LEPTON FLAVOR VIOLATION

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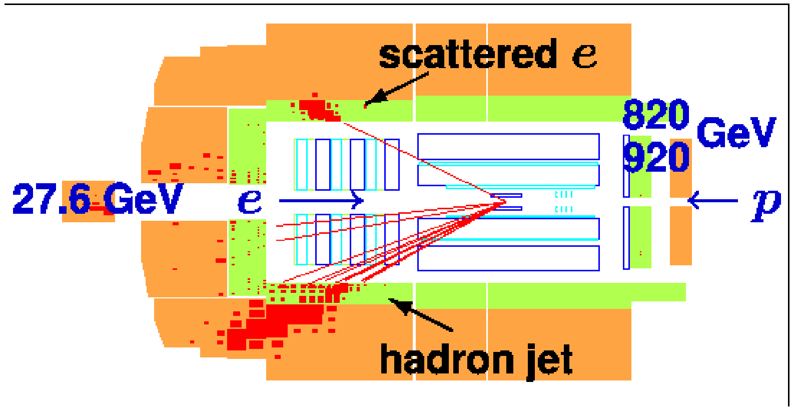
Talk content:

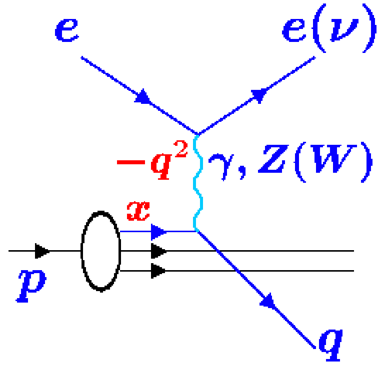
Control Plots;

Final selections

Limit plots.

HERA Physics





CoM Energy = 320 GeV

$e^+(e^-)$ $\Rightarrow$ $\sim$ **27.6 GeV**

p $\Leftarrow$ **920 (820) GeV**

- $Q^2 = -q^2$: four momentum transfer.
- x: momentum fraction of proton carried by the struck quark.
- y: energy fraction of incoming electron transferred to the hadronic system $\Rightarrow$ inelsticity.

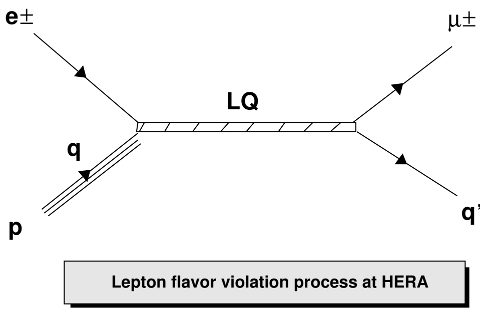
Leptoquarks

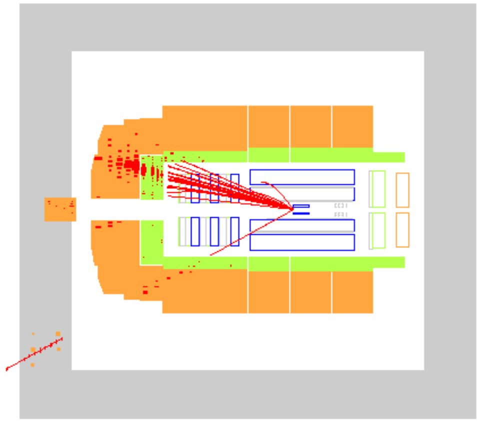
- An extension of SM is leptoquark;
  - carry B, $L \neq 0$ & couples to both letons and quarks.
  - explains clear symmetry between leptons and quarks.
- Buchmüller-Rückel-Wyler (BRW) model:
  - 7 scalar & 7 vector leptoquarks with
    * Fermion numbers:
      · $F = (3B + L) = 0$.
      · $F = (3B + L) = 2$.
- Branching ratios: $\beta_{eq} = 1, \frac{1}{2}$ & $\beta_{\nu q} = 0, \frac{1}{2}$.

Lepton Flavour Violation-μ channel

- One extension to SM is lepton flavour violation where there is an isolated muon or tau with high P_t instead of an electron.

- One way to LFV is a leptoquark decaying to μ or τ.





H1

Generated background events were compared to 99-00 data for e^+p collision using V_0^L LQ type in mass range 100-250 GeV.

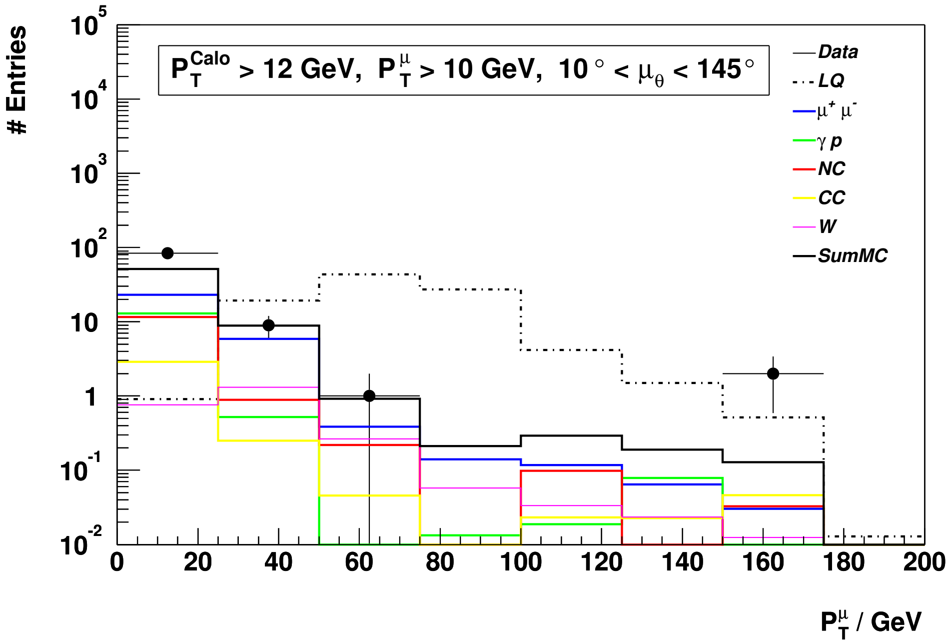
Background is the normal SM events:

- Photoproduction: Pythia(1739 pb^{-1}), Aroma (7527 pb^{-1}).
- Lepton pair: Grape
  - muon (50000 pb^{-1}),
  - tau (100000 pb^{-1}).
- Neutral current: Rapgap (2037 pb^{-1})
- W production: EpVec (100069 pb^{-1})
- Charged current:Django (7631.8 pb^{-1})
- Jpsi: EPJPsi
  - muon (975 pb^{-1}),
  - tau (5940 pb^{-1}).

Selections in the phase space selector:

Muon Theta	$10^\circ - 145^\circ$
Pt Calo(GeV) $>$	12
Pt Muon(GeV) $>$	10

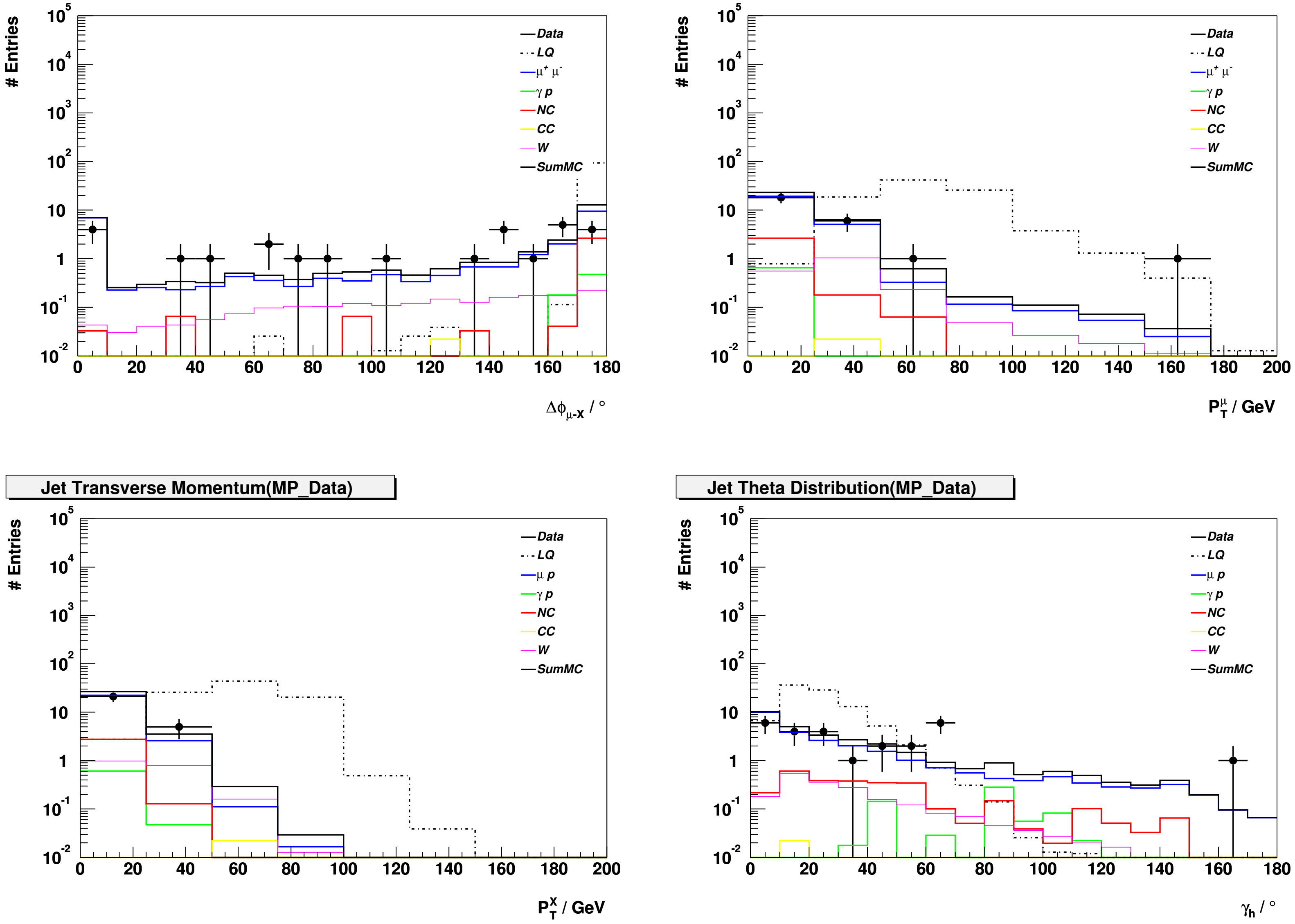
LQ generated at 175 GeV.



Selections in the Muon Pair selector (requiring isolated muon):

Muon Theta		$10^\circ - 145^\circ$	polar angle
Pt Calo(Gev)	$>$	12	P_t in liquid argon
Pt Muon(Gev)	$>$	10	
Dtrack	$>$	0.5	Isolated muon
Djet	$>$	1	Isolated muon
Number of electrons	$=$	0	
Number of muons	$>$	1	
V_{ap}/V_p		0 - 0.3	Isotropy of events.

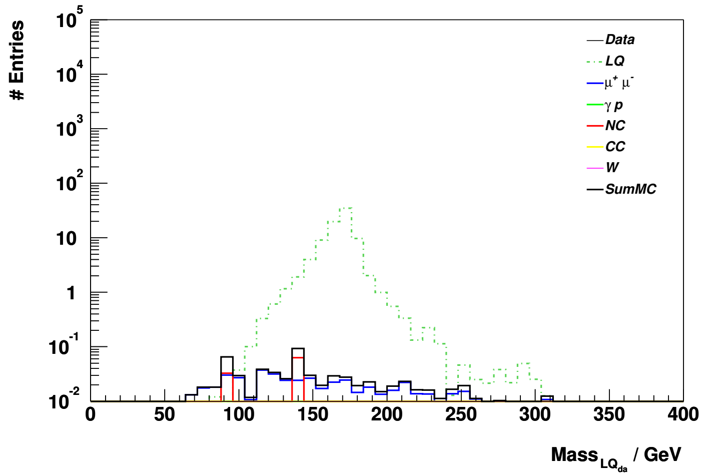
Data=26, MC=25.51 ± 5.86



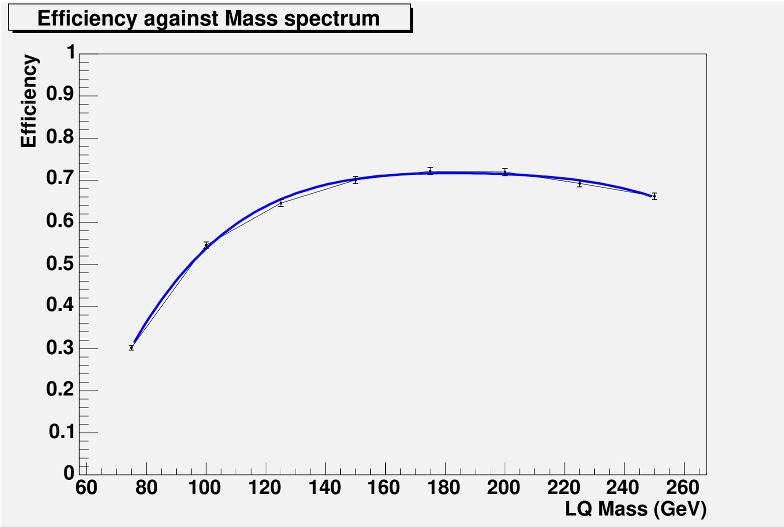
Final Selections:

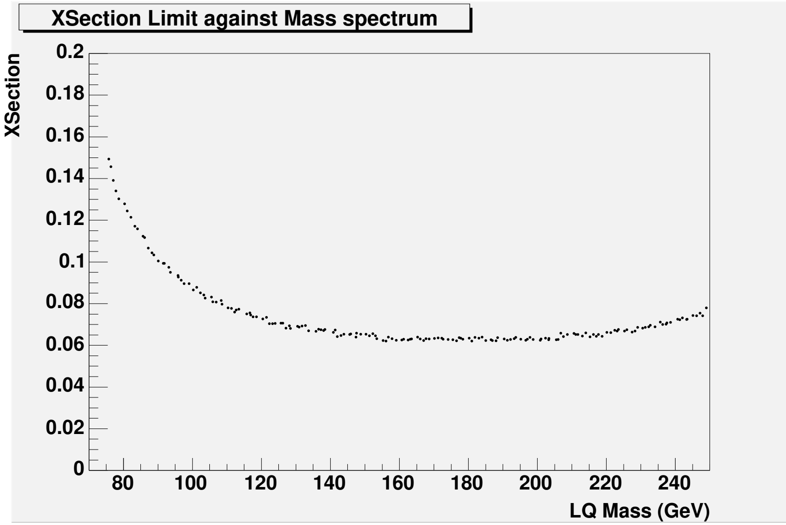
In addition to the phase space and Muon Pair selector cuts:

Jet Theta	$7° - 145°$
Jet $P_t >$	15 GeV
Acoplanarity >	$170°$
Z Vertex <	$\|35\|$

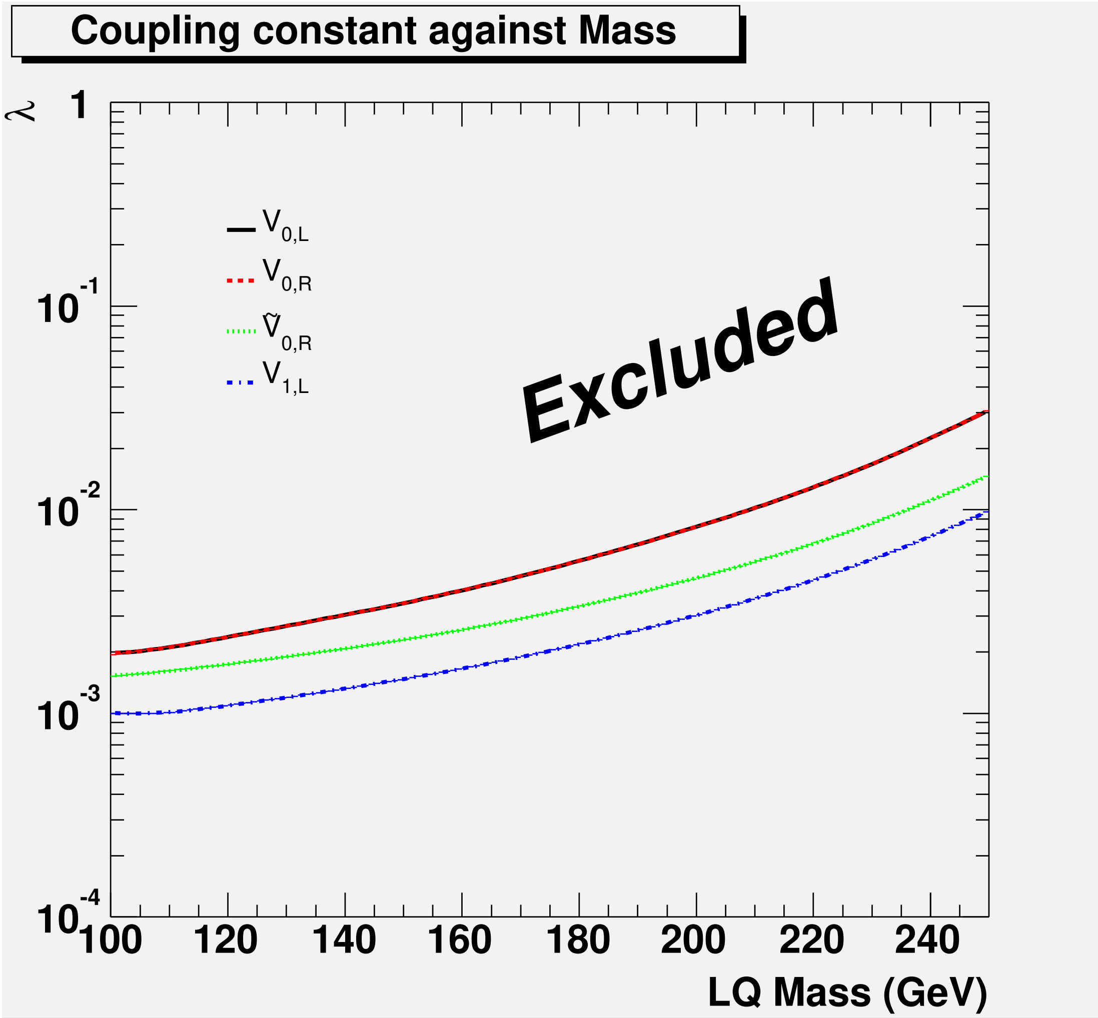


	Space	MP	Final
Sum MC	70.48 ± 23.48	25.51 ± 5.86	0.546 ± 0.356
Data9900	96	26	0





- Efficiency of LQ masses in range 75-250 GeV.
- Fit with polynomial of degree 4.



exclusion limits for vector LQ's in 99-00 runs (e^+p)

Conclusions

- No candidates have been found for lepton flavour volation in the muon channel.
- This study can be extended to higher mass region ($>> \sqrt{s}$).
- Scalar LQ's are still to be studied.
- Study 98-99 data ($e^- p$).