Effect of Beam Energy Spread on the Higgs Recoil Mass

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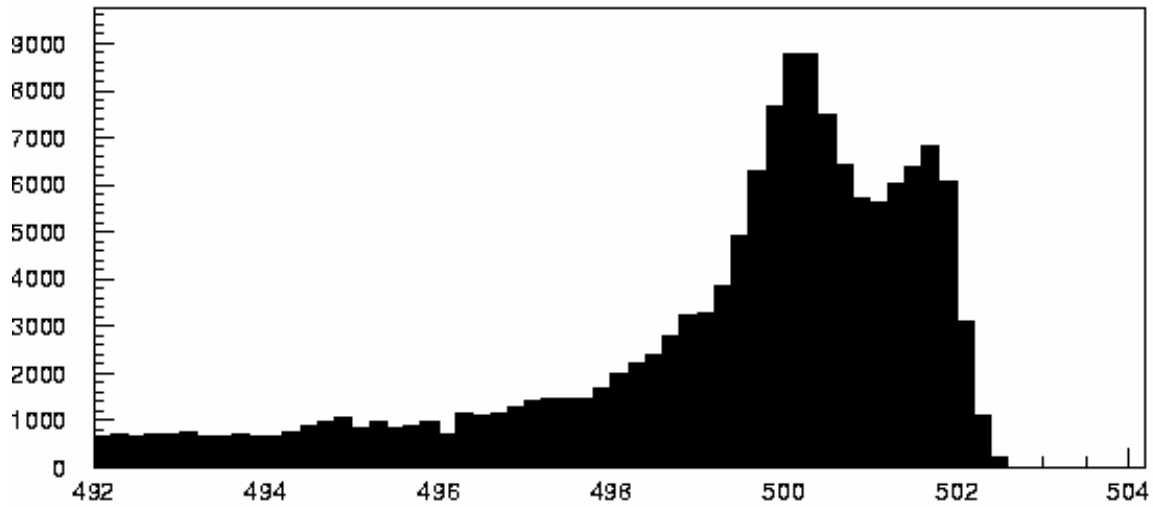
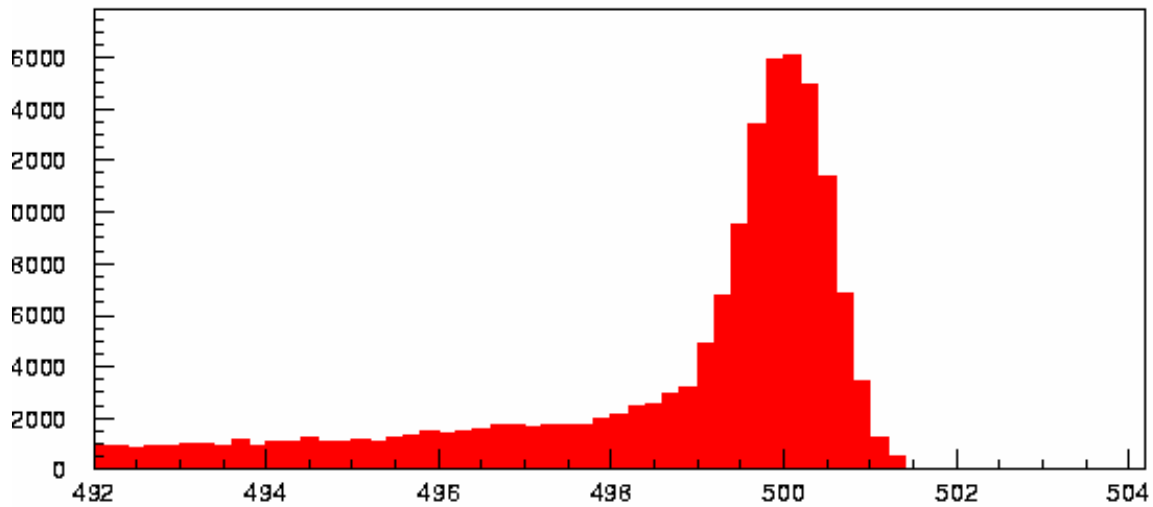
Lumi Weighted Ecm Distribution



NLC



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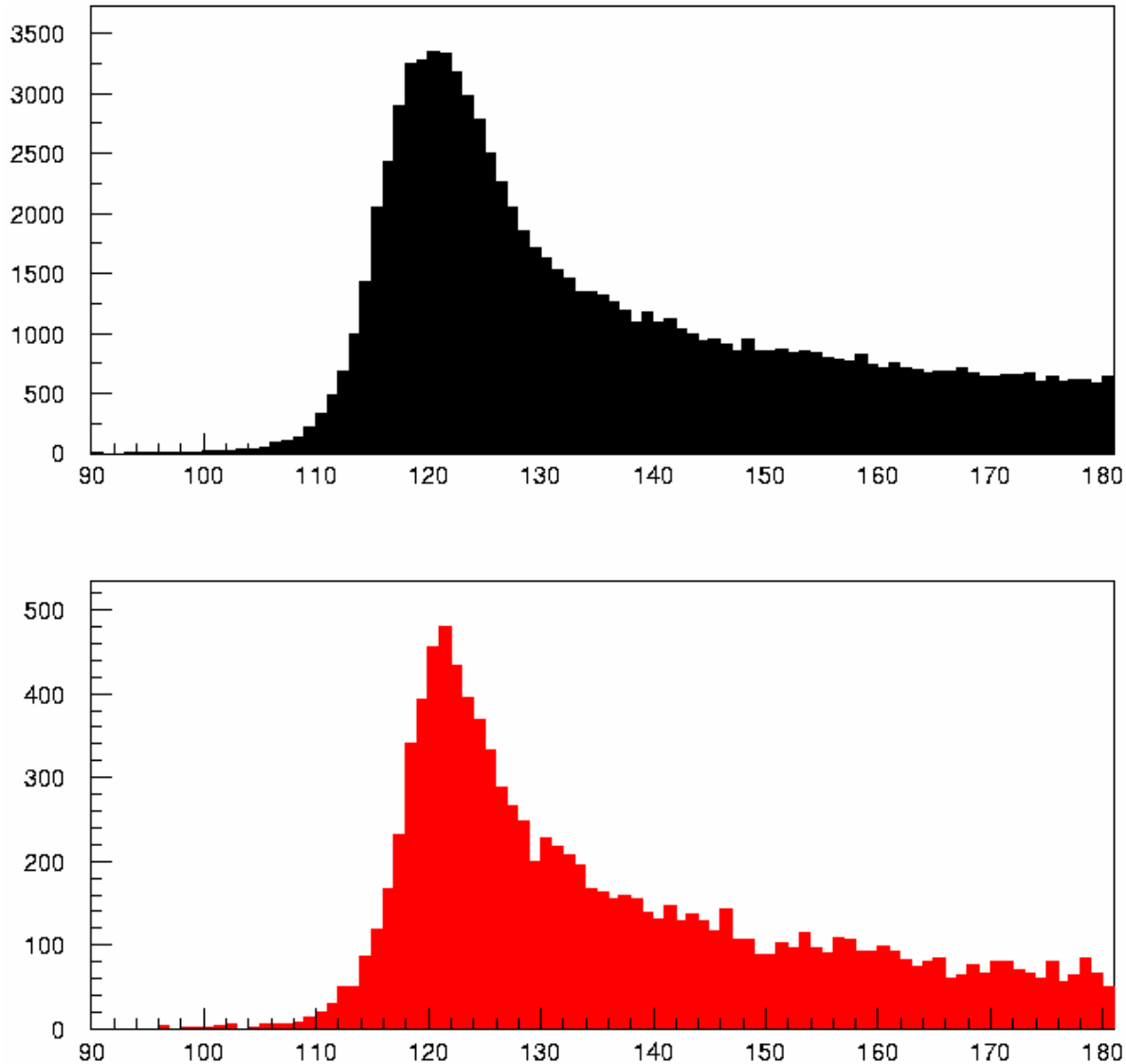
ECM (GeV)

Simdet Detector Simulation of e+e- → Zh $\sqrt{s} = 500\ GeV$ $L = 4400\ fb^{-1}$

$$Z \to e^+e^-\ ,\ \mu^+\mu^-$$

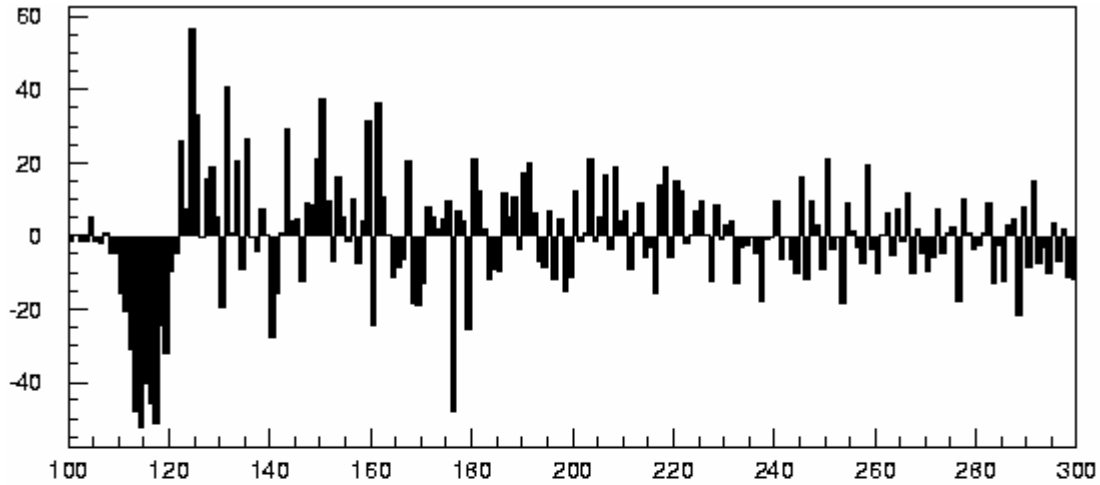


Estimate Statistical Error on Higgs Mass Assuming Perfect MC Simulation

for now only use 110<Mh<130 GeV

$$\sqrt{s} = 500\ GeV \quad L = 500\ fb^{-1}$$

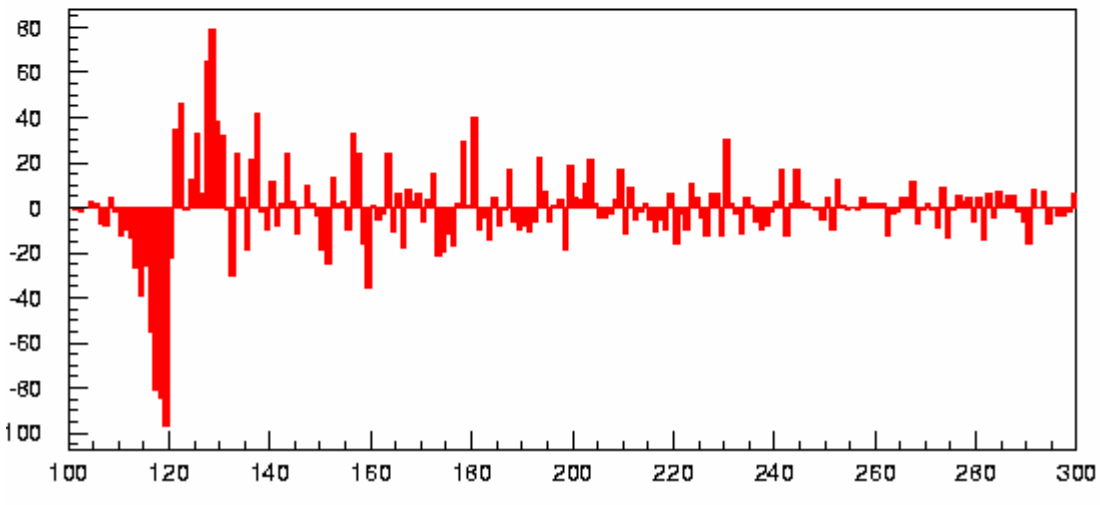
$\frac{dN_{bin}}{dM_h}$



NLC

$\Delta M_h = 269\ MeV$

$\frac{dN_{bin}}{dM_h}$



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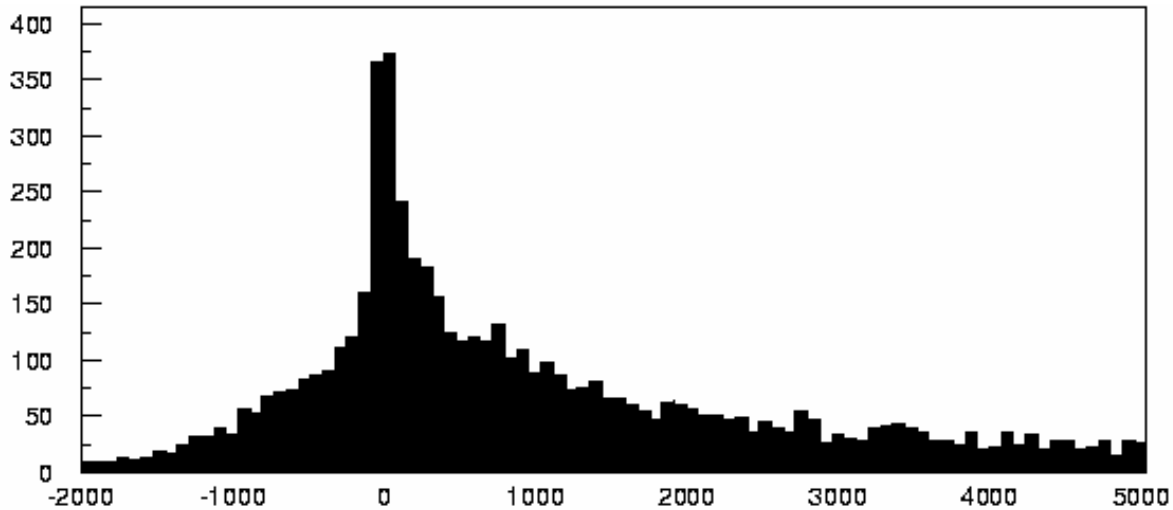
$\Delta M_h = 204\ MeV$

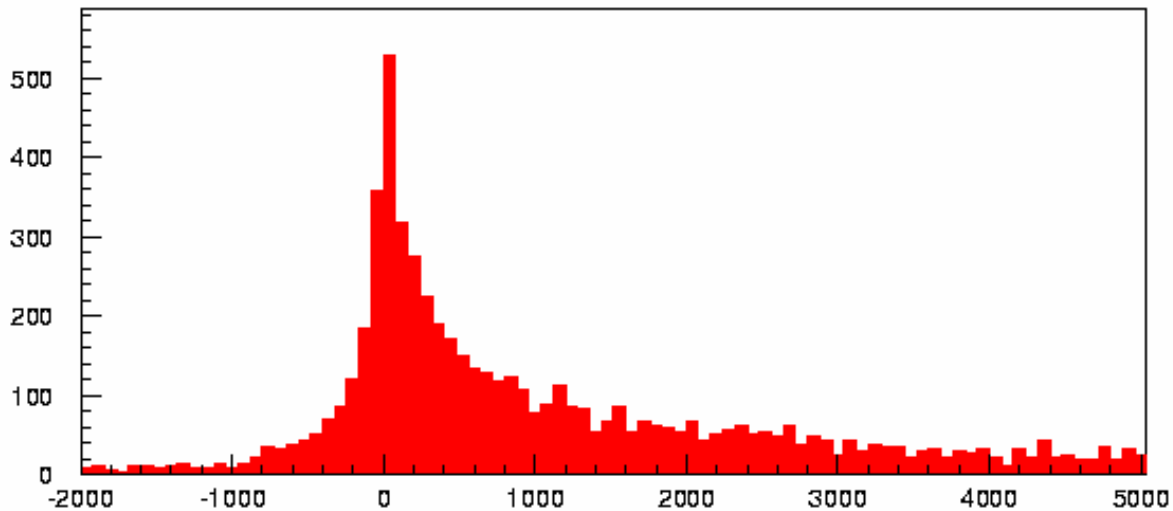
Recoil Mass (GeV)

Simdet Detector Simulation of $e^+e^- \to Z\gamma \quad \sqrt{s} = 500\ GeV \quad L = 20\ fb^{-1}$

$$Z \to e^+e^-, \mu^+\mu^-$$



NLC



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Recoil Mass Squared (GeV^2)

Summary

- No conclusion yet on effect of beam energy spread on recoil Higgs mass resolution – must solve the dN/dMh problem for recoil masses greater than 130 GeV, and must repeat study at Ecm = 350 GeV .
- This talk assumed perfect Monte Carlo simulation of lumi-weighted e+e- energy spectrum. To approach this state Bhabha's and other types of events must be used to extract the spectrum. Perhaps the recoil mass spectrum of e+e- → Zgamma will be helpful here.
- It might be interesting to do this type of error estimate for other physics analyses such as SUSY endpoint spectrum mass measurements.