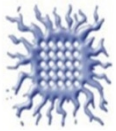
HEP GROUP VINČA



Higgs to μμ on 1.4 TeV

status report

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Overview

Signal and background x-sec calculation

- Tools
- Generation status

Preliminary distributions

Outlook

Tools and assumptions

WHIZARD

Luminosity spectrum included – GUINEAPIG

ISR

Signal dom. production ch. WW fusion

$H \rightarrow \mu^+\mu^-$ rare proces BR=0.028%

H fragmentation through single channel PYTHIA

mH=120 GeV

Background

mH=12000 GeV

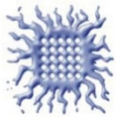
$e^+e^-\mu^+\mu^-$ ($8° < \theta < 172°$) & $100\ \text{GeV} < M_{\mu\mu} < 140\ \text{GeV}$

$\mu^+\mu^-$ $100\ \text{GeV} < M_{\mu\mu} < 140\ \text{GeV}$

C. Grefe LCD-note-2011-035

Generation status

	3TeV	*1.4 TeV*
signal		
$e^+e^- \to \upsilon_e\bar{\upsilon}_e H \to \upsilon_e\bar{\upsilon}_e\mu^+\mu^-$	~ 0.118 fb ✓	~ 0.069 fb
$e^+e^- \to e^+e^- H \to e^+e^-\mu^+\mu^-$	~ 0.012 fb ✓	~0.007 fb
background		
$e^+e^- \to \upsilon\upsilon\mu^+\mu^-$	~ 136 fb ✓	~ 95 fb
$e^+e^- \to e^+e^-\mu^+\mu^-$	~ 540 fb*	~ 450 fb
$e^+e^- \to \mu^+\mu^-$	~ 7.2 fb*	~ 5.3 fb
$e^+e^- \to \tau^+\tau^-$	~ 160 fb *	~ 173 fb
$e^+e^- \to \tau^+\tau^-\upsilon\upsilon$	~ 83 fb *	~ 70 fb
$\gamma\gamma \to \mu^+\mu^-$	~ 20140 fb ✓	~18700 fb



Signal

reproduced at 3TeV

10^5 evts produced at 1.4 TeV

Main backgound

$\nu\nu\mu^+\mu^-$ reproduced at 3 TeV

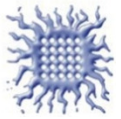
$e^+e^-\mu^+\mu^-$ requires a large number of iteration steps to adapt the phase space (at least 20)

higher x-sec at 3 TeV

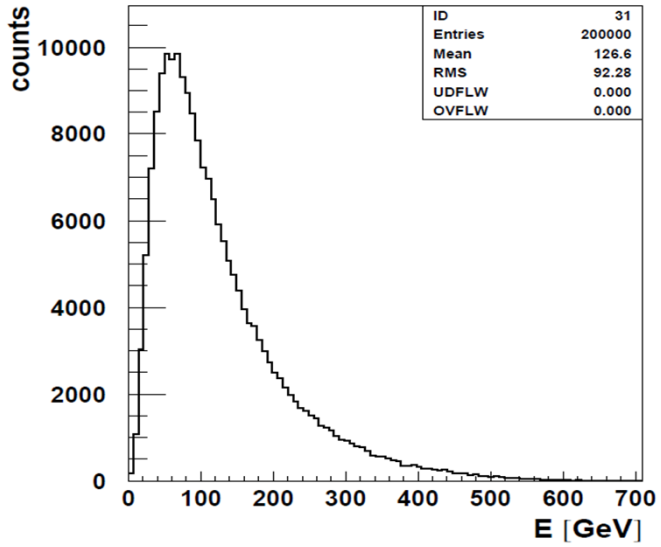
Additional background

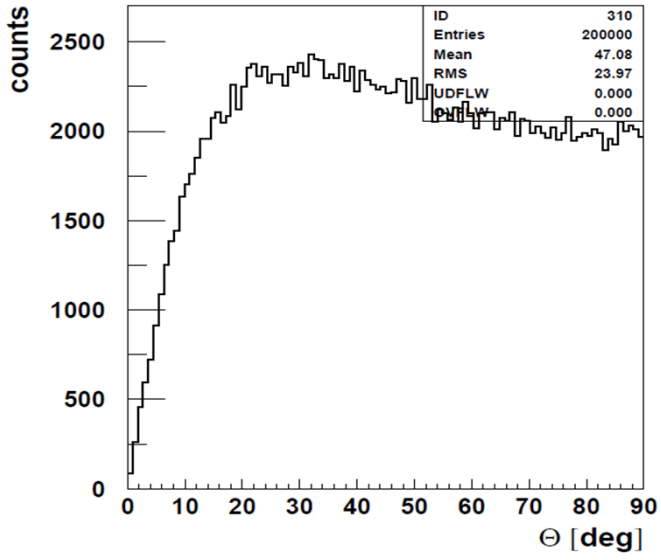
lower x-sec at 3 TeV fb

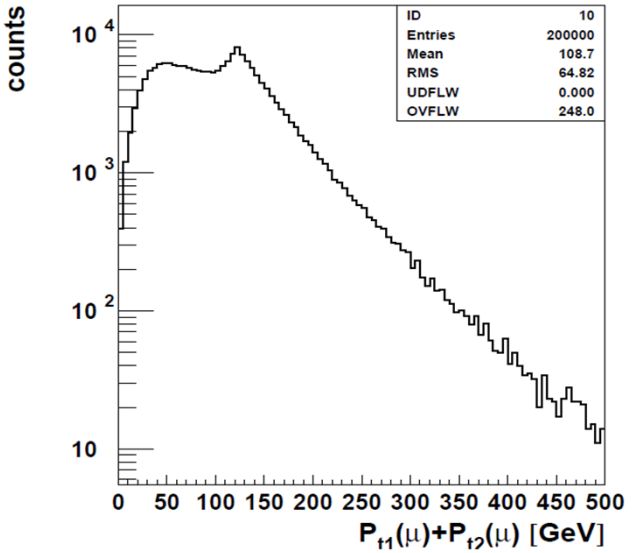
$\gamma\gamma \to \mu^+\mu^-$ reproduced at 3 TeV



Basic signal μ distributions 1.4 TeV

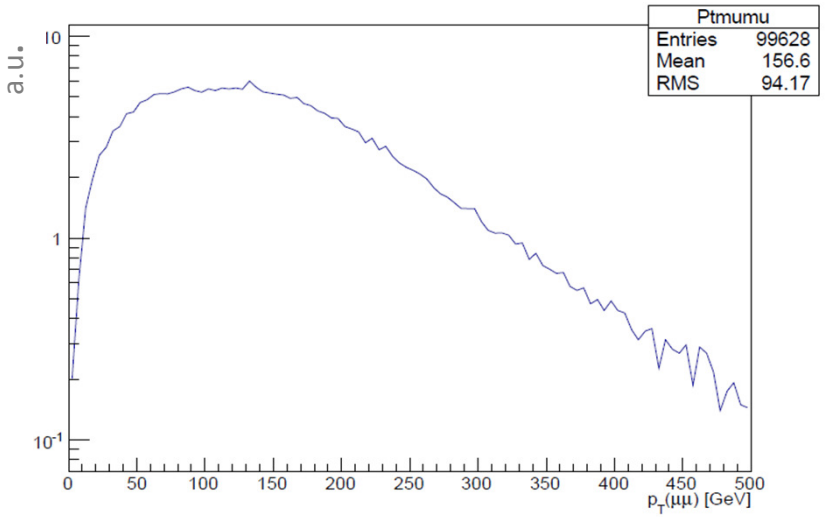


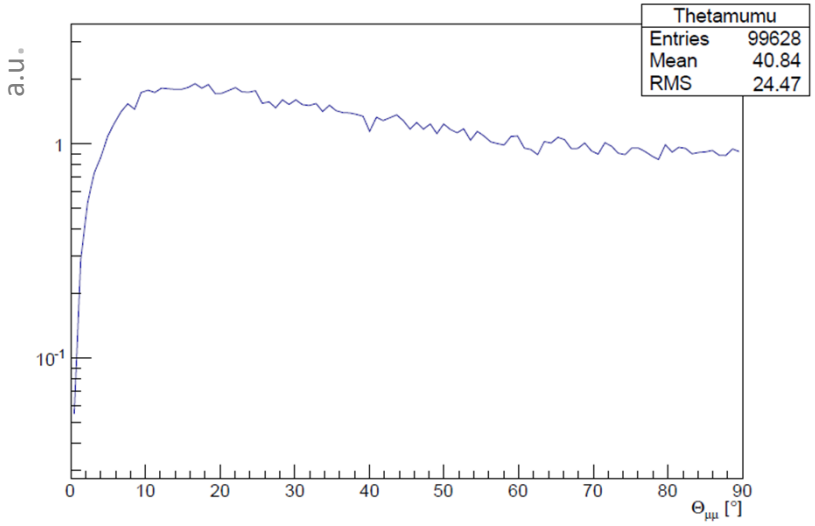




True information generator level
No selection cuts
$N_{evt}=10^5$
Relevant kinematical distributions have the expected shape

Dimuon system





True information generator level
Preselection cuts:

$P_t > 5$ GeV

$100 \text{ GeV} < M_{\mu\mu} < 140 \text{ GeV}$

Outlook

Next

understand the 4-f generation

x-check with other generators (CompHEP…)

production request mH=120 GeV?

x-angle boost

define preselection cuts

detector simulation

Prospects

MVA approach to suppress background

invariant mass fit