INTRODUCTION

Light gluino search

$\tilde{t}_1 \rightarrow c\tilde{g}$

- **Neutral R-hadrons analysis (R^o) :**
  - **DATA Monte-Carlo Comparison at 192, 196, 200, 202 GeV**
  - $\Delta M \leq 10$ **: Sequential analysis**
  - $\Delta M > 10$ **: Neural network analysis**
  - **Preliminary results**

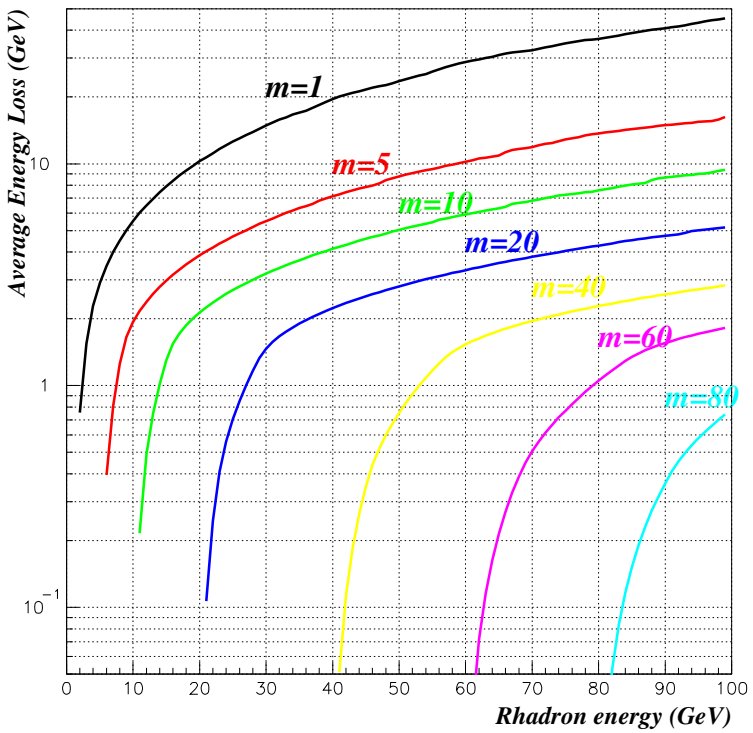
Simulation status

Neutral Rhadron simulation :

They are treated in DELSIM as :

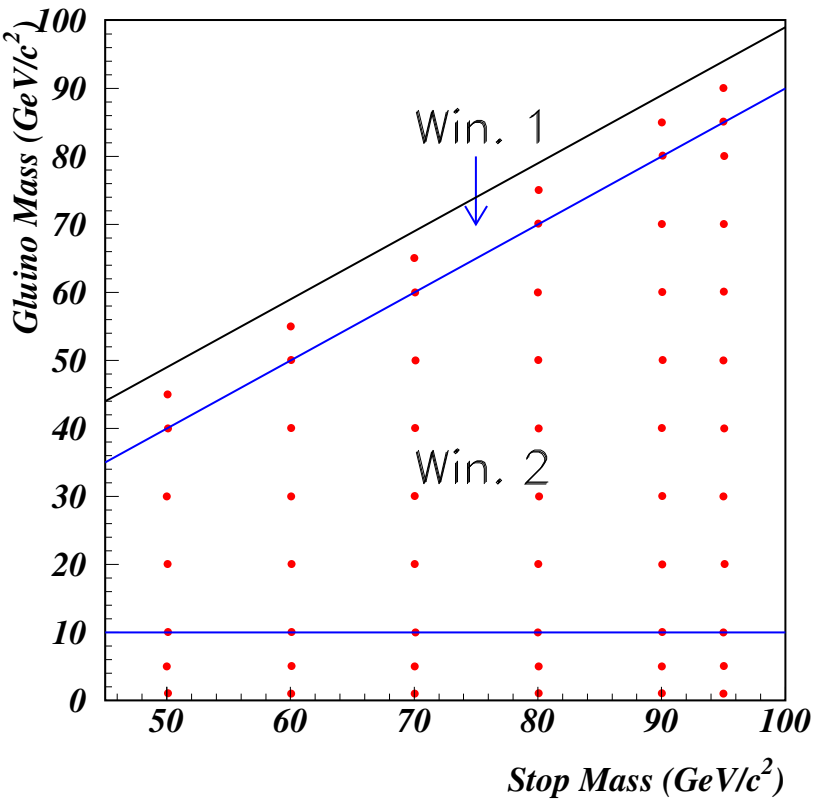
- k_L^o : R^o

The average energy loss of the R^o is estimated using a cross-section model and this energy is given to the k_L^o.



Simulation status :

500 events have been generated with DELSIM+DELANA :



• Analysis steps at 200 GeV:

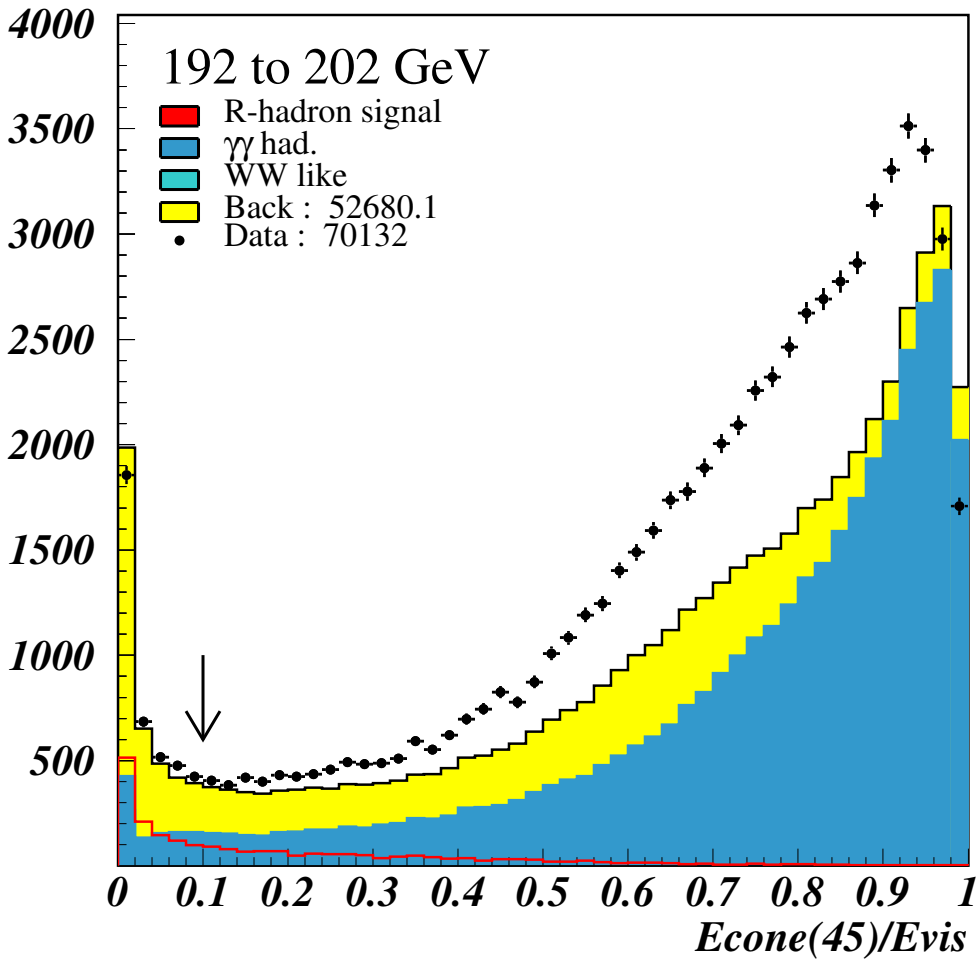
	N data	Nmc (unbiased)	Nmc (biased)
$E_{45^o}/E_{vis} < 0.1$	**1395**	**1468. ± 21.**	**1418. ± 8.3**
$Pt^{ch}_{max} \geq 2.$	**1160**	**1233. ± 16.**	**1221. ± 7.2**
$\lvert\cos(\theta miss)\rvert < 0.8$	**821**	**889.9 ± 11.7**	**886.4 ± 5.9**
$Pt_{mis} > 4.$	**720**	**757.5 ± 7.5**	**753.7 ± 5.0**
$0.05 < Evis/Ecms < 0.25$	**15**	**28.3 ± 5.1**	**23.9 ± 1.5**
$Coplanarity < 170.$	**9**	**14.4 ± 3.6**	**9.1 ± .88**
$Pt > 7\, OR\, Erad > 0.4$	**4**	**7.34± 2.4**	**3.87± .53**

$$E_{rad} = 2\frac{\sqrt{E^2_{hem1} + E^2_{hem2}}}{\sqrt{s}}$$

The same analysis is applied at 192, 196 and 202 GeV

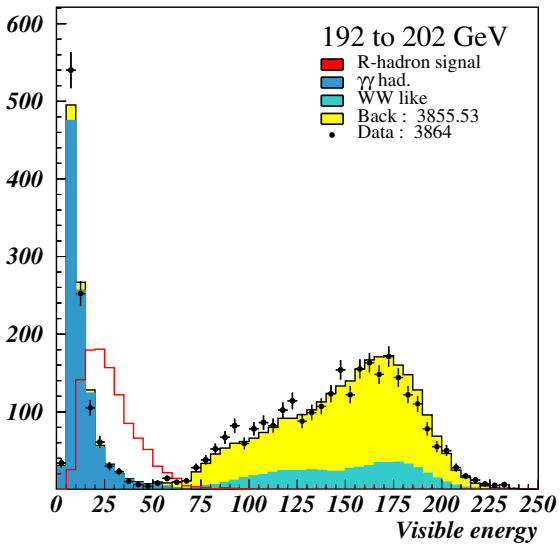
$\Delta M < 10.$

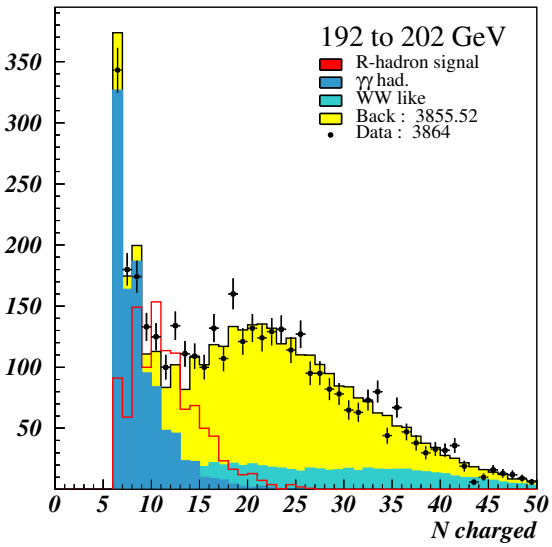
$\Delta M \leq 10.$

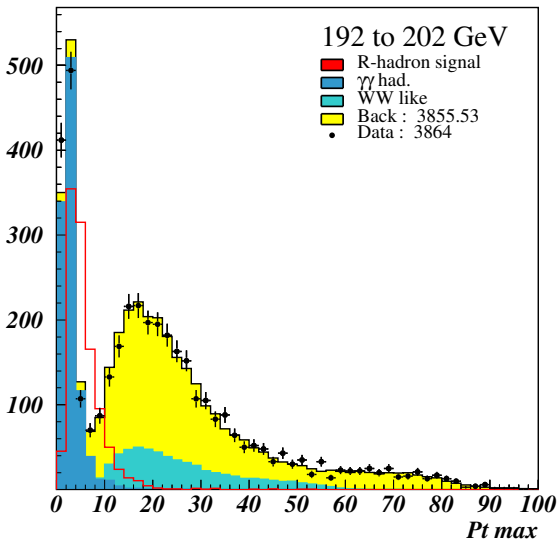


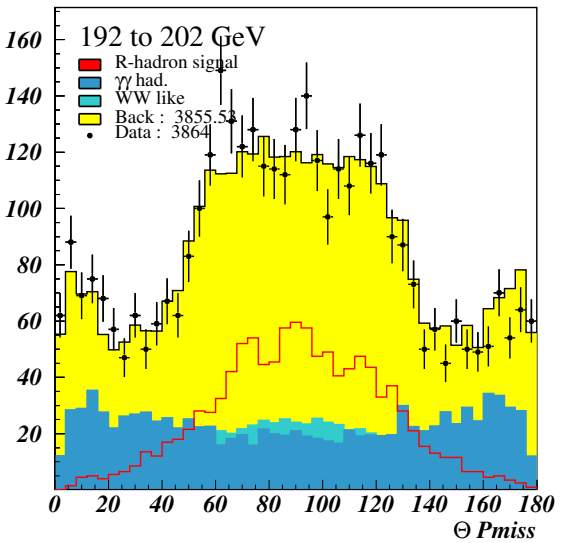
$\Delta M \leq 10.$

• DATA-MC comparison : 192-202 GeV

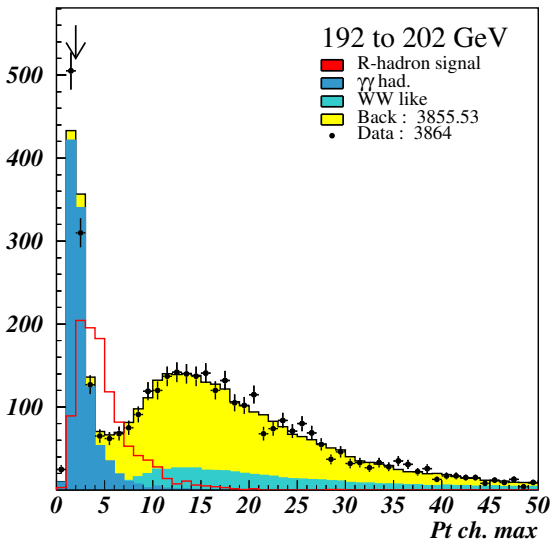


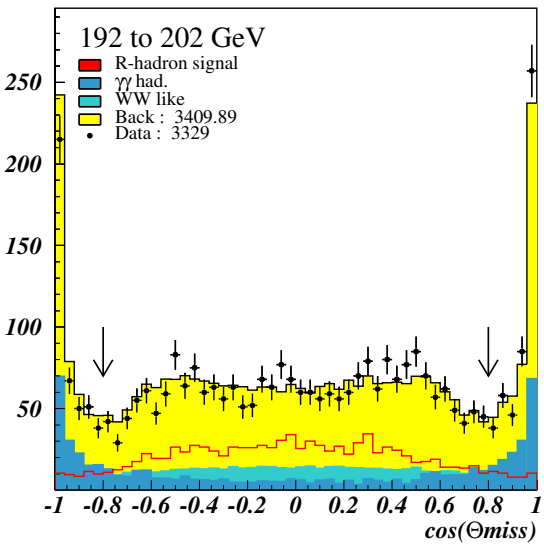


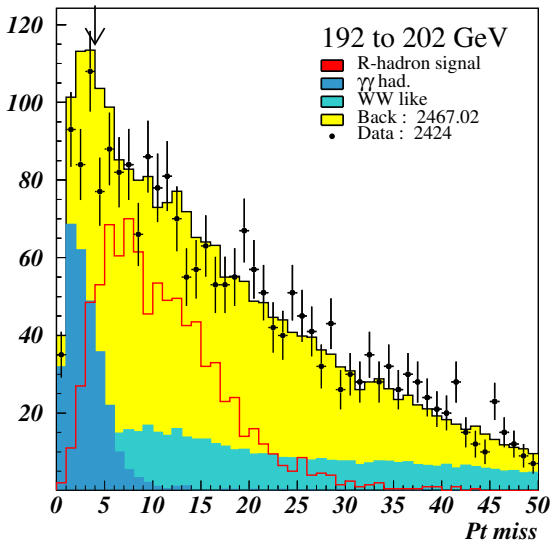


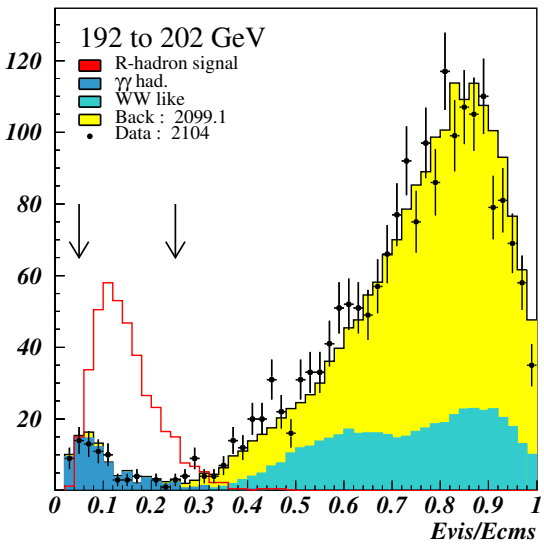


$\Delta M \leq 10.$

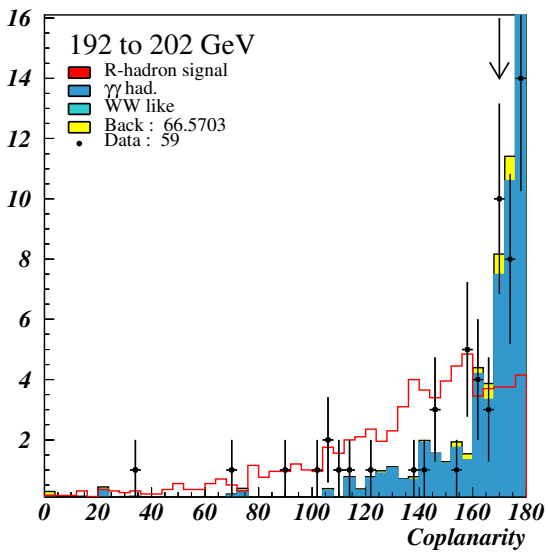


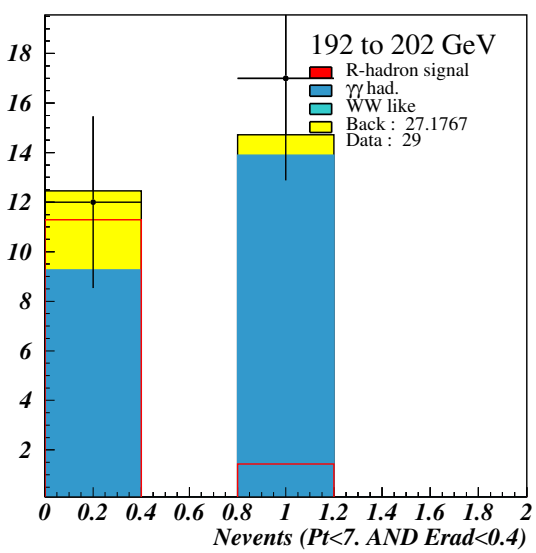






$\Delta M \leq 10.$





• Neural Network analysis:

- **10 inputs**
- **15 hidden nodes**
- **3 outputs :**

Output node	node 1	node 2	node 3
Signal	1	0	0
$q\bar{q}\gamma$ 4-fermions	0	1	0
$\gamma\gamma$ *had.*	0	0	1

- **Variables :**

  - $E_{charged}$
  - M_{vis}
  - $\sqrt{s'}$
  - P_t^{mis}
  - θ_{jet1-2}
  - *copla.*
  - $Dist_{WW}$
  - $H10 + H30$
  - $E_{ch.}^{max}$
  - $E_{ne.}^{max}$

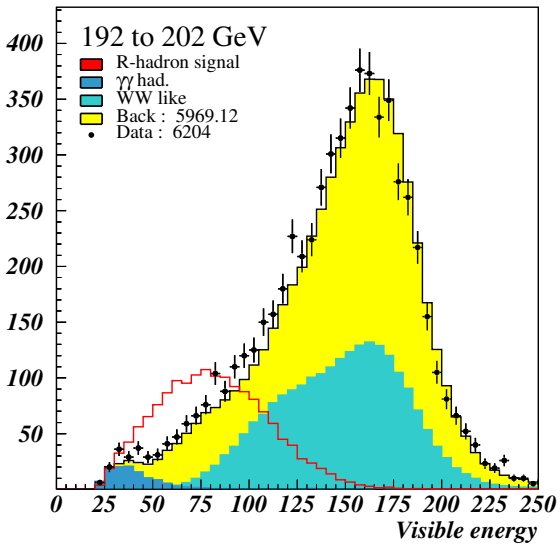
• Analysis steps at 200 GeV:

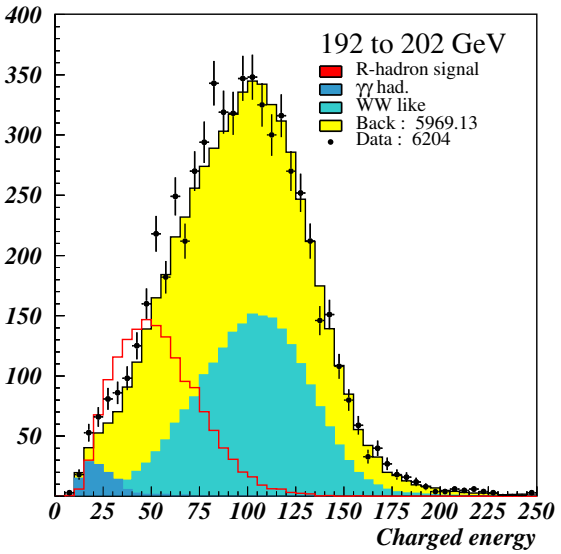
	N data	Nmc (unbiased)	Nmc (biased)
$N_{TPC} \geq 4$	**36313**	**41027. ±175.**	**26171 .± 36.**
$Pt^{ch}_{max} \geq 2.5$	**13189**	**13652. ± 75.**	**11802. ± 19.**
$Pt_{mis} \geq 4.$	**7976**	**7962. ± 42.**	**6997. ± 11.**
$Et \geq 20.$	**7228**	**6786. ± 26.**	**6536. ± 10.**
$E_{30^o}/E_{vis} < 0.6$	**5571**	**5177. ± 15.**	**5156. ± 9.4**
$E_{emf}/E_{cms} < 0.125$	**4452**	**4163. ± 14.**	**4148. ± 9.2**
$\lvert\cos(\theta miss)\rvert < 0.88$	**2595**	**2560. ± 10.**	**2552. ± 7.7**
$\lvert\cos(\theta thrust)\rvert < 0.88$	**2393**	**2392. ± 10.**	**2387. ± 7.5**
$Pt_{mis}/E_{vis} \geq 0.04$	**2227**	**2171. ± 9.9**	**2166. ± 7.3**
$NNout. > 0.92$	**10**	**11.91± 1.78**	**9.55± .53**
$E_{30^o}/E_{vis} < 0.1$	**7**	**7.58± 1.07**	**7.01± .45**
$M_{vis}/E_{cms} < 0.3$ **OR** $P_{mis}/E_{vis} > 0.5$	**3**	**5.55± 1.05**	**4.98± .39**

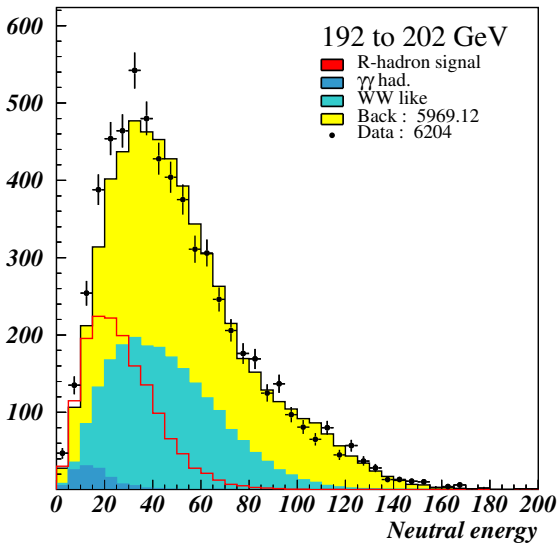
The same analysis is applied at 192, 196 and 202 GeV

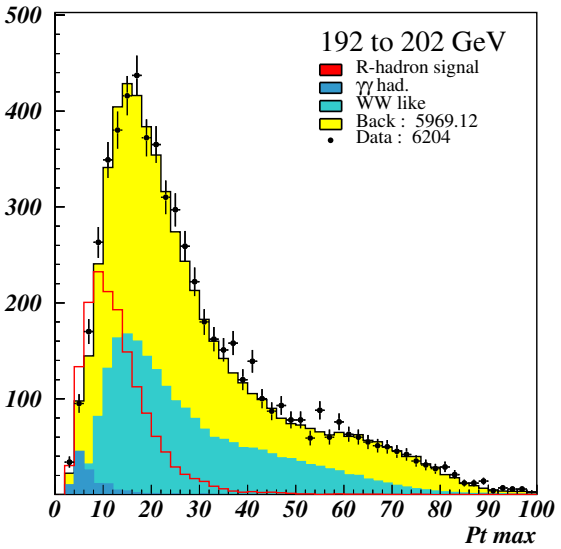
$\Delta M > 10.$

• DATA-MC comparison : 192-202 GeV

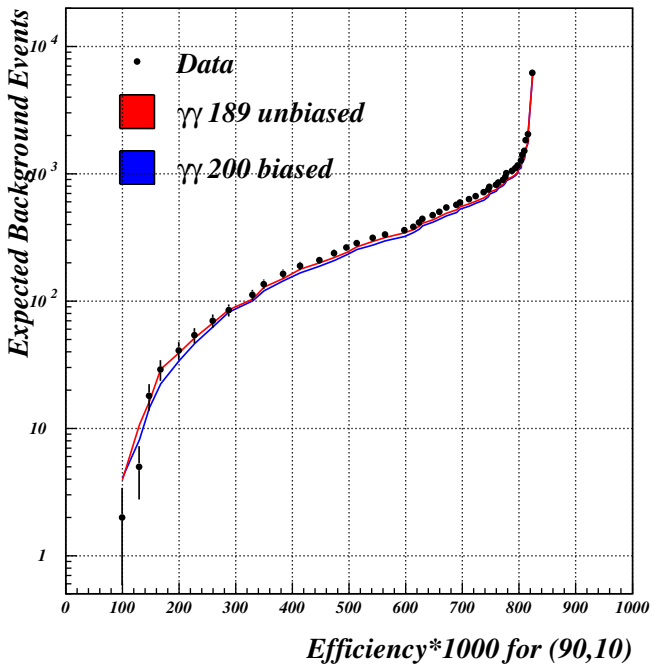


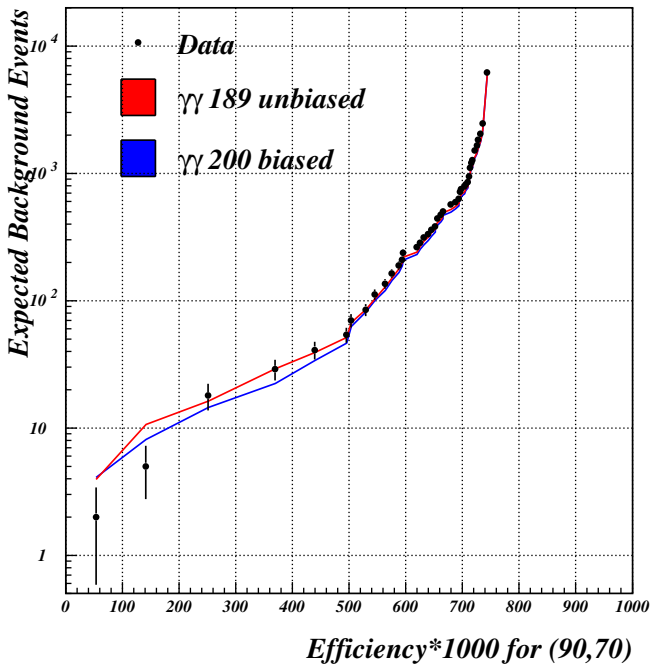






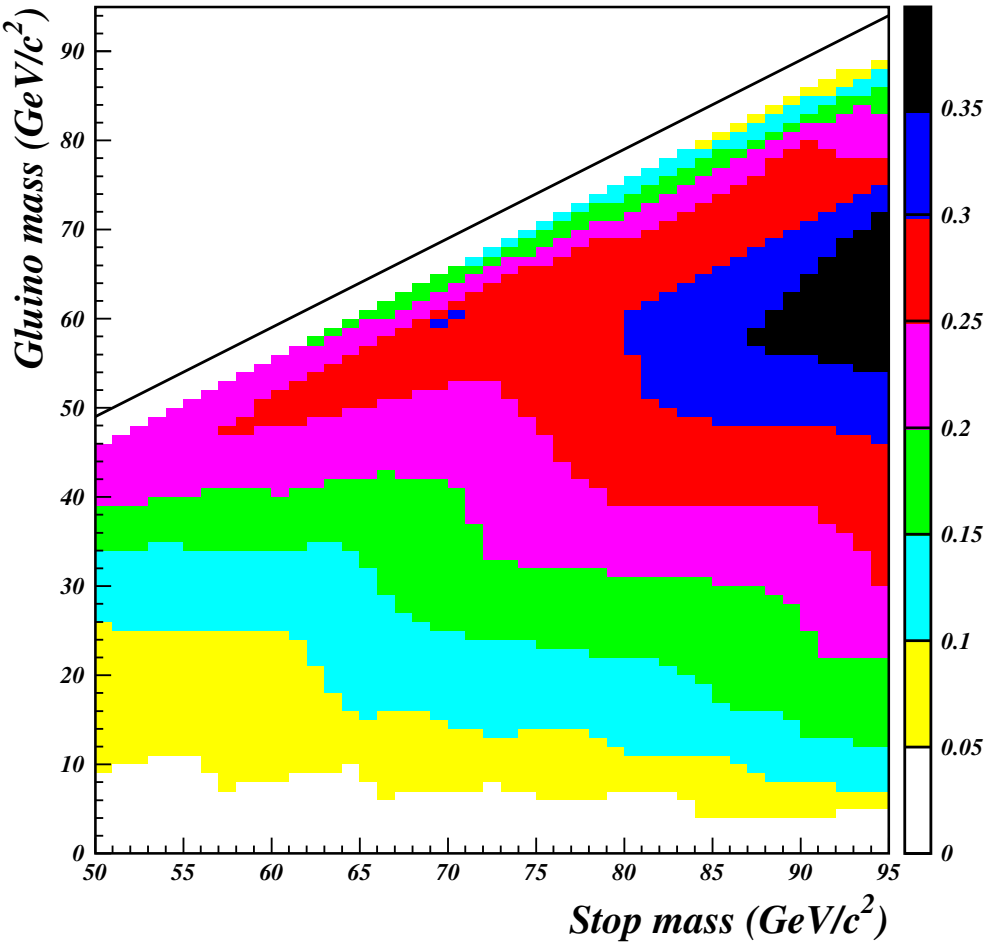
Neural network output :



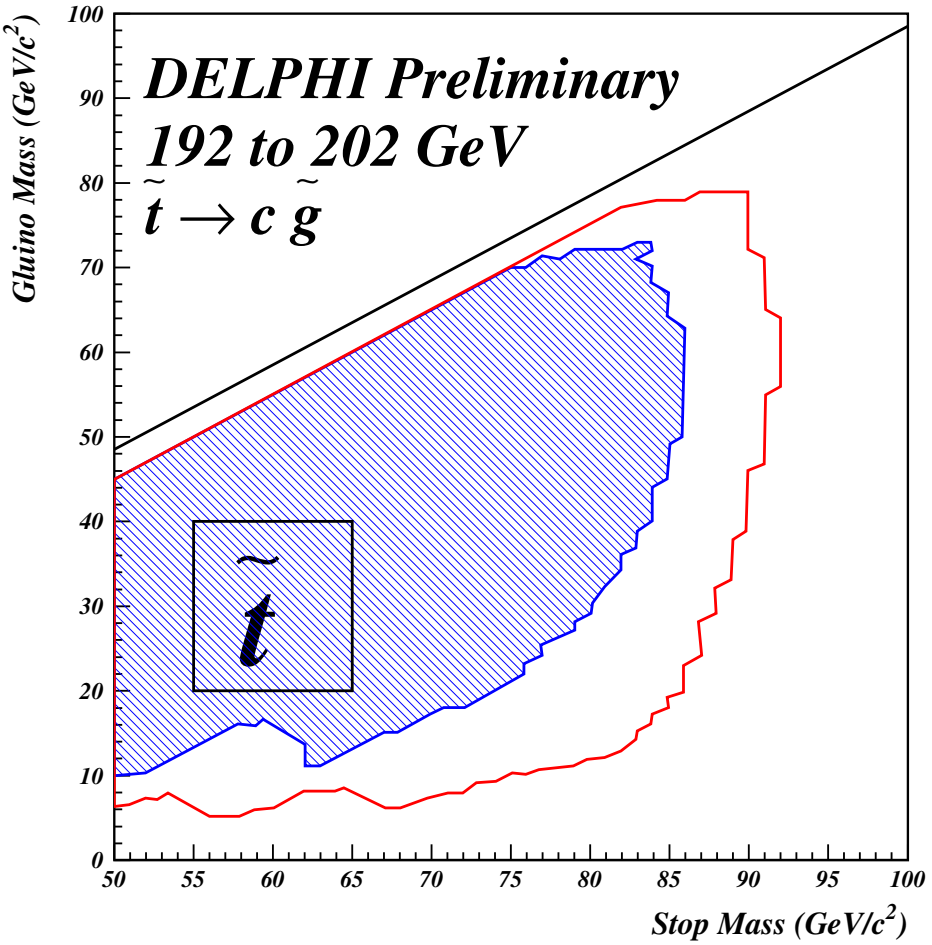


$\Delta M > 10.$

	$\Delta M \leq 10.$		$\Delta M > 10.$	
	N data	Nmc (biased)	N data	Nmc (biased)
192	2	1.48± .20	1	1.25± .17
196	5	4.61± .59	4	3.75± .37
200	4	3.87± .53	3	4.98± .39
202	1	2.49± .32	4	2.15± .21
total	12	12.45± .88	12	12.13± .60



$\Delta M > 10.$


DELPHI Preliminary
192 to 202 GeV
$\tilde{t} \rightarrow c\,\tilde{g}$
$\tilde{t}$
Gluino Mass (GeV/c^2)
Stop Mass (GeV/c^2)
0
10
20
30
40
50
60
70
80
90
100
50
55
60
65
70
75
80
85
90
95
100

Conclusion

- To check the possible overlap between the 2 analysis
- To try to have a look at lower gluino masses
- To make a 4 jet analysis
- Improvement of the Neural network method
- At the end, the analysis for charged and neutral R-hadrons have to be combined to present results as a function of the probability P that the gluino fragments to charged Rhadrons.