Regenerating $H \rightarrow \mu^+\mu^-$ Signal and Background @ Ecm=1 TeV

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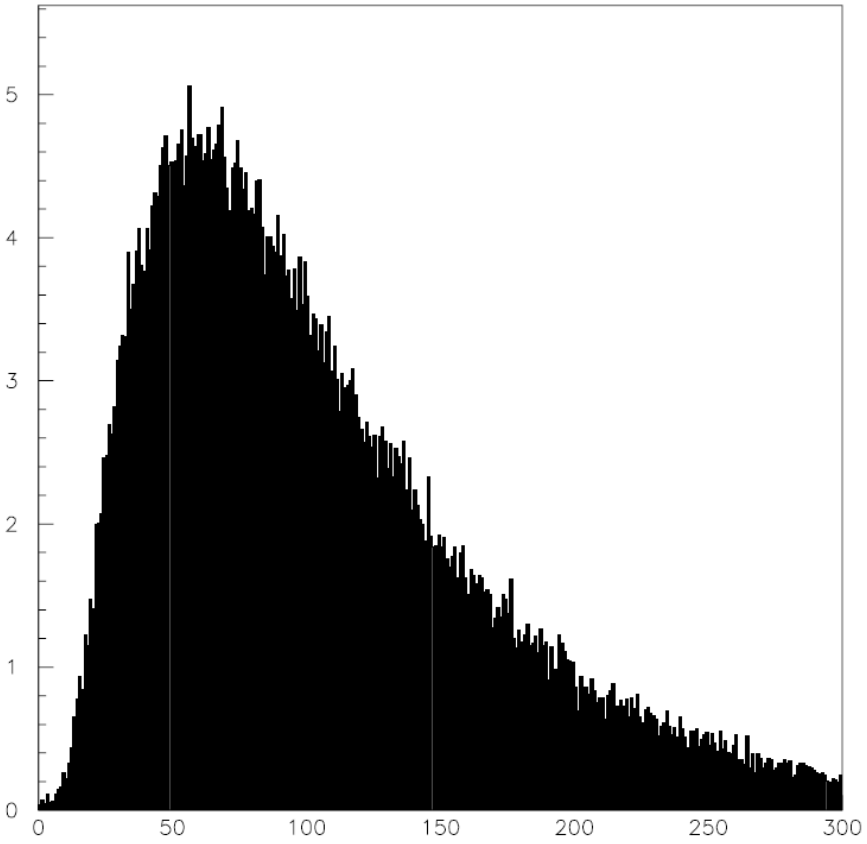
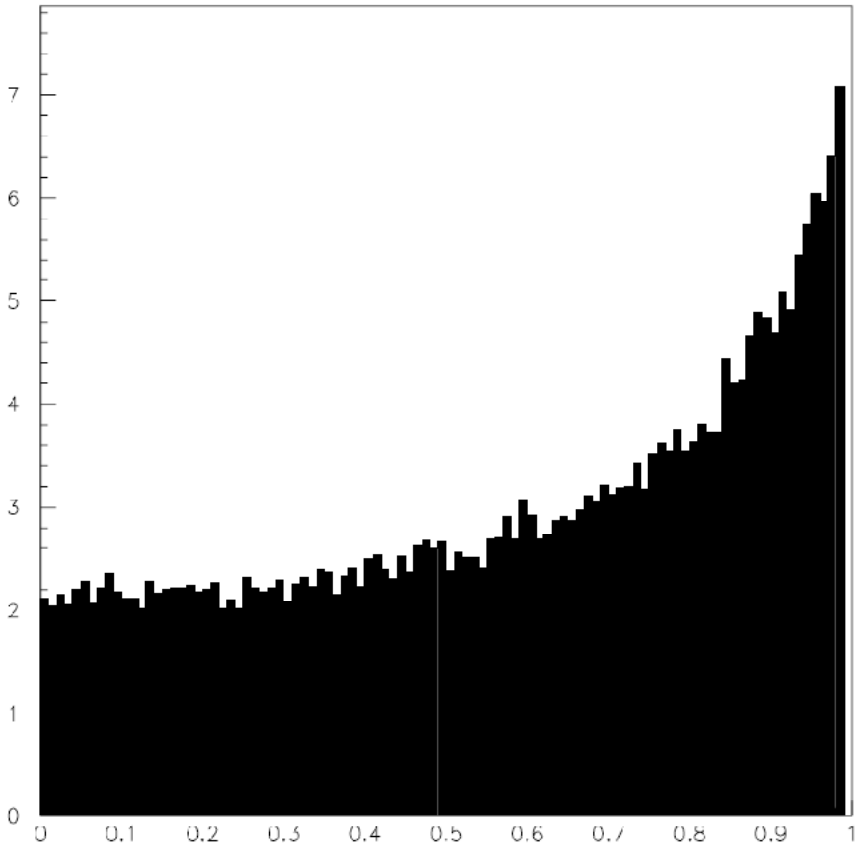
Feb 2, 2010

Energy and $|\cos\theta|$ distributions for muons from

$$e^+e^- \to \nu_e\bar{\nu}_e h \to \nu_e\bar{\nu}_e\mu^+\mu^- \text{ at } \sqrt{s} = 1 \text{ TeV}$$



E_μ (GeV)



$|\cos\theta_\mu|$

Preselection

Require:

$|\cos\theta_{thrust}| < 0.95$

$100\ \text{GeV} < E(visible) < 400\ \text{GeV}$

$20\ \text{GeV} < P_T(visible) < 500\ \text{GeV}$

$N_{chrg\ tracks} = 2$

Total Charge = 0

$N_{chrg\ tracks}$ (large impact parameter)=0

$N_{isolated\ muons} = 2$

$N_{jets} \leq 2$ where jet-finding is done after removing muons

$E_{jet}(photons) / E_{jet}(total) > 0.99$ for all jets

NN

- Use signal and background events that pass preselection to train *NN*
- Use the following variables in the neural net:

$E(visible)$

$P_T(visible)$

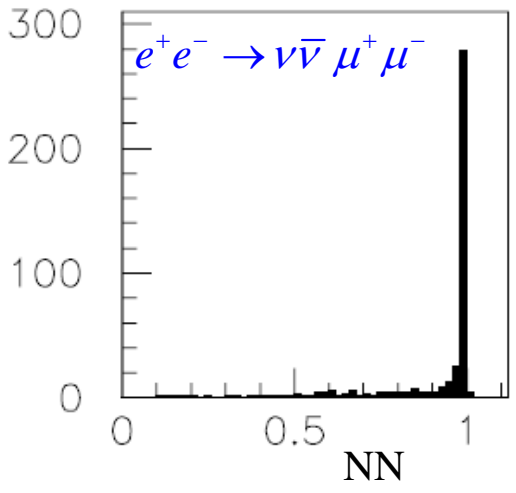
$|\cos\theta_{thrust}|$

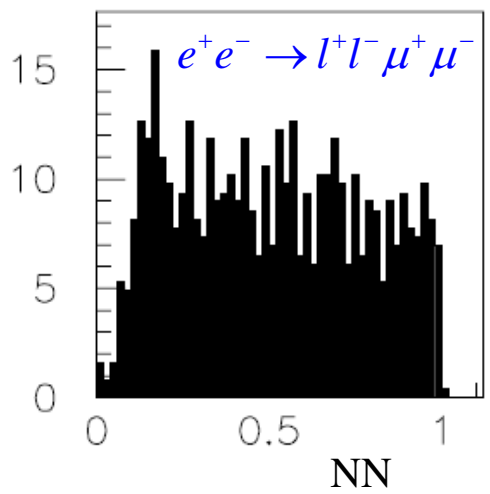
jets

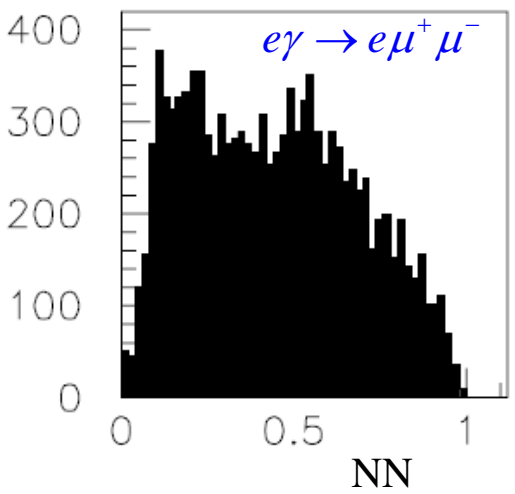
Event acollinearity

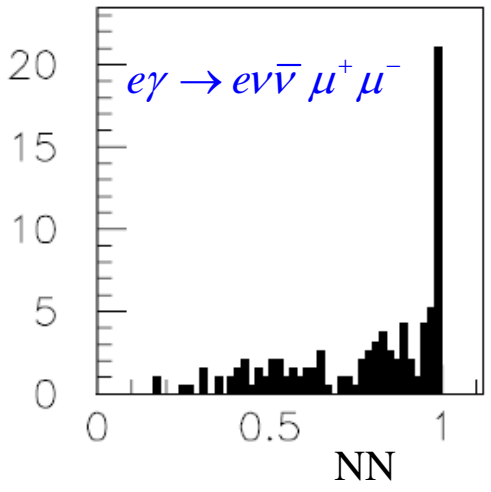
Event acoplanarity

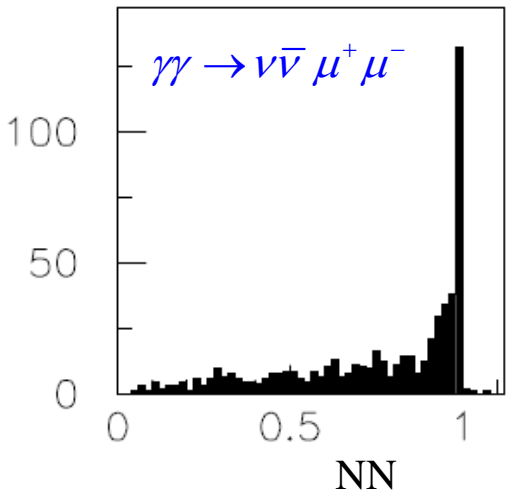
NN Distributions following preselection

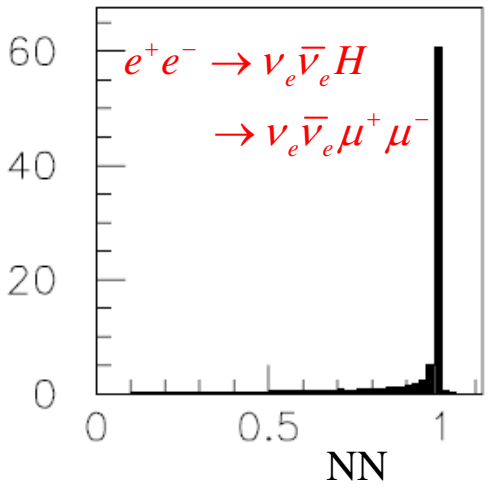




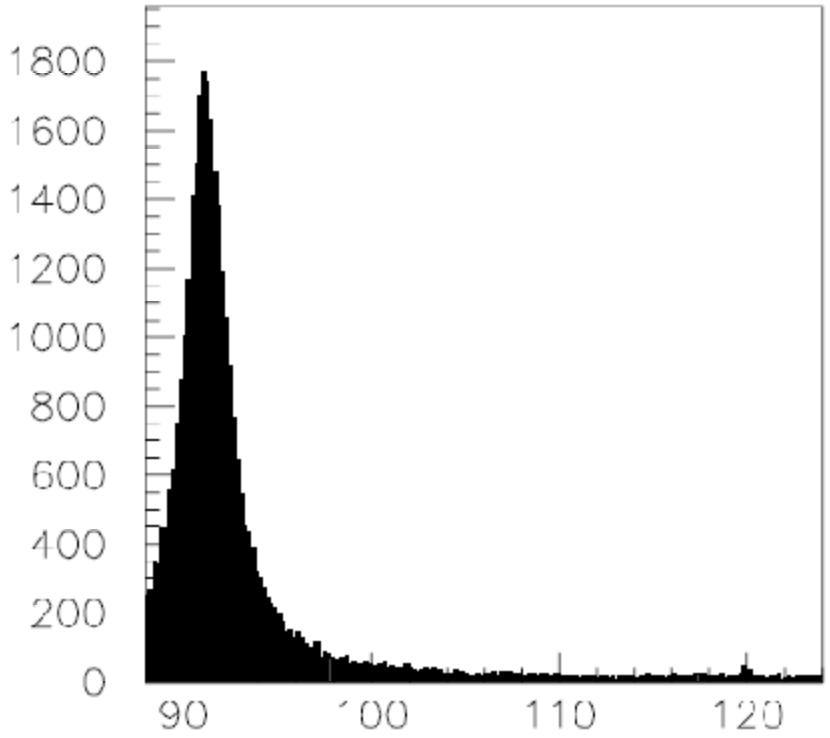




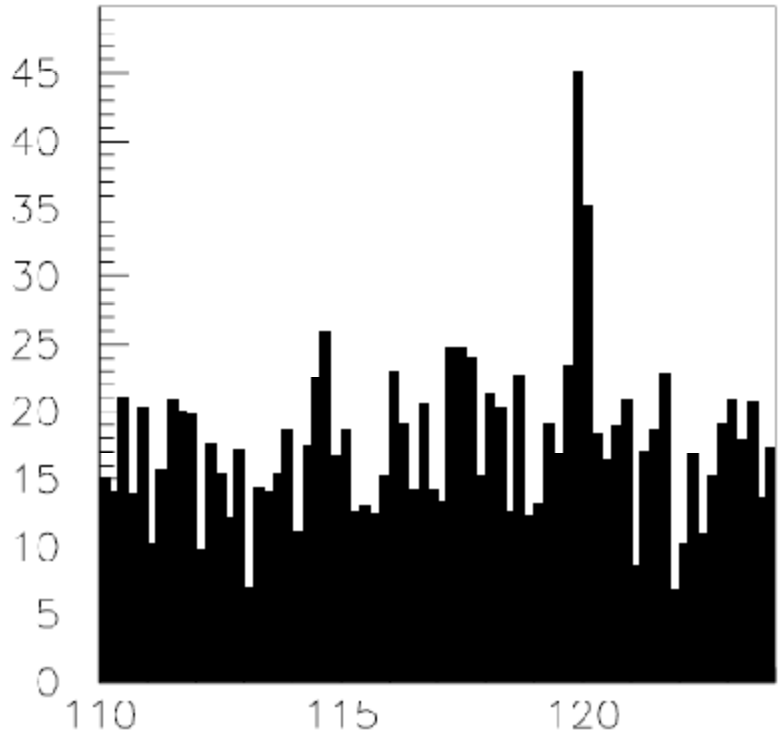




$M_{\mu\mu}$ Distributions for NN>0.95 for signal and background summed



$M_{\mu^+\mu^-}$ (GeV)



$M_{\mu^+\mu^-}$ (GeV)

$a = 2\times10^{-5}$

$b = 1\times10^{-3}$

$$\frac{\delta p_t}{p_t^2} = a \oplus \frac{b}{p_t \sin\theta}$$

$M_{\mu\mu}$ Distributions for Different Random Number Seeds

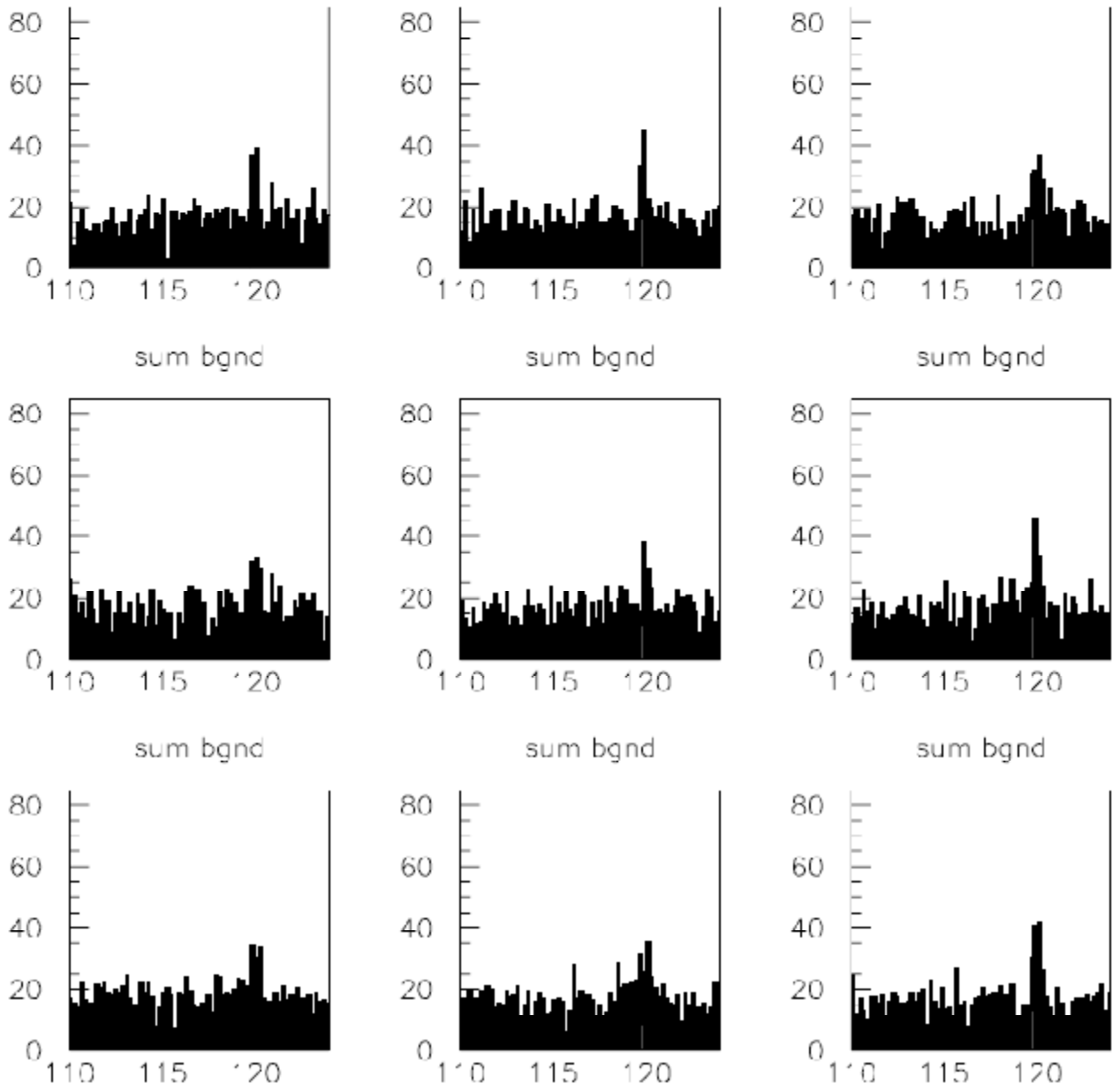
$\sqrt{s} = 1\,TeV$

$L = 1000\ fb^{-1}$

$a = 2 \times 10^{-5}$

$b = 1 \times 10^{-3}$

$$\frac{\delta p_t}{p_t^2} = a \oplus \frac{b}{p_t \sin\theta}$$



$\sqrt{s} = 1\,TeV$

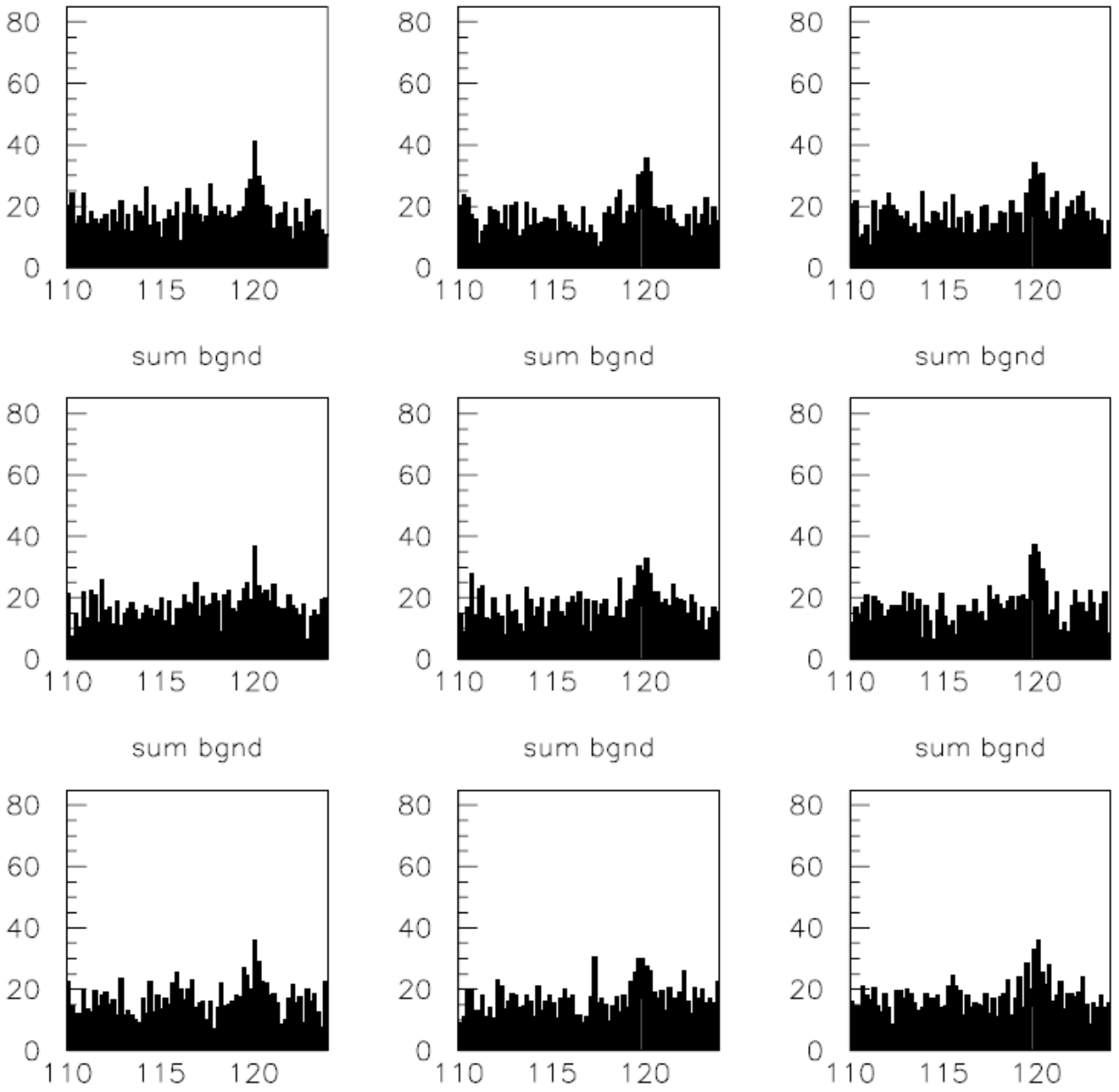
$L = 1000\ fb^{-1}$

$a = 4 \times 10^{-5}$

$b = 1 \times 10^{-3}$

$$\frac{\delta p_t}{p_t^2} = a \oplus \frac{b}{p_t \sin\theta}$$

$M_{\mu\mu}$ Distributions for Different Random Number Seeds



$\sqrt{s} = 1\,TeV$

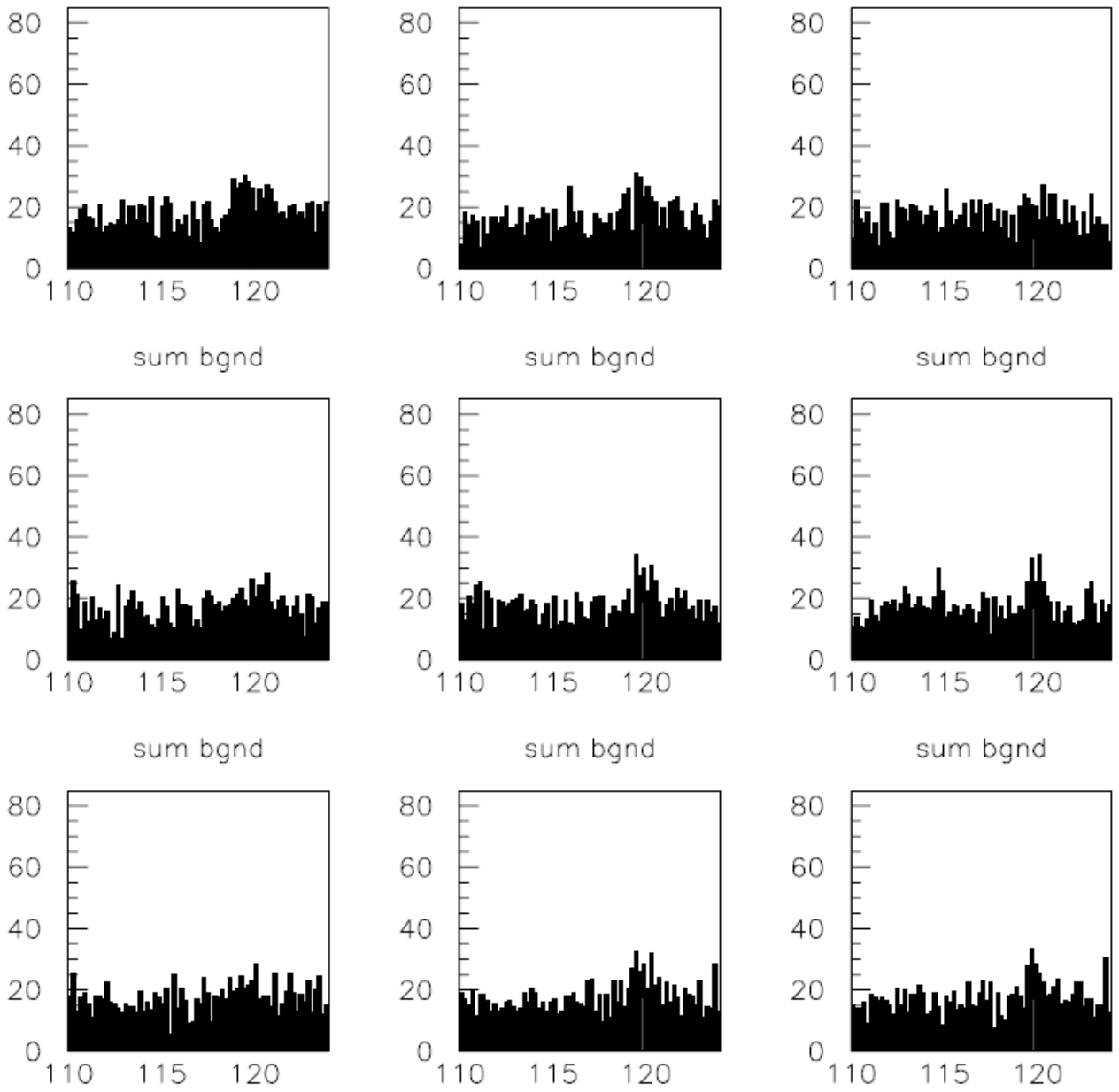
$L = 1000\ fb^{-1}$

$a = 8 \times 10^{-5}$

$b = 1 \times 10^{-3}$

$$\frac{\delta p_t}{p_t^2} = a \oplus \frac{b}{p_t \sin\theta}$$

$M_{\mu\mu}$ Distributions for Different Random Number Seeds



$\sqrt{s} = 1\,TeV$

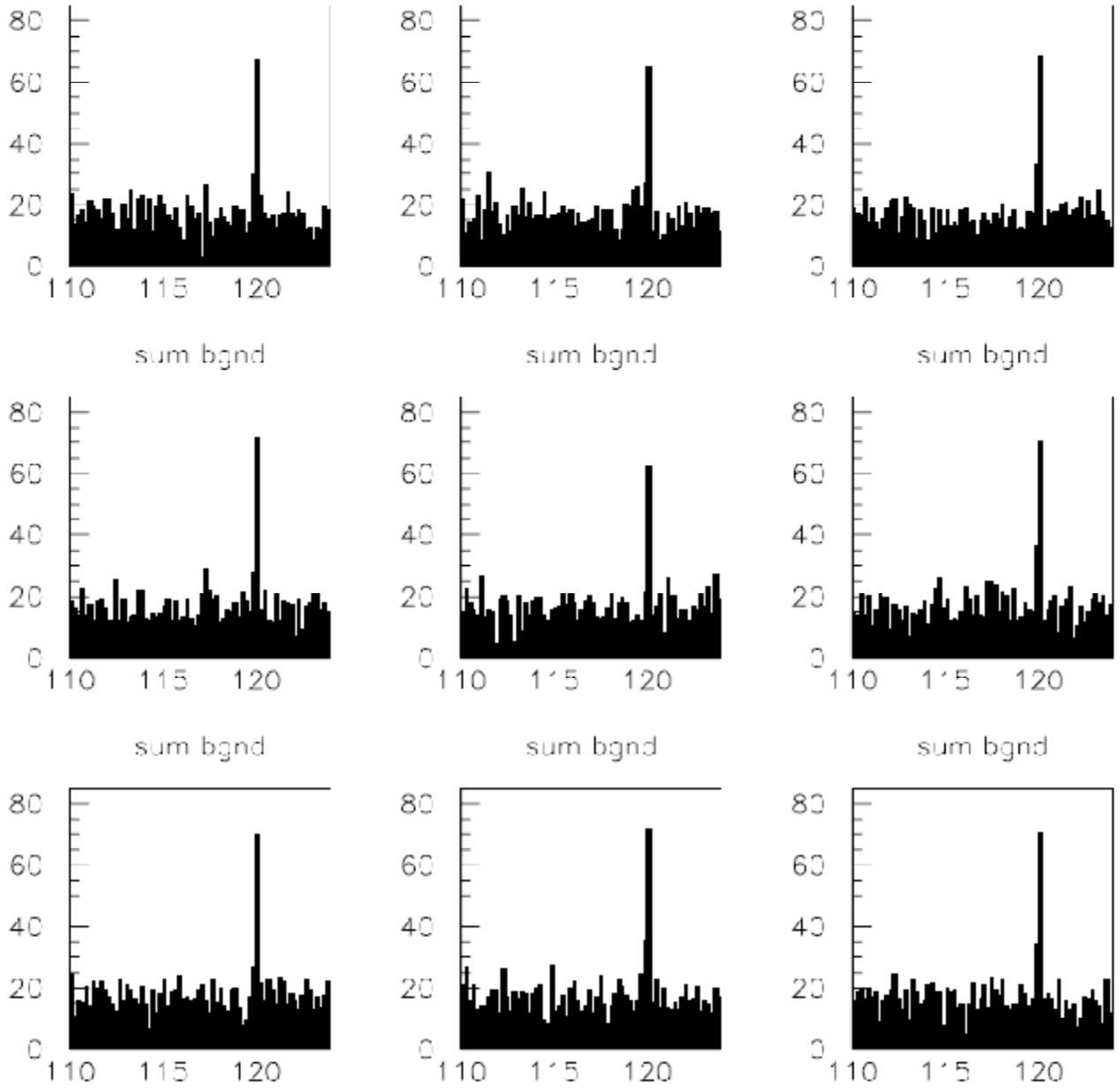
$L = 1000\ fb^{-1}$

$a = 0$

$b = 0$

$$\frac{\delta p_t}{p_t^2} = a \oplus \frac{b}{p_t \sin\theta}$$

$M_{\mu\mu}$ Distributions for Different Random Number Seeds



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/nfs/mstore/g/lcddata/1000/w30816_01.stdhep      1    40438      0.001723      n2n2h_o  1 -1
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.
.

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-rwxr-xr-x+ 1 timb lcddata     491 2010-02-02 03:48 derived_80L_30R
-rw-r--r--+ 1 timb lcddata     822 2010-02-02 03:48 inv_ab_stdhep_files_NLC_vve2e2_mh120p0_ecm000_80L_30R
-rw-r--r--+ 1 timb lcddata       0 2010-02-02 03:48 output_80L_30R.errlog
-rw-r--r--+ 1 timb lcddata    3792 2010-02-02 03:51 output_80L_30R.log
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/nfs/mstore/g/lcddata/1000/w30846_01.stdhep	1	102754	134.751389	e1a_e1e2e2_o	-1	-1
/nfs/mstore/g/lcddata/1000/w30853_01.stdhep	1	107942	214.512451	ae1_e1e2e2_o	1	1
/nfs/mstore/g/lcddata/1000/w30852_01.stdhep	1	103271	97.268082	ae1_e1e2e2_o	1	-1
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