

Dark matter search in higgs portal scenario

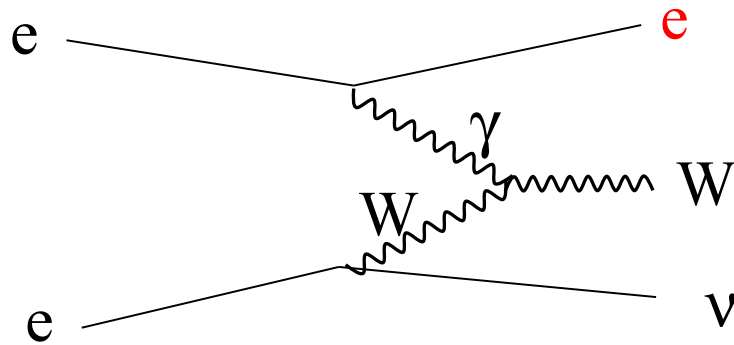
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status

Setup the dark-matter mass at 50GeV (On Shell Higgs) and check the ILC sensitivity of higgs-dark matter coupling

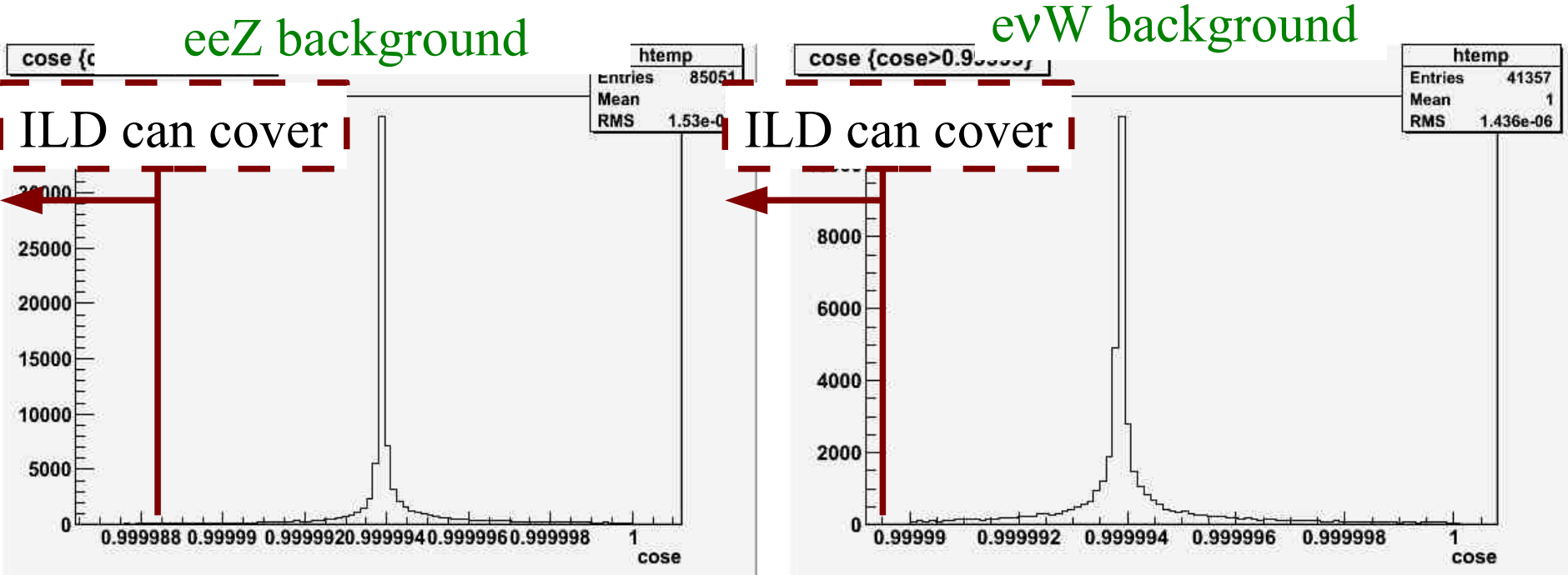
To suppress the enW and eeZ background, add the new cut parameter “**Cose**” in analysis. This parameter has to be checked by forward detector information, but there is not the forward detector in Quick-Sim. So I use the generator information for “**Cose**”.



- Checked dark-matter mass : 50GeV
- E_{cm} : 300 GeV
- Beam polarization : electron +0.8, positron -0.3
- Signal cross section : 2.4 fb $\leftarrow 3\sigma$ significance in [LC-PHSM-2003-096]

Cose : Isolated electron angle

Check the Cose distribution and consider cut value



The time projection chamber design solid angle coverage : $\text{Cos}\theta \sim 0.98$

Beam Cal covers the polar angle range between 5 and 40 mrad

↓

$\text{Cose} = 0.9999875$

analysis procedure

Case 1 : original analysis

Case 2 : LC-PHSM-2003-096

- Reconstruction of all events as 2 jets
- Event selection
 - Z-mass cut , lepton cut, cose cut
- likelihood analysis
 - Parameter : Z-angular ,
Z-mass ,
Missing Pt,
Jet angular at Z rest frame.

- Reconstruction of all events as 2 jets
- Event selection
 - Z-mass cut ,
Z-angular cut,
lepton cut,
Z-transverse momentum cut

Reduction table

Signal region is 115 to 150 GeV

Case 1 : original analysis

Case 2 : LC-PHSM-2003-096

	Non cut	lepton	Cose	Likelihood
Signal	4800	2623	2615	1561
vvZ	20175	2762	956	718
ZZ	1661878	190119	40134	32551
WW	4773700	113948	5155	3582
evW	2177000	193035	7445	2903
eeZ	9607180	690708	0	0

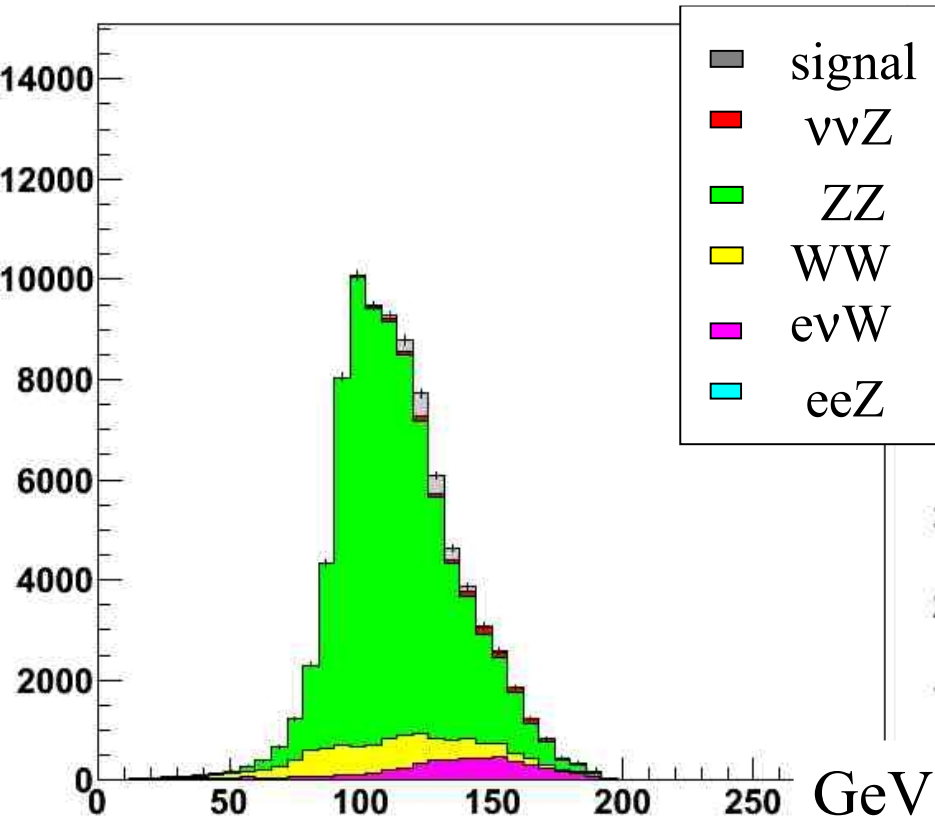
Significance is 7.6

	Non cut	cuts
Signal	1200	459
vvZ	5043	256
ZZ	415468	15650
WW	1193423	1646
evW	544250	1997
eeZ	2401793	0

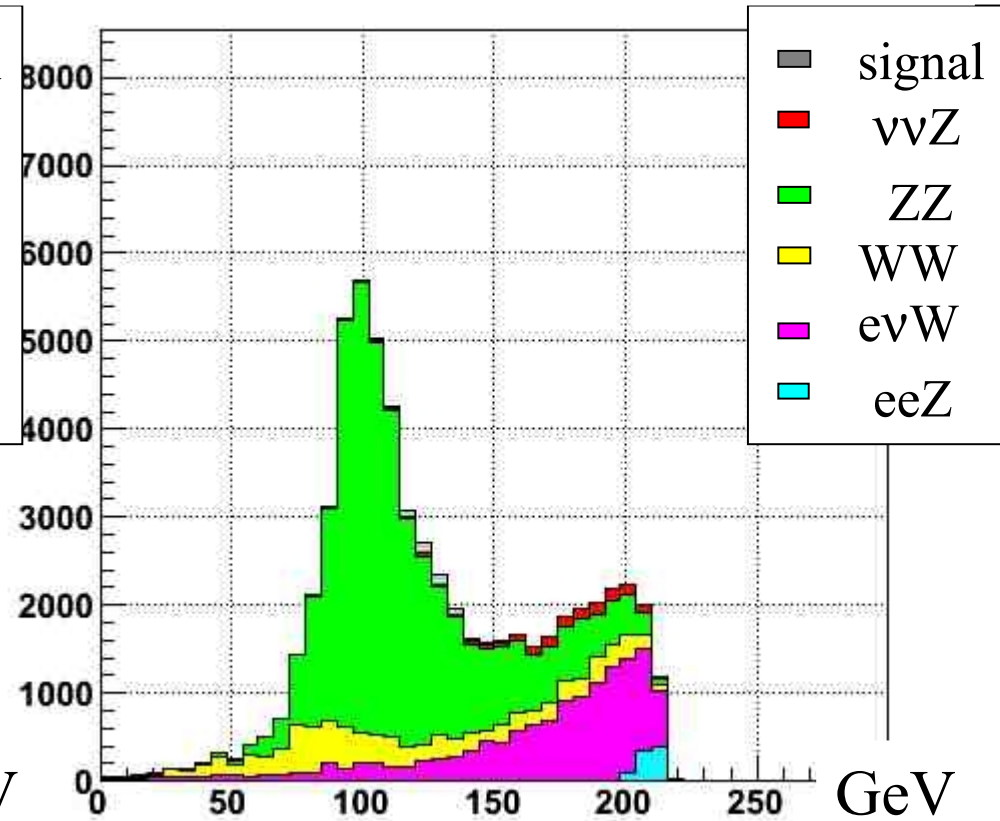
Significance : 3.24₅

Missing mass distribution after all cut

Case 1 : original analysis



Case 2 : LC-PHSM-2003-096



The original analysis can get more significance.

Summary & plan

Summary

- The original analysis get more significance than LC-PHSM-2003-96.

Plan

- Do fit the recoil mass to estimate the signal number.