.1%	13.7%	10.2%	8.2%

BR(bb)=65.7%, BR(cc)=3.6%, BR(gg)=5.5% in Pythia
 $\Delta BR / BR(s)$ includes 2.5% uncertainty of σ^{ZH} from recoil study

Previously I just typo as 5.8% in this slide...

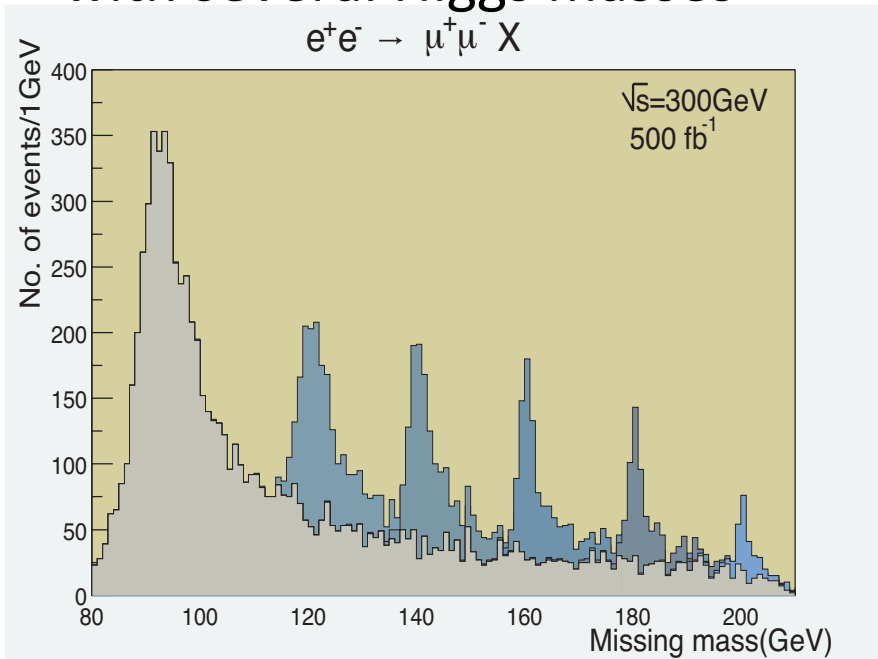
IIH mode results

	mumuH		eeH	
Ecm (GeV)	250	350	250	350
r_{bb}	1.00 ± 0.03	1.00 ± 0.05	1.00 ± 0.03	1.00 ± 0.06
r_{cc}	1.01 ± 0.24	1.02 ± 0.32	0.98 ± 0.28	1.02 ± 0.26
r_{gg}	1.00 ± 0.21	0.97 ± 0.35	0.99 ± 0.35	0.97 ± 0.38
$\sigma_{BR(bb)}/\sigma^{SM}$	$65.7 \pm 2.2\%$	$65.6 \pm 3.3\%$	$65.7 \pm 2.6\%$	$65.7 \pm 2.6\%$
$\sigma_{BR(cc)}/\sigma^{SM}$	$3.63 \pm 0.85\%$	$3.66 \pm 1.16\%$	$3.53 \pm 1.03\%$	$3.68 \pm 0.94\%$
$\sigma_{BR(gg)}/\sigma^{SM}$	$5.49 \pm 1.14\%$	$5.35 \pm 1.94\%$	$5.45 \pm 1.14\%$	$5.32 \pm 1.94\%$
$\Delta BR/BR(bb)$	4.2%	5.6%	4.7%	6.1%
$\Delta BR/BR(cc)$	23.6%	31.7%	29.3%	25.6%
$\Delta BR/BR(gg)$	20.9%	36.3%	21.1%	36.5%

Next step to do

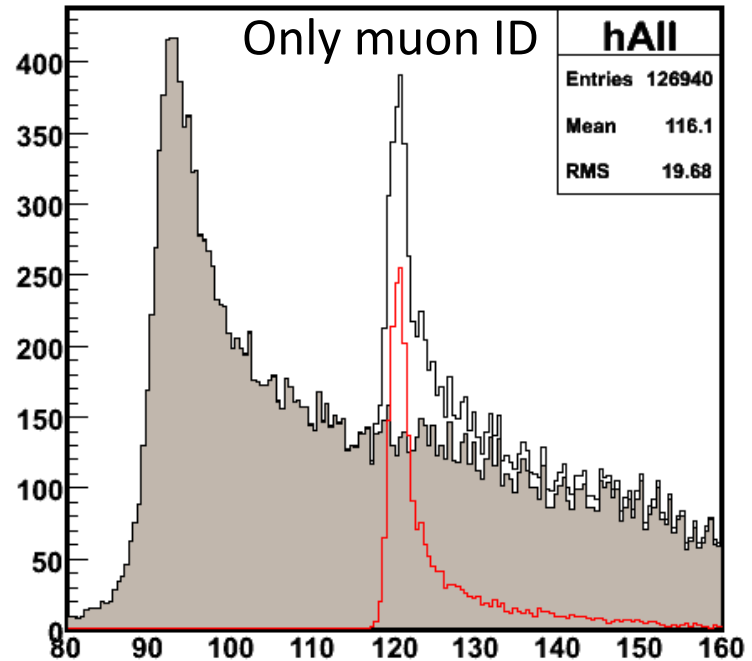
Recoil with several mass will update with full simulation

$\mu\mu h$ @300 GeV, $L=500\text{fb}^{-1}$
with several Higgs masses



in RDR

$\mu\mu h$ @250 GeV, $L=250\text{fb}^{-1}$
 $m_h=120\text{ GeV}$



Add $m_h=130, 140\text{ GeV}$ with new sample