Introduction

Squark searches

$\tilde{t}_1 \rightarrow \mathbf{c}\tilde{\chi}_1^0$, $\tilde{b}_1 \rightarrow \mathbf{b}\tilde{\chi}_1^0$

- Sbottom analysis in 2000
- Stop analysis in 2000

- Analysis are performed with **SUSANA ntuples**
- Data with B1 processing: $L_{2000} = \mathbf{64.61}\ pb^{-1}$
- Available Monte-Carlo at 204 GeV

Bkg.	σ (pb^{-1})	L_{gen}/L	Bkg.	σ (pb^{-1})	L_{gen}/L
zgpy	81.9200	35.23	llll	0.0418	866.81
kora	7.0200	42.77	qqee	0.4040	551.21
mumu	7.2000	35.61	qqmm	0.2476	937.53
cmpt	46.0700	8.53	qqtt	0.1143	2030.22
bhfo	1081.0000	4.64	qqvv	0.3657	634.76
vvkz	9.6500	34.87	ze1g	6.7000	13.86
eegg	9.0000	58.31	ze2g	6.7200	13.82
wwex	18.8680	24.60	ze4g	13.0000	8.93
eemm	0.3474	133.08	ze5g	13.0000	8.93
eett	0.0723	484.23	ggm1	940.0000	16.46
evqq	0.4200	221.11	ggtt	451.2000	12.12

Preselection

- **General SUSANA preselection: JBIT(IPRSEL,2).EQ.1**
  - **At least 1 charged particle with Pt $\geq$ 1.5**
  - $E_t \ \geq \ 4$
- **At least 1 charged particle with Pt $\geq$ 2**
- $E_t \ \geq \ 10$
- **at least 6 charged particles and 4 TPC tracks.**
- $E_{stic}/E_{vis} \ \geq \ 0.1$
- $E_{40}/E_{vis} \ \leq \ 0.1$ **OR** $P_t^{max} \ > 4$
- $E_{neutral}^{max} \ < \ 30$
- $|\cos(\theta_{thrust})| \ \leq \ 0.88$
- $|\cos(\theta_{miss})| \ \leq \ 0.88$
- $P_t^{mis} \ > \ 4$

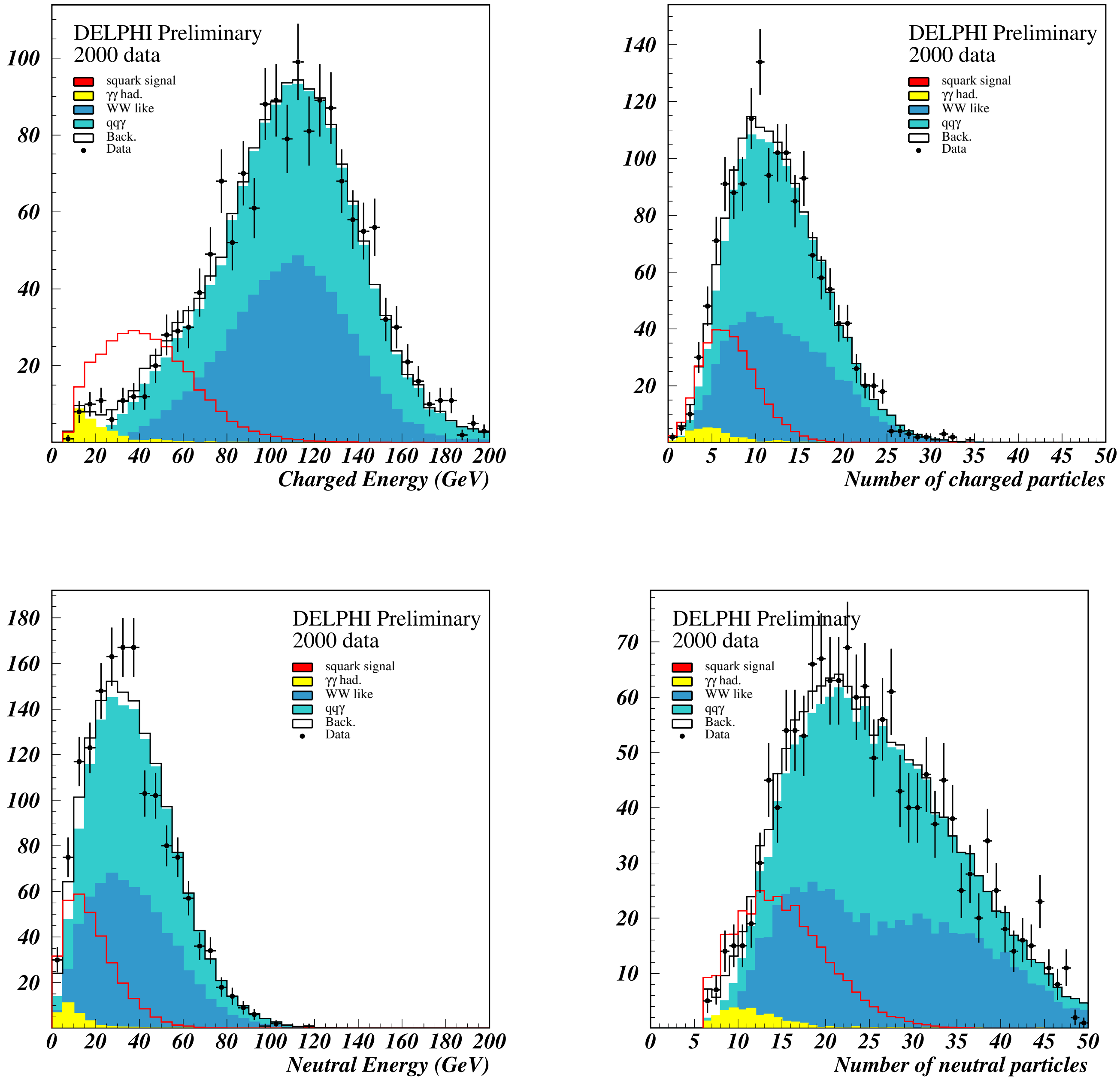
Ndata = 1552 , Nmc = 1545$\pm$5.9

- **Two mass analysis windows:**
  - $\Delta M \ > \ 30 \text{ GeV}/c^2$
  - $10 \ < \ \Delta M \ \leq \ 30 \text{ GeV}/c^2$

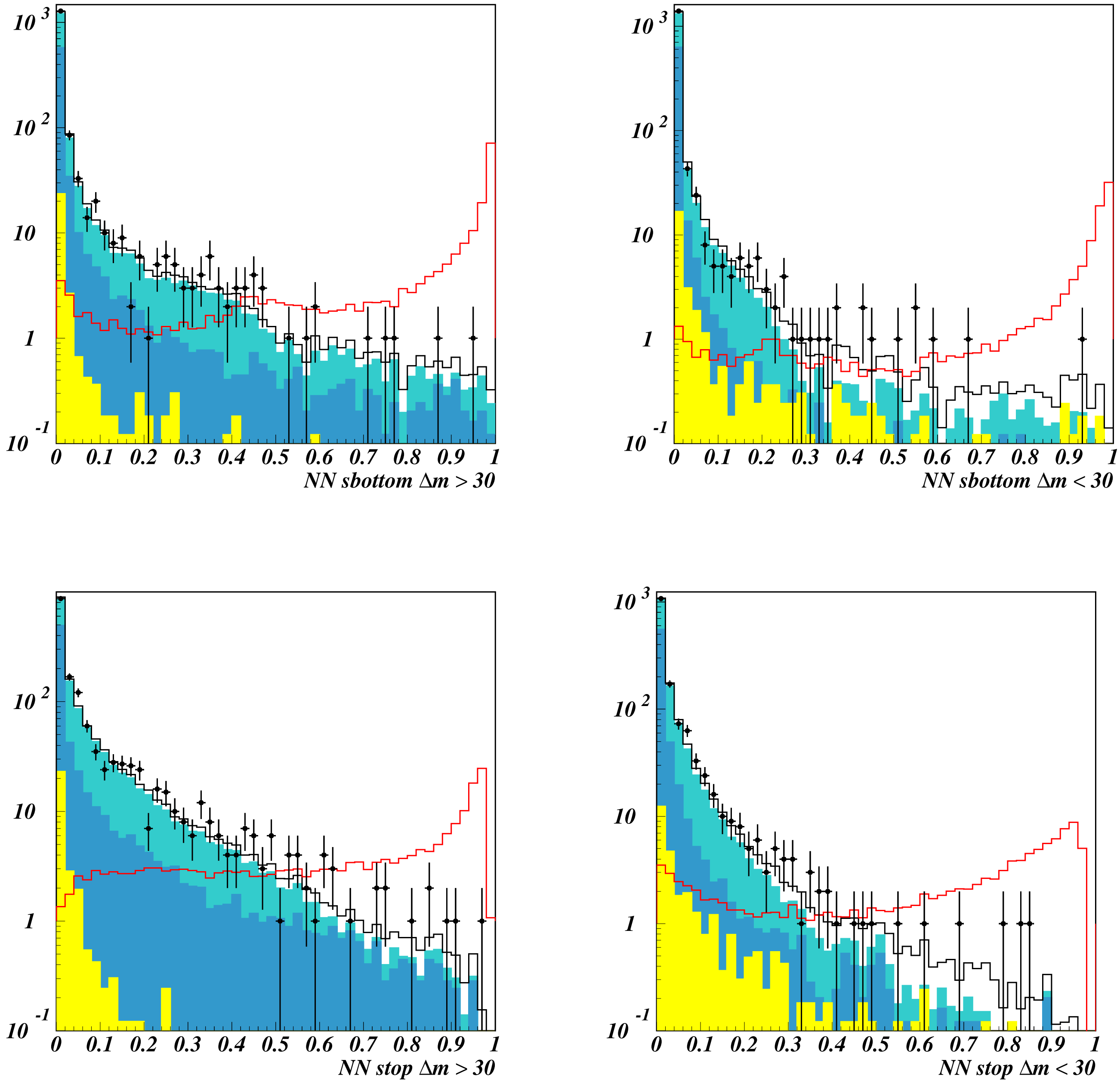
The final selection is performed using neural networks

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

DATA-MC comparison

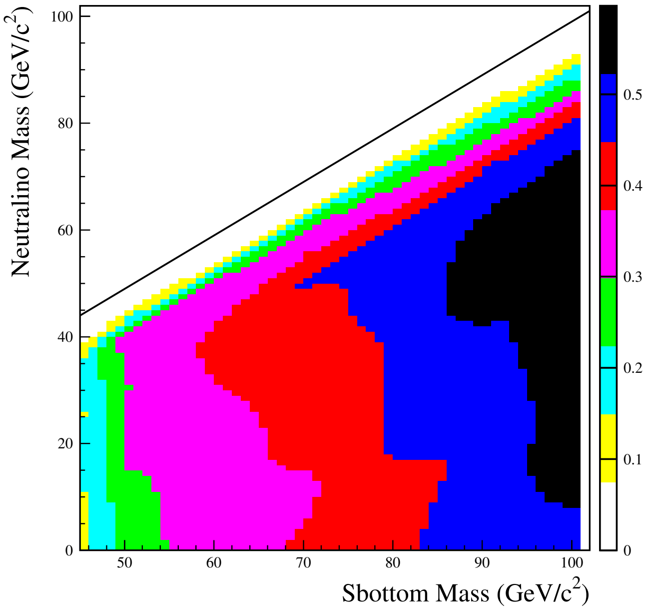


DATA-MC comparison



Sbottom Analysis

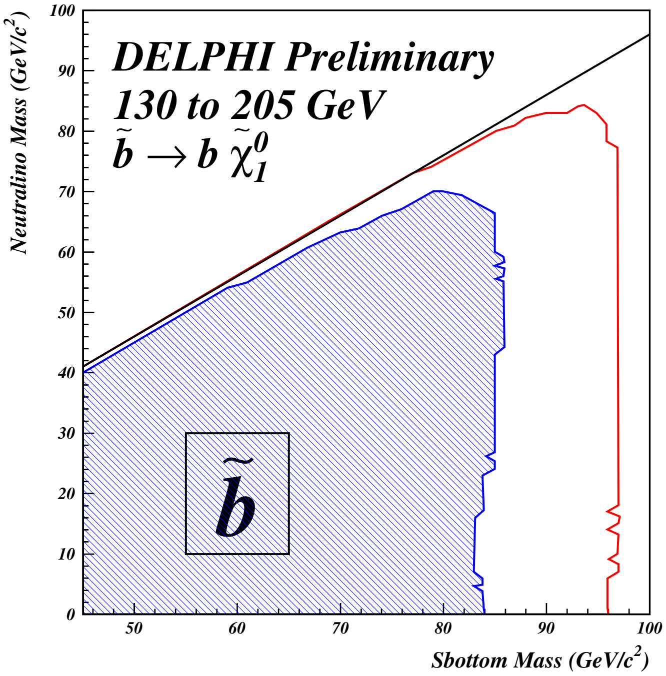
	data	MC
$\Delta M > 30$	1	**2.46±0.27**
$\Delta M \leq 30$	0	**0.75±0.17**
204	1	**2.82±0.30**



- **DELPHI results from 130 to this year are combined.**
  $\Longrightarrow L_{tot} = \mathbf{528.5}\ \mathrm{pb}^{-1}$
- **We used $\sqrt{s}$ = 205 GeV for this year data.**
- **We assumed 100 % BR in this decay channel**
- **Excluded regions at 95 % CL are obtained using ALRMC.**

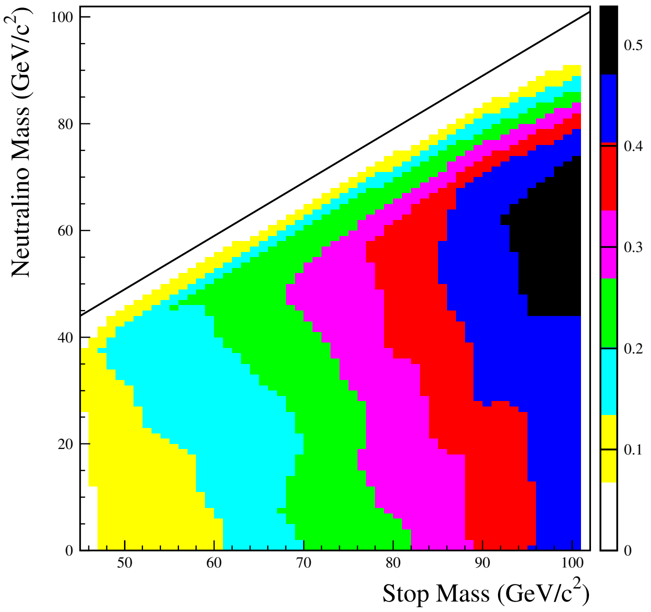
For $\Delta M \geq$ 15 GeV/c^2:

	Limit (GeV/c^2)
$\Theta_{\tilde{b}} = \mathbf{0}$	$M_{\tilde{b}_1} \geq \mathbf{96}$
$\Theta_{\tilde{b}} = \mathbf{68}$	$M_{\tilde{b}_1} \geq \mathbf{82}$



Stop Analysis

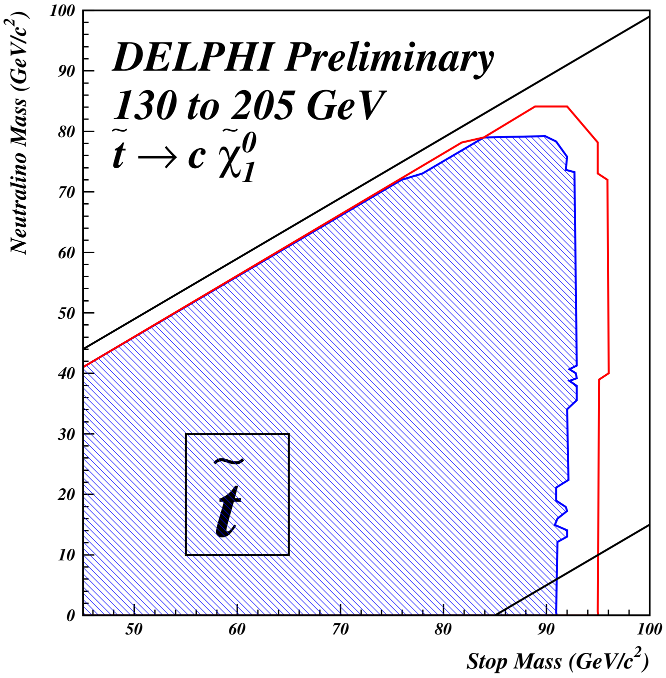
	data	MC
$\Delta M > 30$	4	**3.20±0.29**
$\Delta M \leq 30$	0	**1.47±0.22**
204	4	**4.22±0.35**



- **DELPHI results from 130 to this year are combined.**
  $\Longrightarrow L_{tot} = \mathbf{528.5}\ \mathrm{pb}^{-1}$
- **We used** $\sqrt{s} = \mathbf{205\ GeV}$ **for this year data.**
- **We assumed 100 % BR in this decay channel**
- **Excluded regions at 95 % CL are obtained using ALRMC.**

For $\Delta M \geq \mathbf{15}\ \mathrm{GeV}/c^2$**:**

	Limit (GeV/c^2)
$\Theta_{\tilde{t}} = \mathbf{0}$	$M_{\tilde{t}_1} \geq \mathbf{95}$
$\Theta_{\tilde{t}} = \mathbf{56}$	$M_{\tilde{t}_1} \geq \mathbf{91}$



Light gluino search

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

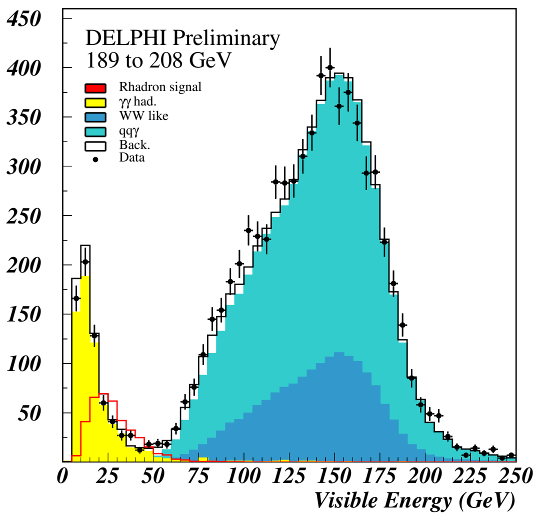
- **Charged R-hadrons analysis ($R^{\pm}$) :**
  - $e^+e^- \rightarrow \tilde{t}_1\tilde{t}_1 \rightarrow \mathbf{c}\tilde{g}\mathbf{c}\tilde{g} \rightarrow \mathbf{c}R^{\pm}\mathbf{c}R^{\pm}$
- **Neutral R-hadrons analysis (R^{o}) :**
  - $e^+e^- \rightarrow \tilde{t}_1\tilde{t}_1 \rightarrow \mathbf{c}\tilde{g}\mathbf{c}\tilde{g} \rightarrow \mathbf{c}R^{o}\mathbf{c}R^{o}$
- **DATA Monte-Carlo Comparison at 189, 192, 196, 200, 202, 205 GeV**
- **Preliminary results**

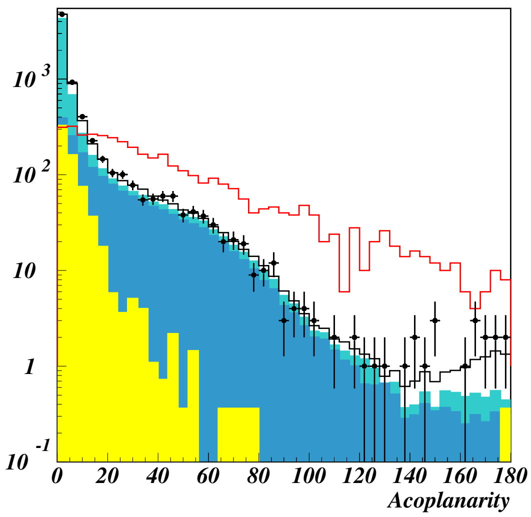
- **Neutral R-hadron analysis : 2 mass analysis windows :**
  - $\Delta M < 20$ **: sequential analysis**
  - $\Delta M > 20$ **: neural network analysis**

- **Charged R-hadron analysis : 3 mass analysis windows :**
  Searching for anomalous dE/dx in the TPC:
  - $M_{\tilde{g}} \leq 30$
  - $30 < M_{\tilde{g}} < 60$
  - $M_{\tilde{g}} \geq 60$

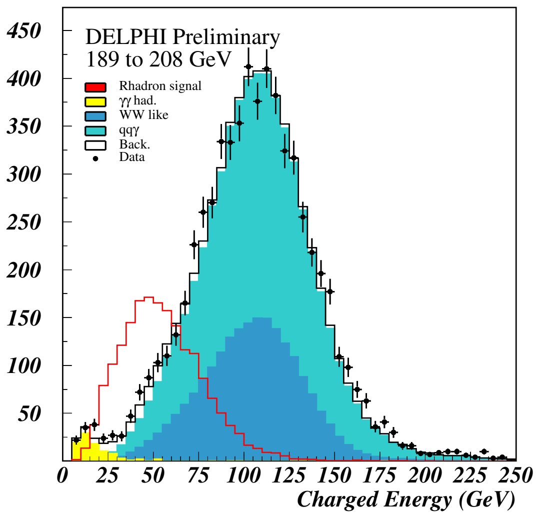
Data-MC comparison

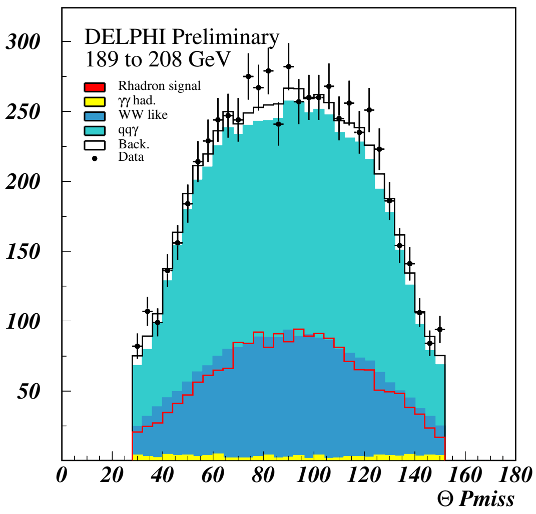
Neutral R-hadrons : $\Delta M < 20$





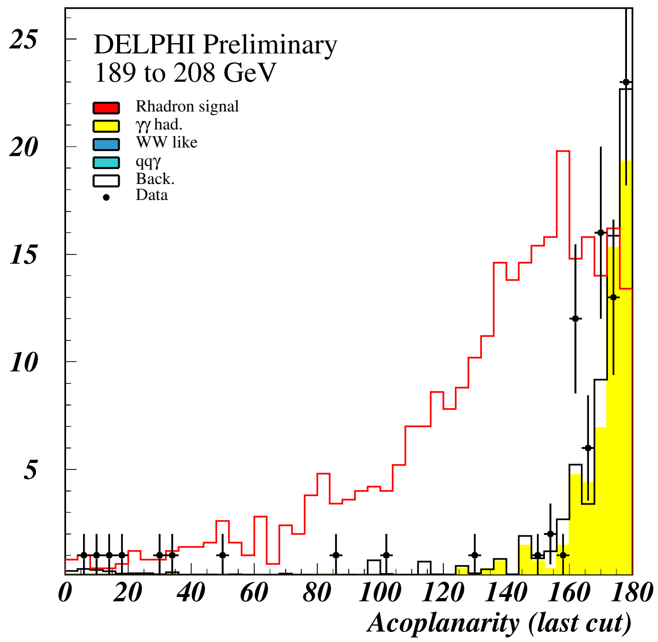
Neutral R-hadrons : $\Delta M > 20$



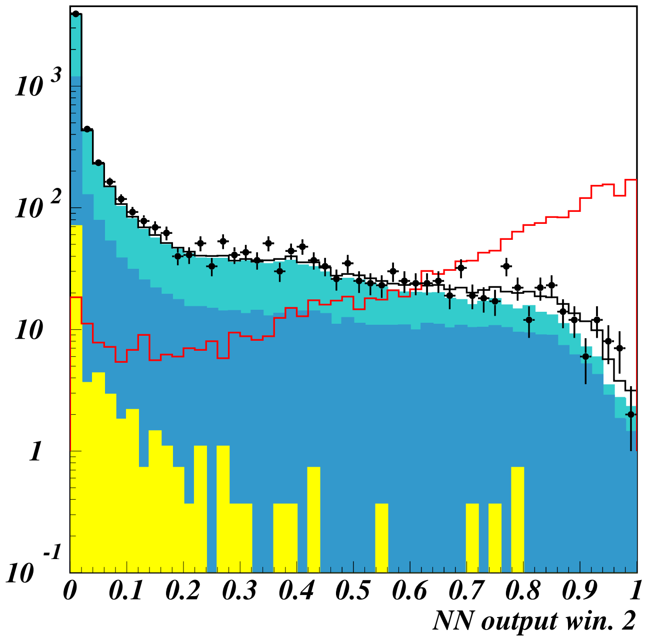


Data-MC comparison

Neutral R-hadrons : $\Delta M < 20$ **Final cut on Acoplanarity:**



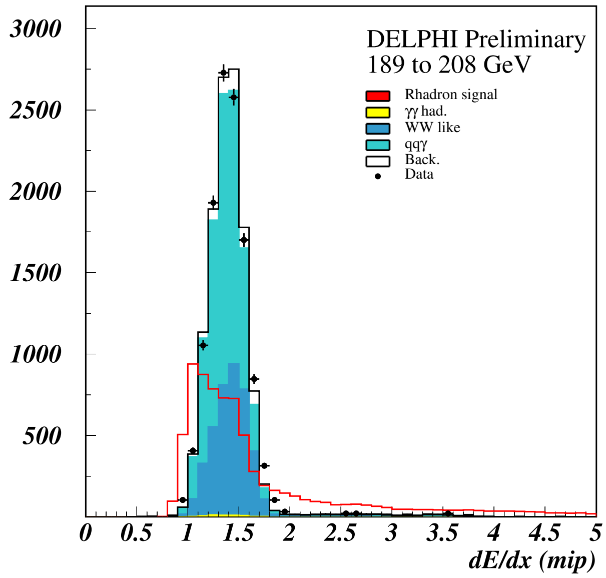
Neutral R-hadrons : $\Delta M > 20$ **Final cut on SNNS output:**

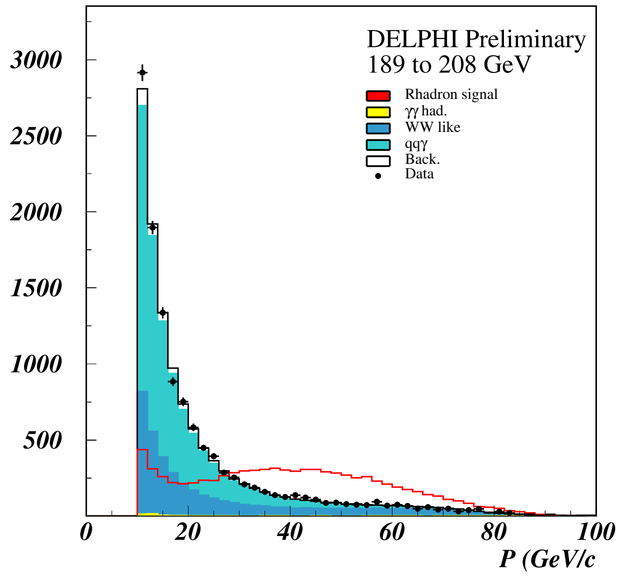


Data-MC comparison

Charged R-hadrons : HIP candidate

- dE/dx correction on the data:
  - in 1998 : dE/dx(data) / 0.955
  - in 1999 : dE/dx(data) / 0.930
  - in 2000 : dE/dx(data) / 0.915
- in 2000 : do not look at dE/dx in Sector 6 of the TPC

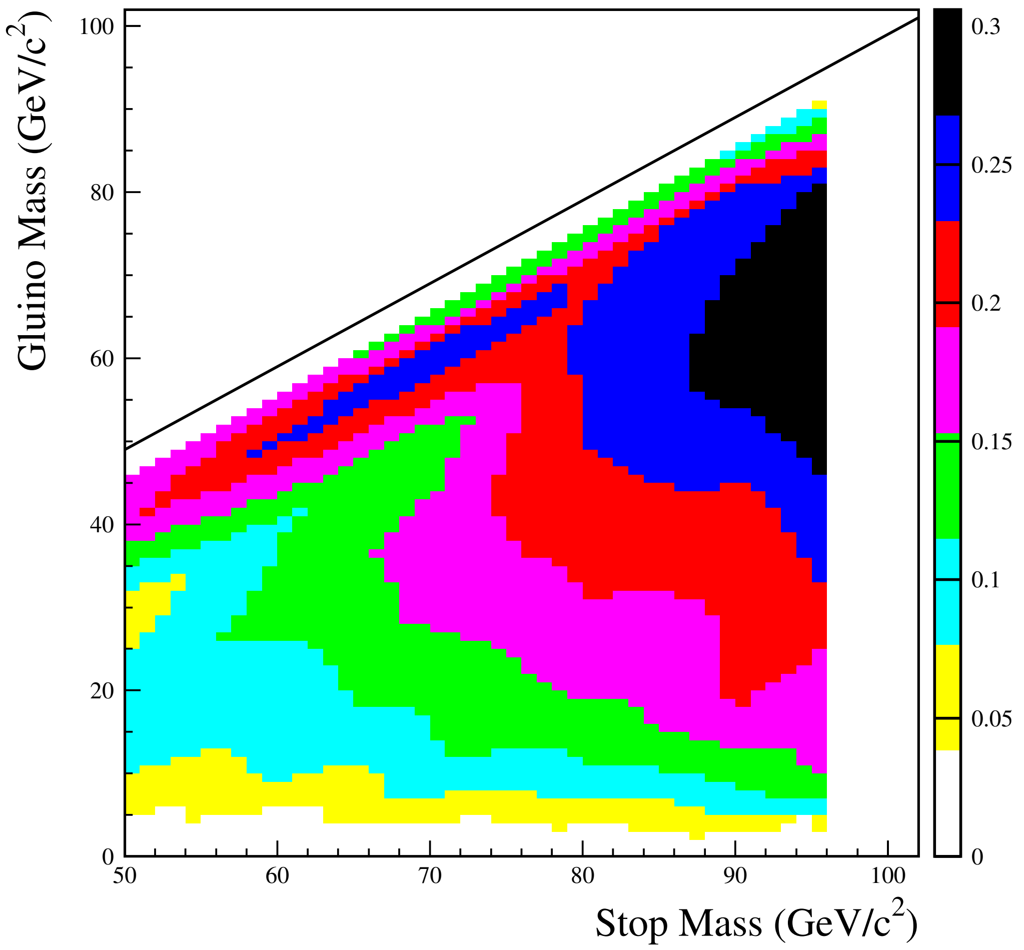




Results

Neutral R-hadrons :

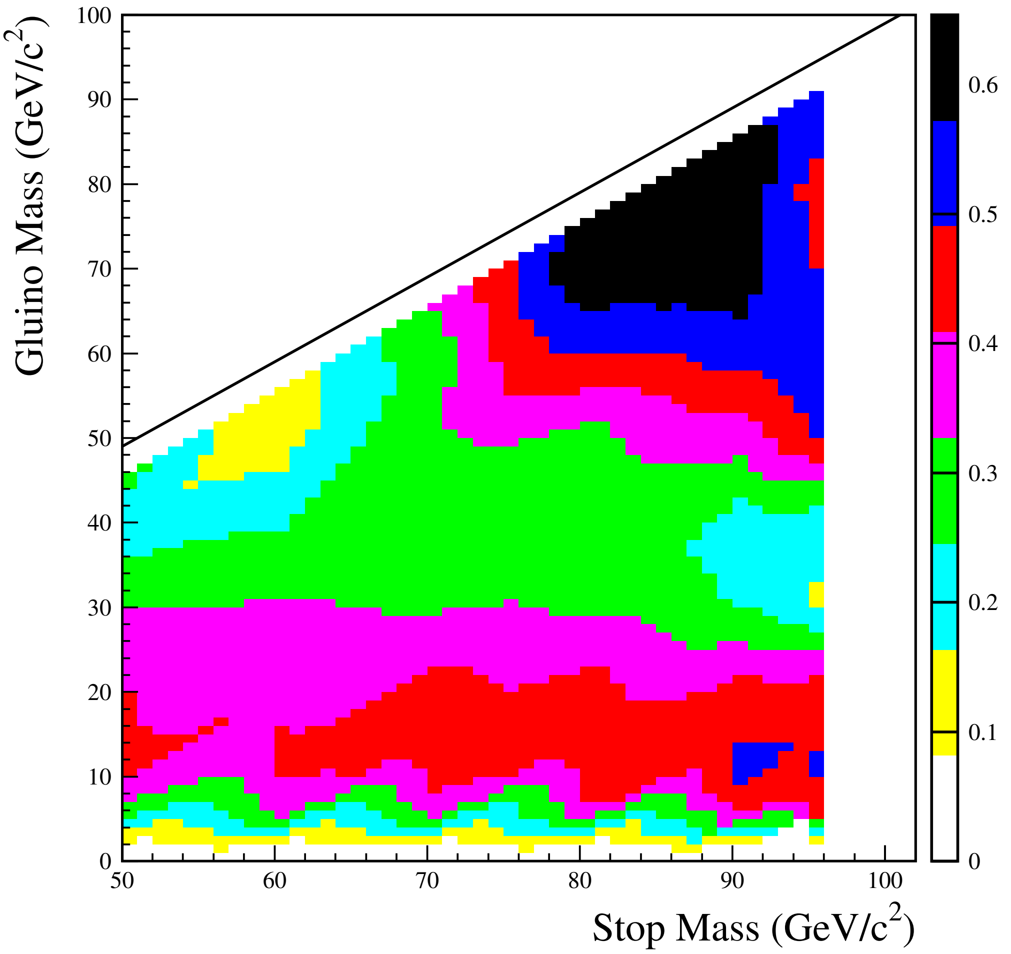
	$\Delta M \leq 20.$		$\Delta M > 20.$	
$\sqrt{s}$	data	MC	data	MC
189	3	5.93±1.63	9	6.46±0.50
192	1	0.62±0.09	4	1.46±0.15
196	5	1.96±0.29	6	5.11±0.30
200	1	2.36±0.33	6	5.89±0.34
202	2	1.09±0.16	4	1.81±0.11
204	2	1.91±0.20	1	4.22±0.25
total	14	13.26±1.71	30	24.94±0.75



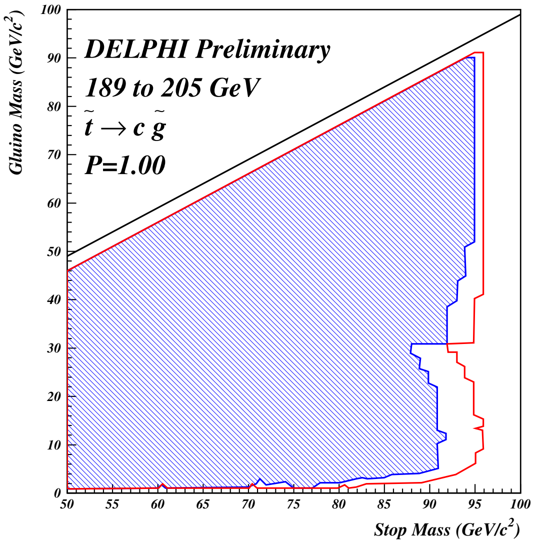
Results

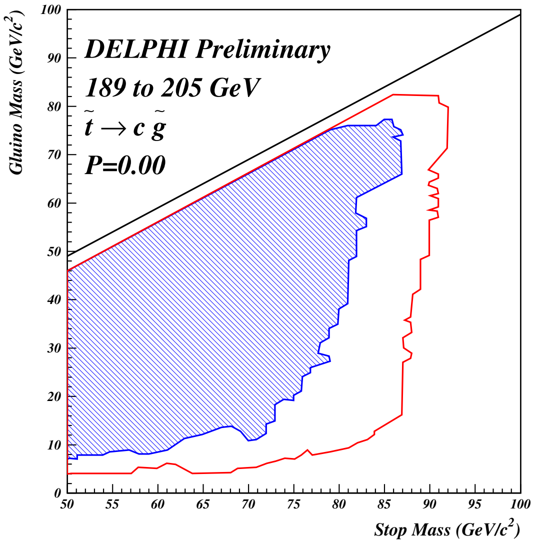
Charged R-hadrons :

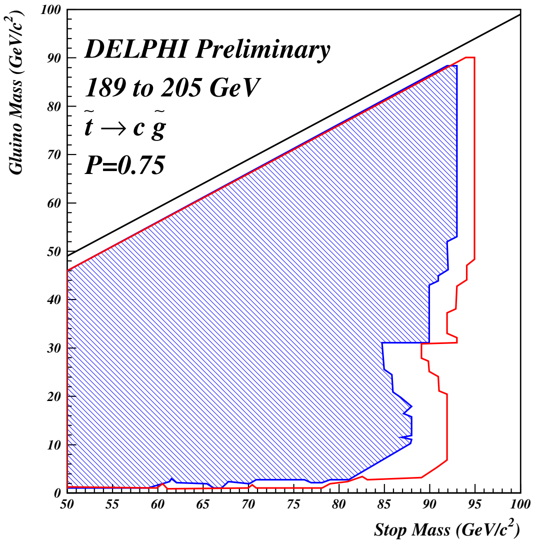
	win. 1		Win. 2		Win. 3	
$\sqrt{s}$	data	MC	data	MC	data	MC
189	4	5.03±0.56	0	0.185±0.055	0	0.213±0.096
192	1	0.84±0.18	0	0.031±0.012	0	0.014±0.008
196	4	2.35±0.29	0	0.095±0.049	0	0.003±0.002
200	0	2.42±0.31	0	0.046±0.010	0	0.030±0.014
202	2	0.99±0.12	0	0.020±0.008	0	0.010±0.003
204	2	1.54±0.16	0	0.013±0.003	0	0.036±0.021
total	13	13.17±0.75	0	0.390±0.076	0	0.306±0.100

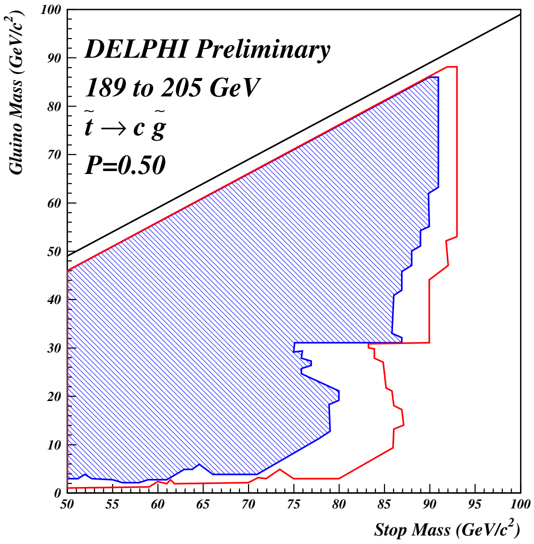


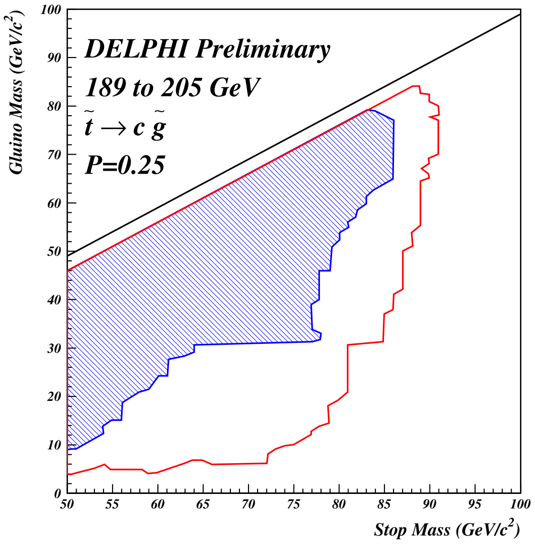
Results


DELPHI Preliminary
189 to 205 GeV
$\tilde{t} \to c\,\tilde{g}$
P=1.00
Gluino Mass (GeV/c^2)
Stop Mass (GeV/c^2)


DELPHI Preliminary
189 to 205 GeV
$\tilde{t} \to c\,\tilde{g}$
P=0.00
Gluino Mass (GeV/c^2)
Stop Mass (GeV/c^2)


DELPHI Preliminary
189 to 205 GeV
$\tilde{t} \to c\,\tilde{g}$
P=0.75
Gluino Mass (GeV/c^2)
Stop Mass (GeV/c^2)


DELPHI Preliminary
189 to 205 GeV
$\tilde{t} \to c\,\tilde{g}$
P=0.50
Gluino Mass (GeV/c^2)
Stop Mass (GeV/c^2)


DELPHI Preliminary
189 to 205 GeV
$\tilde{t} \to c\,\tilde{g}$
P=0.25
Gluino Mass (GeV/c^2)
Stop Mass (GeV/c^2)