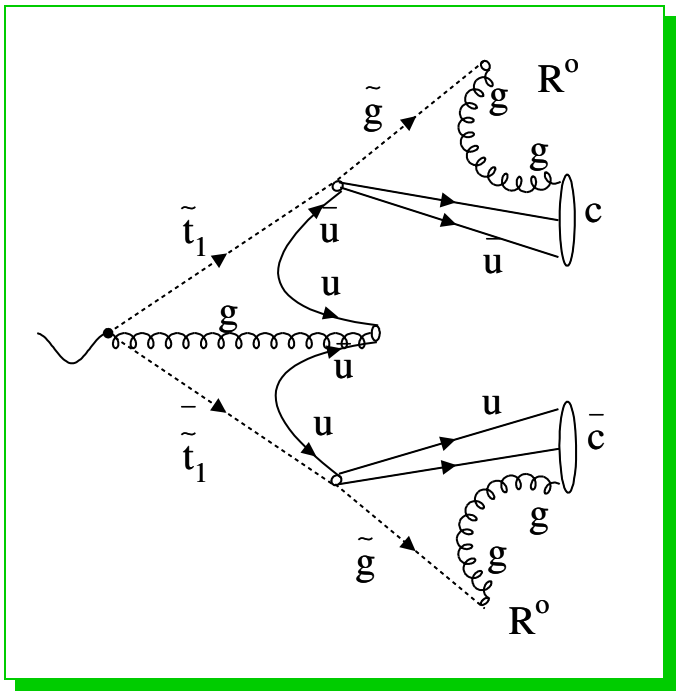
Introduction

LSP gluino search from stop decay from 189 to 208 GeV

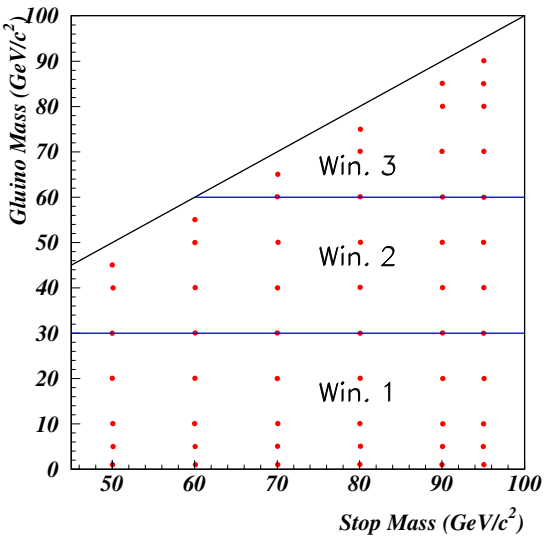


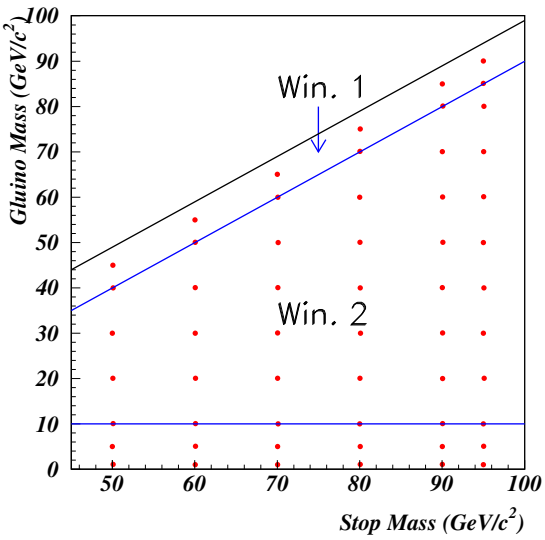
$\tilde{t}_1 \rightarrow c\tilde{g}$

2 acoplanar jets + 2 gluino "jets"

Mass Analysis Windows

- **3 analysis:**
  - $e^+e^- \rightarrow \tilde{t}_1\tilde{t}_1 \rightarrow$ **$R^{\pm}cR^{\pm}c$: P=1.0**
  - $e^+e^- \rightarrow \tilde{t}_1\tilde{t}_1 \rightarrow$ **R^0cR^0c: P=0.0**
  - $e^+e^- \rightarrow \tilde{t}_1\tilde{t}_1 \rightarrow$ **$R^{\pm}cR^0c$**





- **Signal samples:**

Signals simulated with full detector response (DELSIM+DELANA)

- **Stop : STOPGEN at 189, 200 and 206**

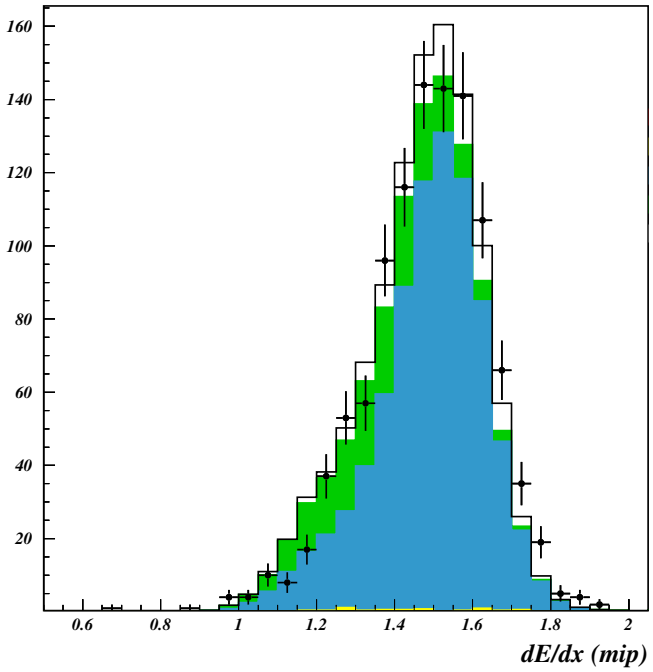
$\sim$ 500 events per points in the plane $(m_{\tilde{q}_1}, m_{\tilde{g}})$

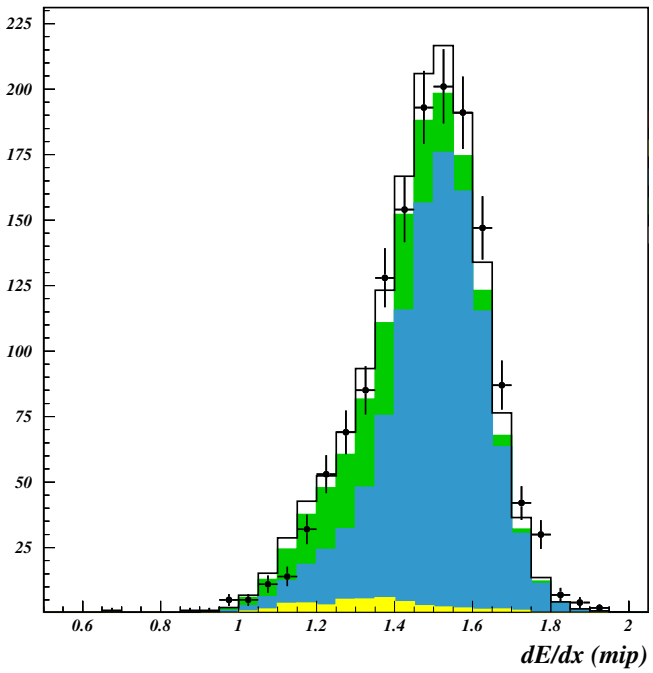
Pre-selection

- **HIP candidates:**
  - **VD-ID-TPC track**
  - **momentum greater than 10** GeV/c
  - **quality flag from bbdedx**
  - **at least 80 wires**
  - **neutral and charged energies in a 15° cone less than 5 GeV**
- **2 Charged R-hadrons: at least 2 HIP candidates**
- **1 Charged R-hadron: at least 1 HIP candidate**

dE/dx calibration

- A multiplicative factor is applied to adjust the mean values of the dE/dx distributions
- Tracks in S6 are rejected for 2000 data



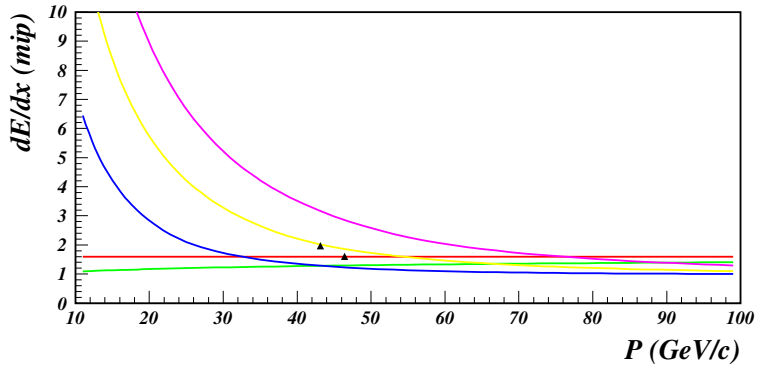


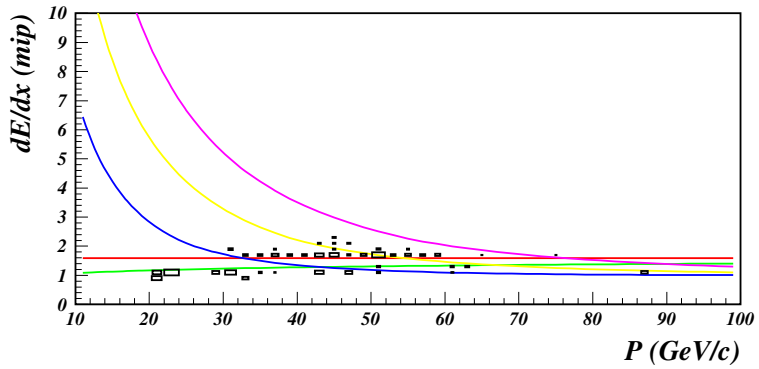
Results

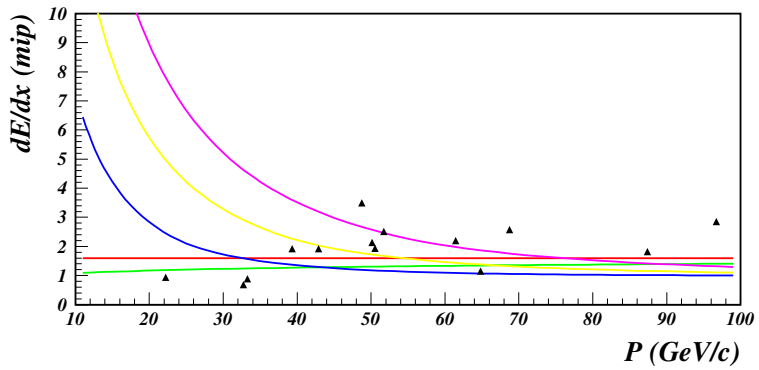
charged R-hadrons						
	$m_{\tilde{g}} \leq 30$		$30 < m_{\tilde{g}} < 60$		$m_{\tilde{g}} \geq 60$	
	data	MC	data	MC	data	MC
188.7	0	0.029	0	0.017	0	0.003
191.6	0	0.005	0	0.003	0	0.001
195.6	0	0.023	0	0.007	0	0.001
199.6	0	0.007	0	0.006	0	0.001
201.7	0	0.011	0	0.002	0	0.001
204.8	0	0.009	0	0.003	0	0.001
206.6	0	0.012	1	0.003	0	0.001
208.1	0	0.001	0	0.002	0	0.002
Total	0	0.097	1	0.038	0	0.009

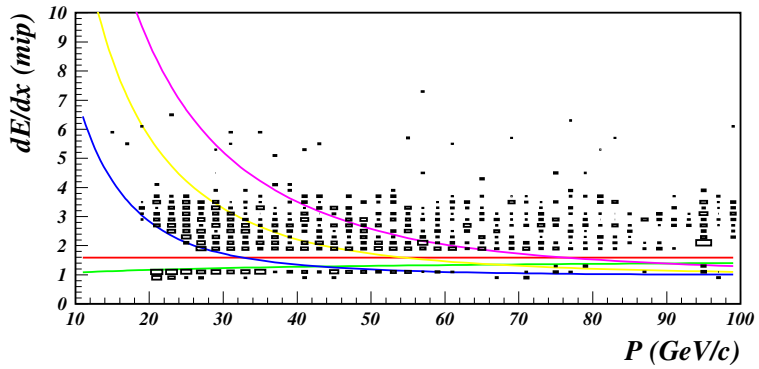
Mixed						
188.7	0	0.60	3	2.81	3	2.21
191.6	0	0.03	1	0.54	1	0.51
195.6	2	0.13	2	1.02	0	0.89
199.6	0	0.26	1	1.47	1	1.21
201.7	0	0.09	2	0.62	2	0.53
204.8	2	0.21	2	1.09	0	0.88
206.6	0	0.17	3	0.92	3	0.76
208.1	0	0.01	0	0.10	0	0.10
total	4	1.48	14	8.57	10	7.09

Candidates









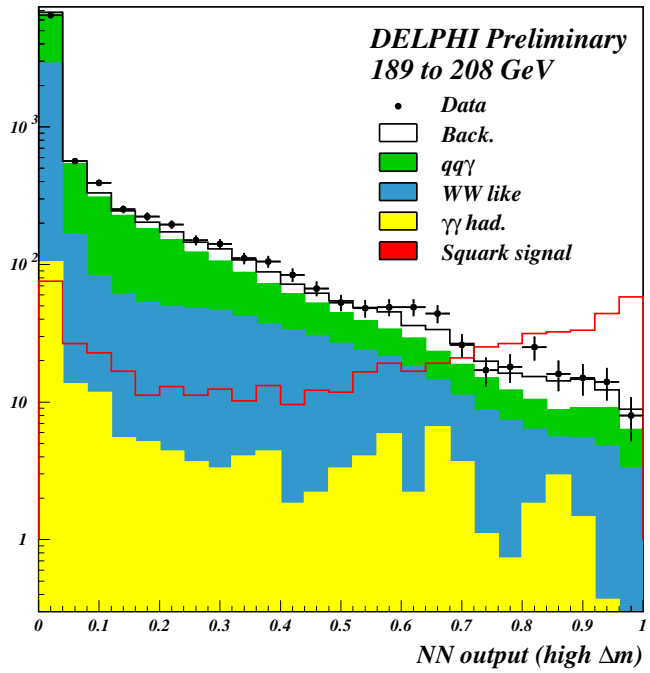
Neural Networks

• Neutral R-hadron search:

- The neural network is trained at 189 GeV
- They are normalised between 0. and 1.

• E_{cha}	• E_{ch}^{max}
• E_t^{ch}	• acolinearity
• M_{vis}	• acoplanarity
• Thrust	• H10+H30
• $\sqrt{s'}/\sqrt{s}$	• H20+H40

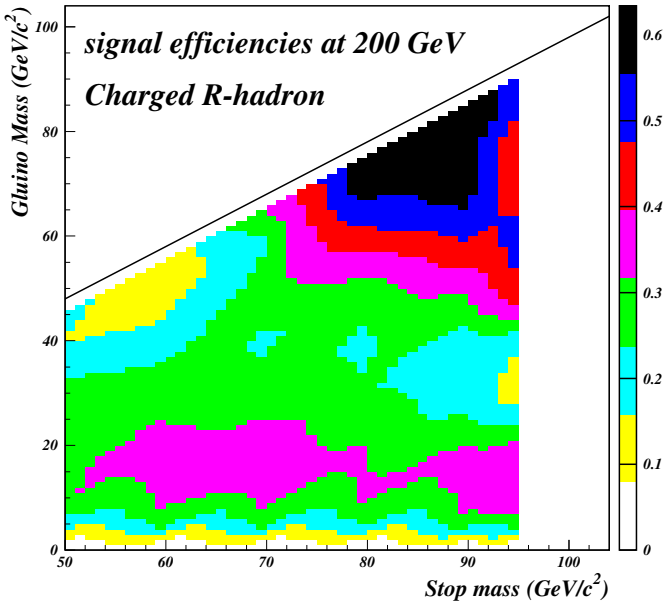
	node 1	node 1	nod e 3
Signal	1	0	0
QCD,4-Ferm.	0	1	0
$\gamma\gamma \rightarrow$ had.	0	0	1

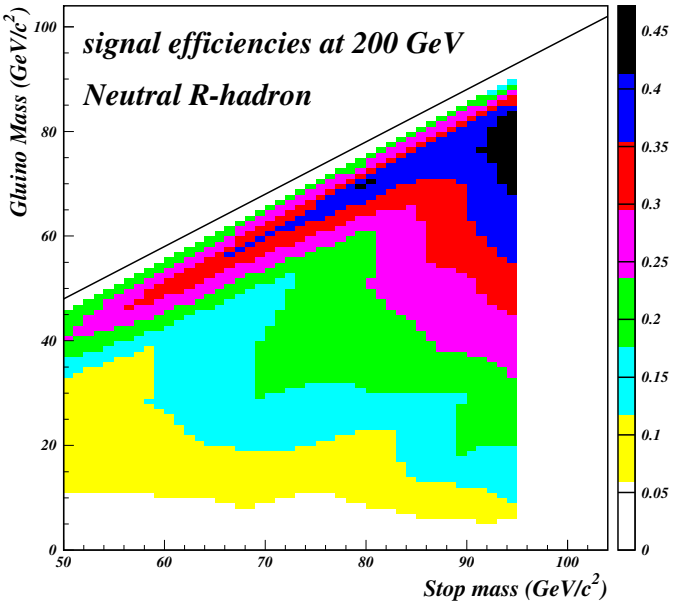


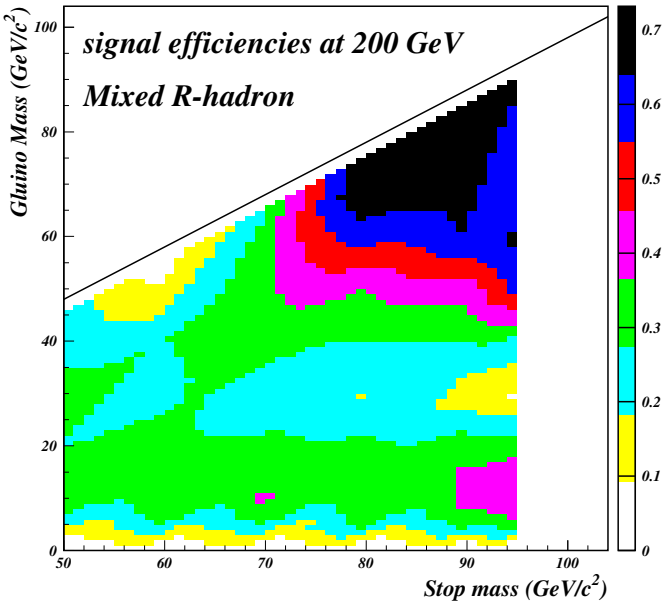
Results

neutral R-hadrons				
	$\Delta M \geq 20$		$\Delta M < 20$	
	data	MC	data	MC
188.7	8	8.20	2	3.64
191.6	3	2.10	0	0.47
195.6	8	6.60	2	1.37
199.6	8	4.91	0	1.59
201.7	2	1.98	0	0.83
204.8	1	3.07	0	1.51
206.6	1	3.65	2	1.60
208.1	0	0.34	0	0.15
Total	31	30.9	6	11.2

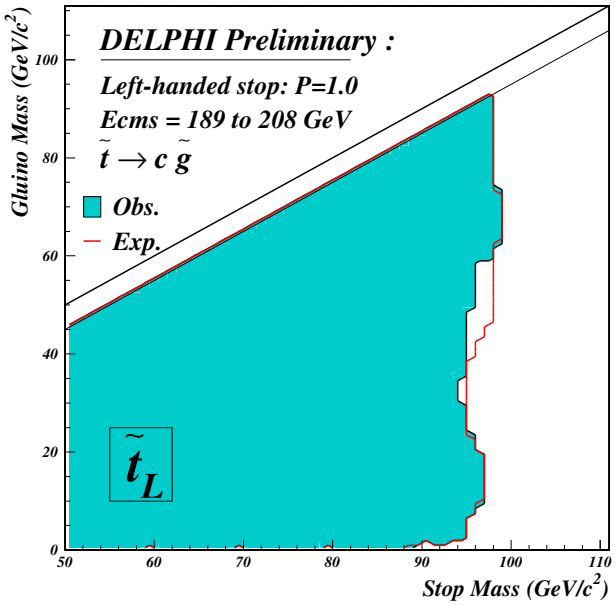
Signal Efficiencies

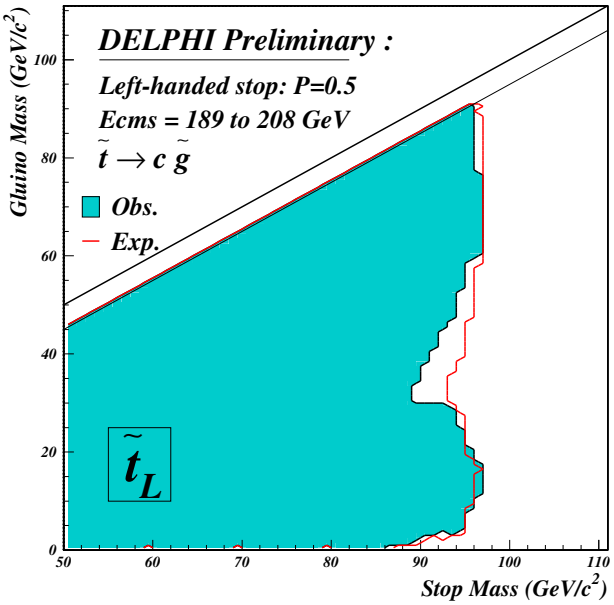


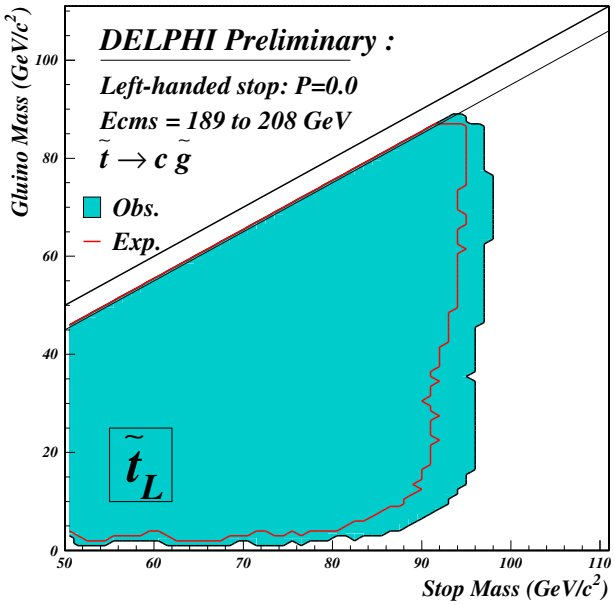
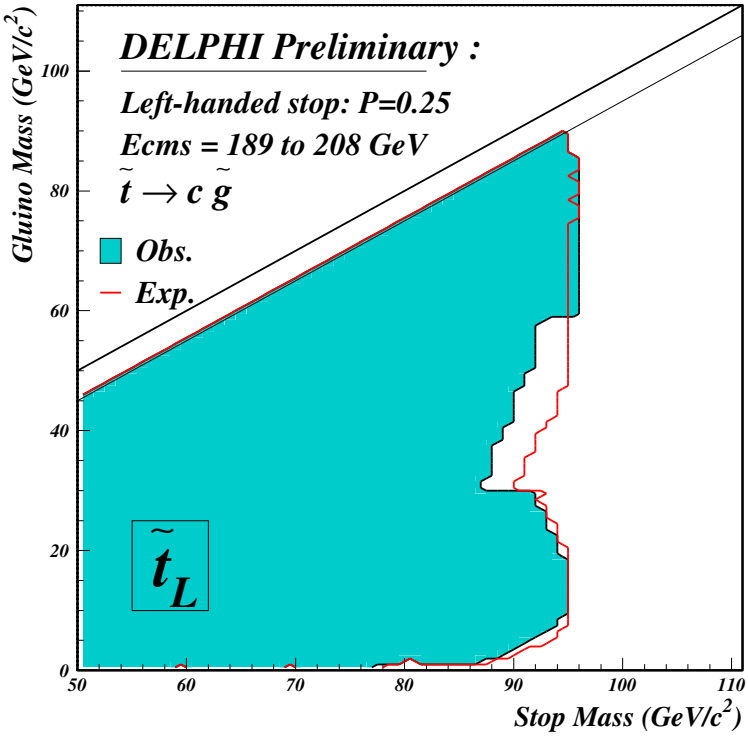
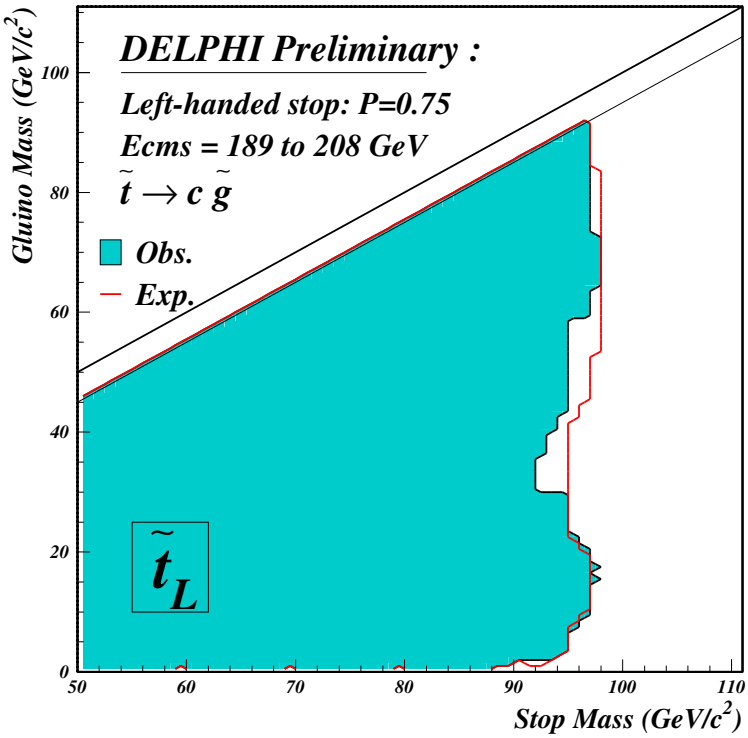




Excluded region



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