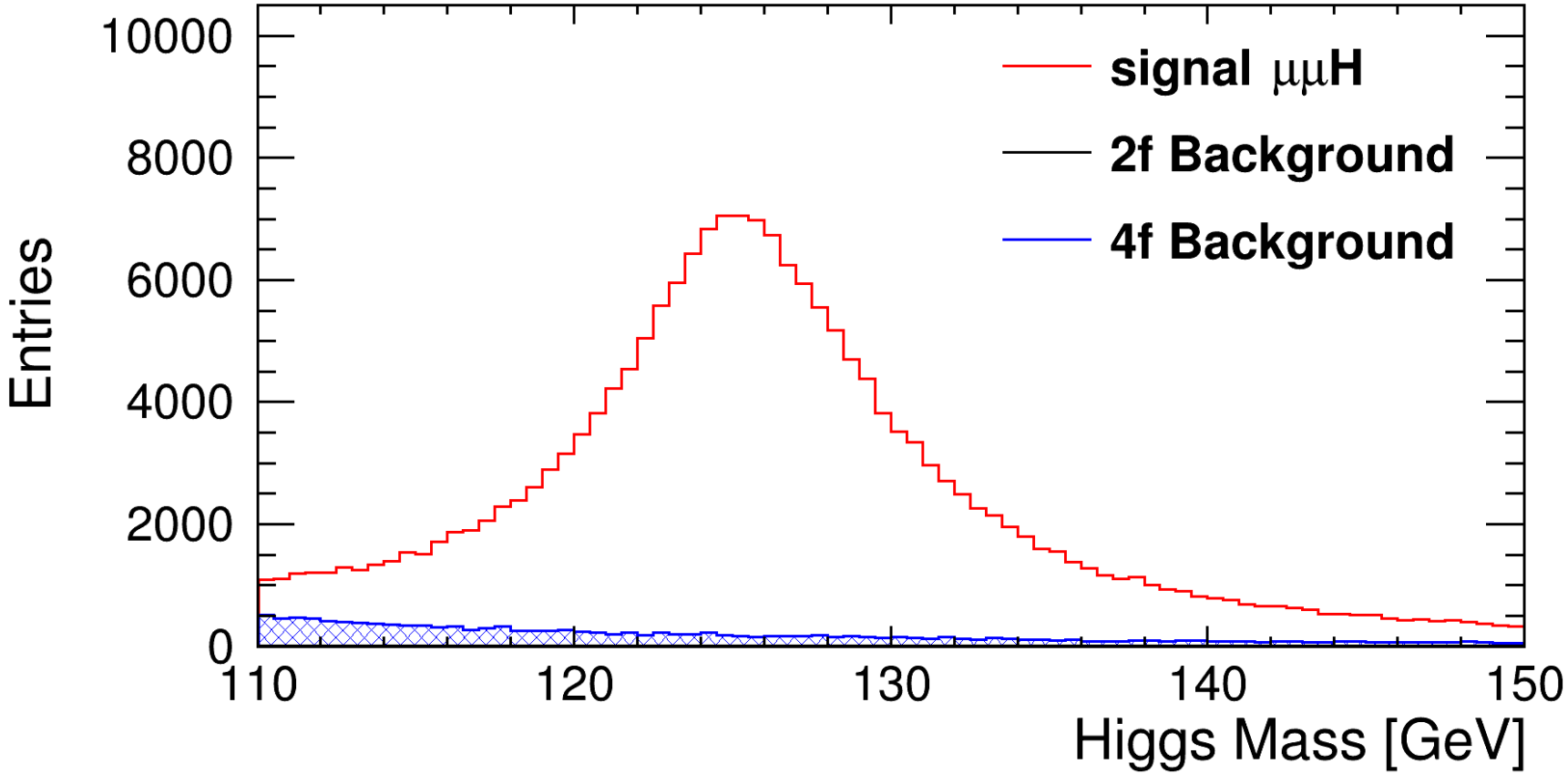
ILC meeting 27/06

Cuts Applied bb mode:

- Cut 1: lepton pair must be muons with mass close to m_Z
- Cut 2:$n_{ChargedPFOs}$ >3 in each jet
- Cut 3:$E_{vis}+E_{lep}$ >150 GeV
- Cut 4: b-likeness > 0,66
- Cut 5: Lepton pair: abs(cos) < 0,9
- Cut 6:Tight cut on Higgs mass: $110<m_H^{new}<150$ GeV



Process	2f_l	2f_h	4f_l	4f_sl	4f_h	BG	llh	Signal	Signf
Cross Section (fb)	103542	695920	15807.9	19163.2	16800.5	232638	10,3083	**5,95817**	
Generated Events	1,88E+08	9,71E+08	1,12E+07	1,66E+07	9,58E+06	1,20E+09	1,00E+06	**1,00E+06**	
Cut0	1,46E+06	16048	3,27E+06	824121	270,899	5,57E+06	19429.3	**11311.2**	**4.78924**
Cut1	1,03E+06	31,778	8,20E+04	158666	0	1,28E+06	17449,4	**10168.8**	**8,96809**
Cut2	2,40E+00	23,4257	3,18689	122529	0	1,23E+05	14173,8	**9537.39**	**26,2413**
Cut3	2,40064	22,019	3,18689	122529	0	1,23E+05	14161,2	**9537.39**	**26,2425**
Cut4	0	1,36209	0,218908	290778	0	2,91E+05	9237,16	**8958,71**	**45,9345**
Cut5	0	1,36209	0	22626,9	0	2,26E+04	8415,75	**8161,5**	**46,5127**
Cut6	0	0	0	2513,97	0	2,51E+03	7281,25	**7084.71**	**72,3121**

Full simulations at 250 GeV. With all backgrounds + Cuts

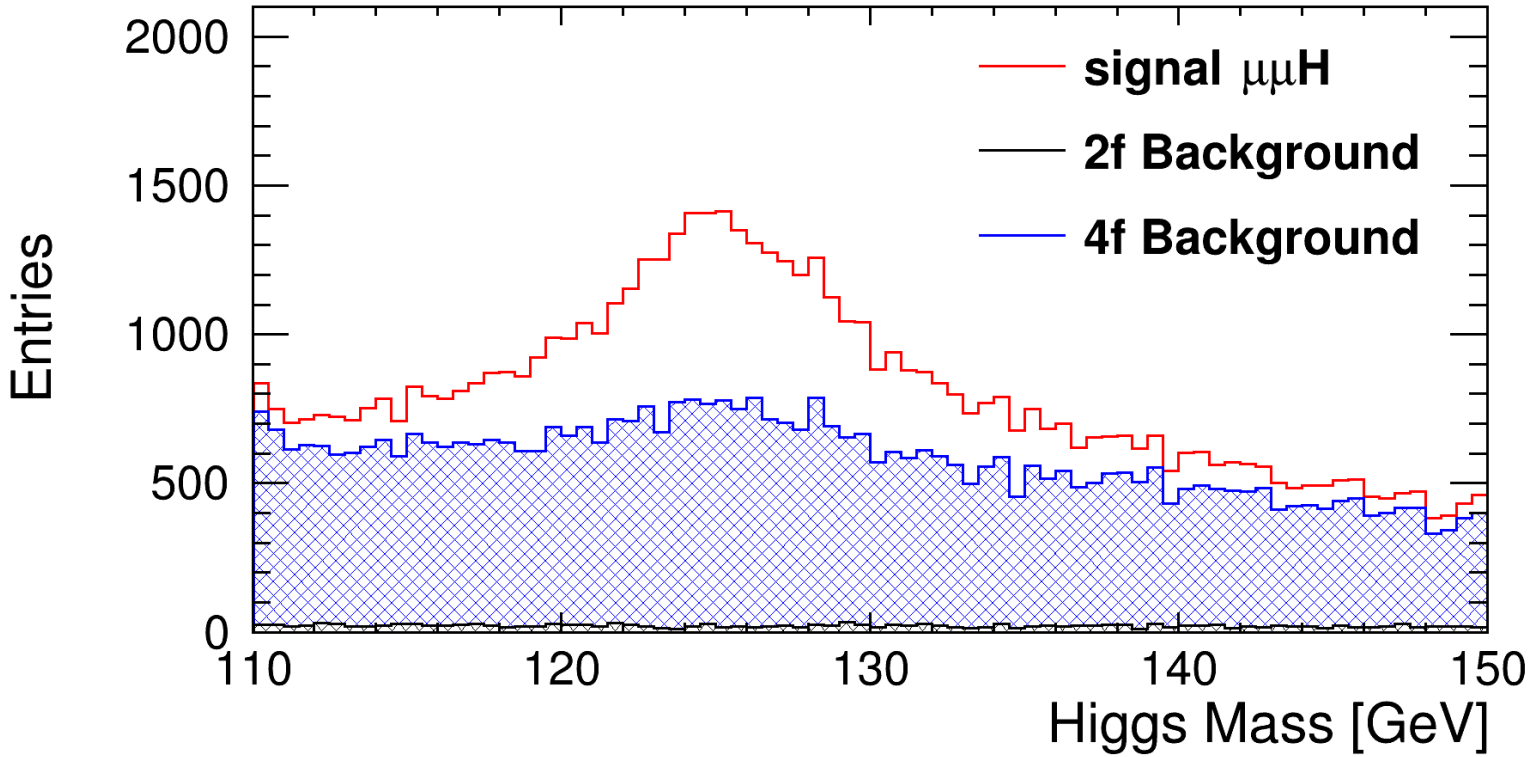
60% Efficiency and 74 sigmas for the bb mode.

Gaussian Fit gives: m_H=125,28±0,019GeV

For ττ:

Different Cuts and more added for leptonic background:

- Cut 1: lepton pair must be muons with mass close to m_Z
- Cut 2:$n_{ChargedPFOs}$ <4 in each jet because τ decays to 1-prong or 3-prong
- Cut 3:$E_{vis}+E_{lep}$ >100 GeV
- (Cut 4: b-likeness < 0,70) Remove it / very small?
- Cut 5:Non-null number of PFOs in a jet: $n_{ChargedPFOs}$ >0,5
- Cut 6: Lepton pair: abs(cos) < 0,9
- Cut 7: Cut on System's Recoil Mass: 110<m_{recoil}<150 GeV
- Cut 8:Tight cut on Higgs mass: 110<m_H^{new}<150 GeV



Process	2f_l	2f_h	4f_l	4f_sl	4f_h	BG	llh	Signal	Signf
Cross Section	12928.9	231973	15807.9	16800.5	19163.2	296728	10,3083	**0.656636**	
Generated	1.88484e+08	6.59515e+08	1,12E+08	1.48366e+08	1.6634e+08	5.93455e+08	1,00E+06	**1,00E+06**	
Cut0	1,45E+06	14912,1	3,27E+06	824124	270,899	5,56E+06	1,94E+04	**1221.13**	**0.517557**
Cut1	1,03E+06	37,9872	82040,6	158666	0	1,28E+06	1,74E+04	**1094.55**	**0.968726**
Cut2	1,03E+06	1,4964	81438,2	2132,72	0	1,12E+06	1,60E+03	**1062.67**	**1.00456**
Cut3	1,02E+06	1	80885,7	2132,72	0	1,10E+06	1,60E+03	**1062,55**	**1,00588**
Cut4	1,02E+06	0	44015,2	1136,62	0	1,07E+06	1,46E+03	**969,074**	**1,82622**
Cut5	235463	0	26977,4	1060,07	0	2,64E+05	1,35E+03	**928,927**	**4,52497**
Cut6	13176	0	4116,99	135,965	0	1,74E+04	1,08E+03	**741,401**	**10,0388**
Cut7	459,967	0	2293,82	30	0	2,78E+03	6,48E+02	**605,386**	**11,1081**
Cut8	40,0506	0	2281,66	30	0	2,35E+03	6,48E+02	**605,386**	**11,1081**

Worse significance and efficiency at 45% for tau channel

Less events because BR(ττ)= 6% whereas BR(bb)=58%

Cut 4 may be changed or optimized

Fit gives:

m_H=125,31± 0,072 GeV