

Lista calchep

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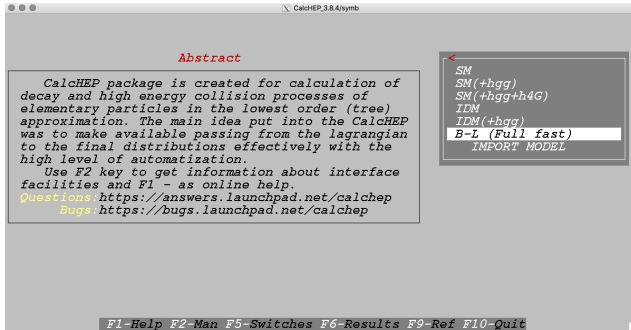
Programa de Pós-Graduação em Física (PPGF)

Introdução à análise de dados em FAE

Brazil

18.06.2020

1. Download the model “Minimal Zp models” from HEPMDB
2. Put the model files in the “models” directory (do not forget to rename the files!)



3. Calculate the cross-section for the various sub-process of the process $pp \rightarrow Z' \rightarrow \mu^+ \mu^-$. Remove the contributions from the photon and Z bosons and from the scalars $H1$ and $H2$ in order to estimate the contribution from Z' only.

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Model: B-L (Full fast)

List of particles (antiparticles)

A(A )- photon           Z(Z )- Z boson          G(G )- gluon
W+(W- )- W boson        Zp(Zp )- Zprime boson  e(E )- electron
m(M )- muon             l(L )- tau-lepton      nl(nl )- lt-neutrino-1
n2(n2 )- lt-neutrino-2  n3(n3 )- lt-neutrino-3 ~n1 - hv-neutrino-1
~n2 - hv-neutrino-2     ~n3 - hv-neutrino-3    u(U )- u-quark
d(D )- d-quark          c(C )- c-quark         s(S )- s-quark
t(T )- t-quark          b(B )- b-quark        H1(H1 )- Light Higgs
H2(H2 )- Heavy Higgs

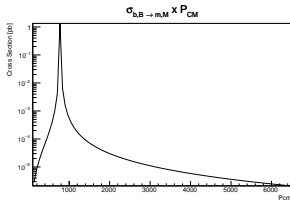
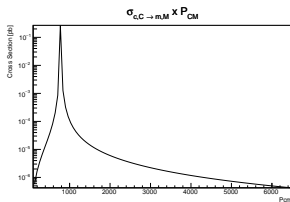
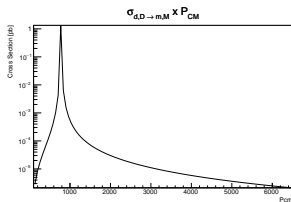
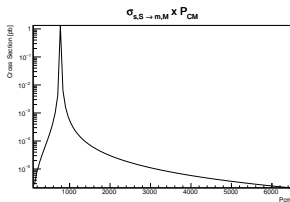
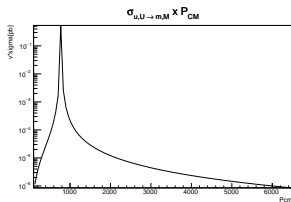
Enter process: p,p -> m,M
composite 'p' consists of: u,U,d,D,c,C,b,B,s,S,G
Exclude diagrams with A,Z,H1,H2

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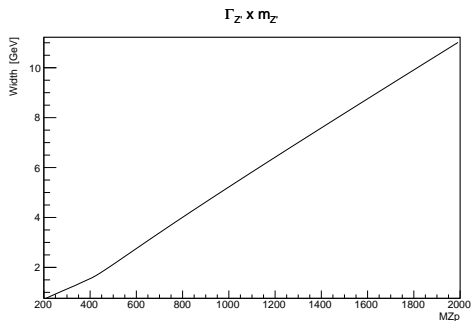
3. Calculate the cross-section for the various sub-process of the process $pp \rightarrow Z' \rightarrow \mu^+ \mu^-$. Remove the contributions from the photon and Z bosons and from the scalars H1 and H2 in order to estimate the contribution from Z' only.

Subprocess	Cross section (pb)
$u, U \rightarrow m, M$	4.26804×10^{-7}
$d, D \rightarrow m, M$	2.12124×10^{-6}
$c, C \rightarrow m, M$	4.26804×10^{-7}
$b, B \rightarrow m, M$	2.12124×10^{-6}
$s, S \rightarrow m, M$	2.12124×10^{-6}

4. Check unitarity using 1D integration option to plot Xsec versus Ecm



5. Check how the Z' width vary with its mass



6. Calculate the Xsec for the above process using different Z' mass in batch mode. Generate events.

Numerical Sessions

B-L (Full fast)

Done!

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[arXiv:1207.6082](#)

Scans	σ (fb)	Running	Finished	Time (hr)	N events
MZp=1000	76.442	0/11	11/11	0.01	1000
MZp=1500	12.351	0/11	11/11	0.01	1000
MZp=2000	2.8761	0/11	11/11	0.01	1000
				0.03	



Remember to clear your web browser cache if the plots are not updating properly. Also, remember to refresh your browser if you started a new run.

7. Using the root tuple from the LHE event file, plot individual muons pseudorapidity, transverse momentum, muon pair rapidity and muon pair invariant mass.