

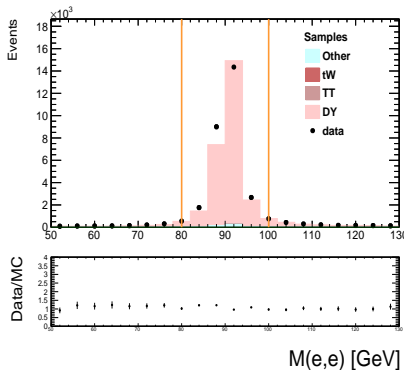
Stime dei fondi

May 17, 2019

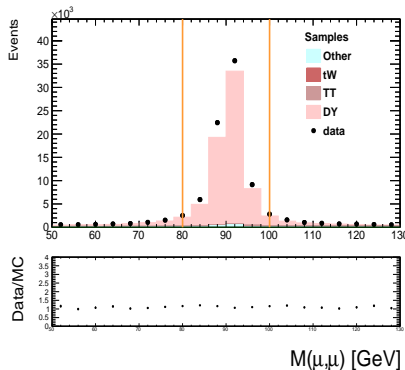
Vecchia selezione

Fattori Data/MC per la stima del DY

Pesiamo il MC per un fattore di scala misurato intorno al picco della Z
([80-100] GeV)



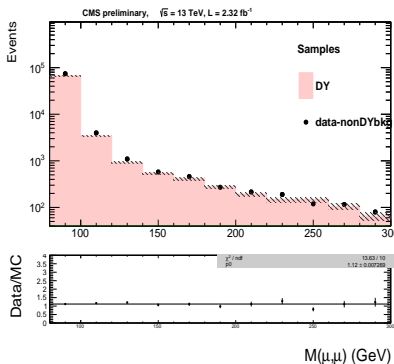
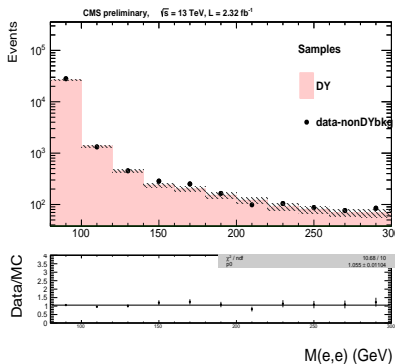
Fattore di scala per il canale $eejj$:
 1.06 ± 0.01



Fattore di scala per il canale $\mu\mu jj$:
 1.118 ± 0.007

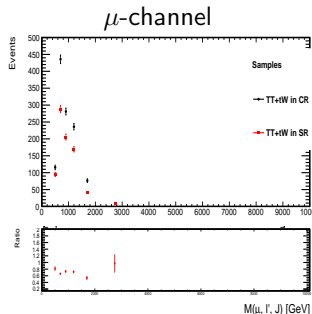
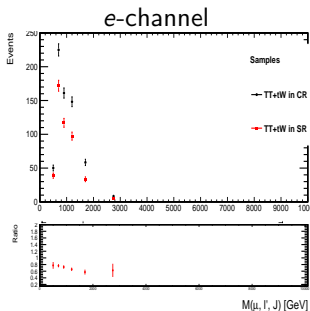
Controllo sulla stabilità dei fattori Dati/MC per il DY a masse più alte

Facciamo il fit del rapporto dati/MC nella regione $80 \text{ GeV} < M(\ell, \ell) < 300 \text{ GeV}$, per rimanere fuori dalla regione di segnale.



Troviamo un valore costante compatibile con quello della slide precedente.

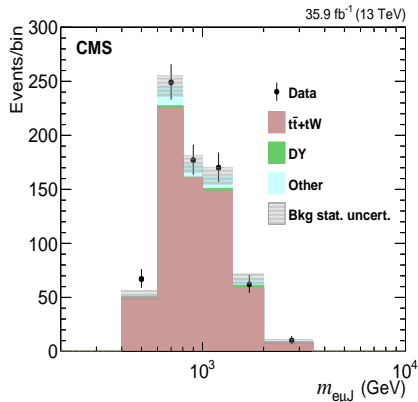
Fattori SR/CR per la stima di $t\bar{t} + tW$



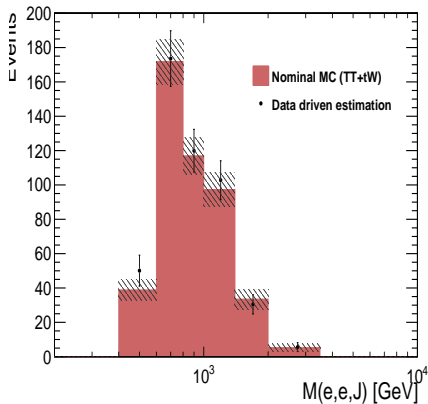
bin	400-600	600-800	800-1000	1000-1400	1400-2000	2000-3500
e-chan.	0.77 ± 0.10	0.76 ± 0.05	0.73 ± 0.05	0.66 ± 0.05	0.57 ± 0.07	0.63 ± 0.20
μ -chan.	0.82 ± 0.07	0.66 ± 0.03	0.73 ± 0.04	0.72 ± 0.04	0.54 ± 0.06	0.97 ± 0.28

Confronti Dati/MC per il canale $eejj$

Risultati nella CR $e\mu$



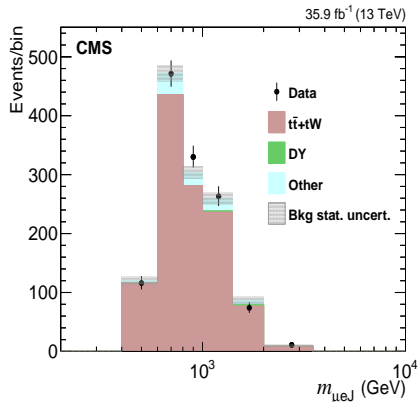
Risultati nella SR



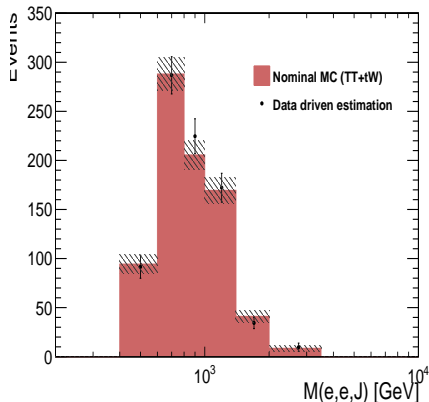
La nostra stima e il MC sono in accordo

Confronti Dati/MC per il canale $\mu\mu jj$

Risultati nella CR $e\mu$



Risultati nella SR



La nostra stima e il MC sono in accordo

Stima del fondo QCD nel canale elettronico

- Evaluate multijet from poorly identified, non-isolated lepton candidates
- $QCD_{SR} = QCD_{CR} \times W_{SR/CR}^{(e1)} \times W_{SR/CR}^{(e2)}, \quad W_{SR/CR} = FR/(1 - FR)$

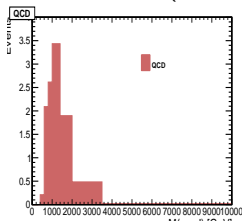
CR: SR with electrons selected according to the fake rate preselection

FR:

variable	barrel	endcap
$\sigma_{in\eta}$	< 0.013	< 0.034
H/E	< 0.15	< 0.10
nr. missing hits	≤ 1	≤ 1
$ dxy $	< 0.02	< 0.05

region	E_T range (GeV)	functional form
barrel	$35 \leq E_T \leq 131.5$	$0.106 - 0.00252 \times E_T + 2.28 \times 10^{-5} \times E_T^2 - 7.21 \times 10^{-8} \times E_T^3$
	$131.5 \leq E_T \leq 355.0$	$0.0138 - 0.000103 \times E_T + 3.62 \times 10^{-7} \times E_T^2 - 4.25 \times 10^{-10} \times E_T^3$
	$E_T \geq 355.0$	$0.00279 + 2.43 \times 10^{-6} \times E_T$
endcap $ \eta \leq 2.0$	$35.0 \leq E_T \leq 122.0$	$0.117 - 0.0013 \times E_T + 4.67 \times 10^{-6} \times E_T^2$
	$122.0 \leq E_T \leq 226.3$	$0.0345 - 4.76 \times 10^{-5} \times E_T$
	$E_T \geq 226.3$	$0.0258 - 9.09 \times 10^{-6} \times E_T$
endcap $ \eta \geq 2.0$	$35.0 \leq E_T \leq 112.5$	$0.0809 - 0.000343 \times E_T$
	$E_T \geq 112.5$	0.0423

- Abbiamo 10.7 eventi di QCD nella SR ($\approx 1\%$ del fondo totale)



Stima del fondo QCD nel canale muonico

- Evaluate multijet from poorly identified, non-isolated lepton candidates
- $QCD_{SR} = QCD_{CR} \times W_{SR/CR}^{(\mu 1)} \times W_{SR/CR}^{(\mu 2)}, \quad W_{SR/CR} = FR/(1 - FR)$

CR: SR with muons selected according
to the fake rate preselection

FR:

variable	cut value
is GlobalMu and is TrackerMu	true
$ dz $	< 1.0
$ d_{xy} $	< 0.2
Nb. of Tracker Layers with Measurement	> 5
Nb. of Valid Pixel Hits	> 0
Matching with HLT object (Mu50 TkMu50)	true

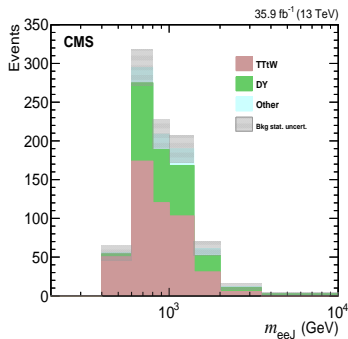
Eta region	p_T range (GeV)	functional form
Barrel	$53 < p_T \leq 200$	$0.111040 - 0.00121997 \times p_T + 5.27748 \times 10^{-06} \times p_T^3$
Barrel	$200 < p_T \leq 800$	$2.38002 - 5726.51/[2234.75 + p_T]$
Barrel	$p_T > 800$	0.412519
Endcap	$53 < p_T \leq 250$	$0.137352 - 0.00108994 \times p_T + 5.64918 \times 10^{-06} \times p_T^2$
Endcap	$p_T > 250$	0.238683

- Abbiamo 0.055 eventi di QCD nella SR
- Contributo trascurabile

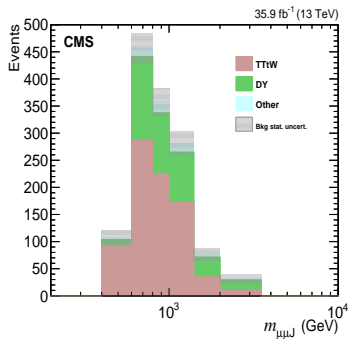
Distribuzioni $M_{\ell\ell J}$ dei fondi stimati

Mostriamo le distribuzioni $M_{\ell\ell J}$ dei fondi stimati con l'incertezza statistica

canale elettronico



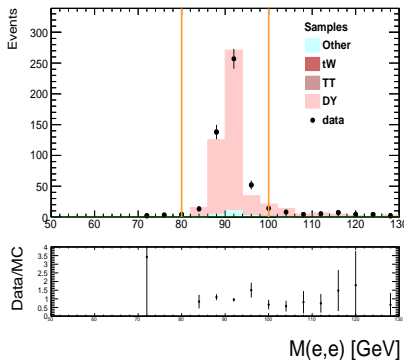
canale muonico



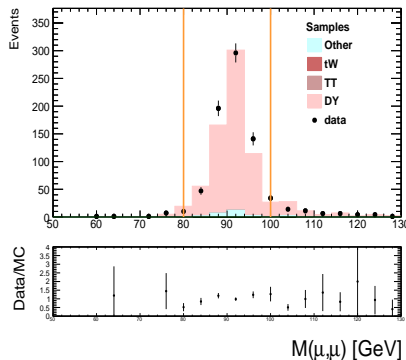
Nuova selezione

Fattori Data/MC per la stima del DY

Pesiamo il MC per un fattore di scala misurato intorno al picco della Z
([80-100] GeV)



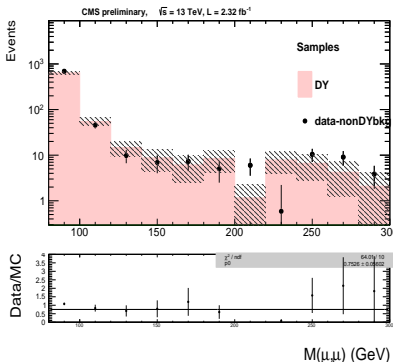
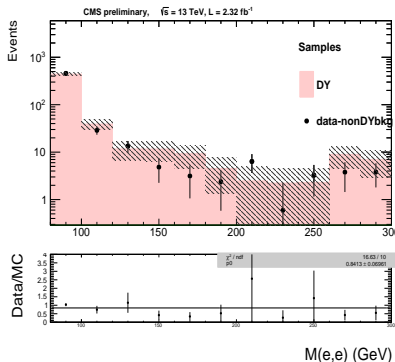
Fattore di scala per il canale $eejj$:
 1.03 ± 0.09



Fattore di scala per il canale $\mu\mu jj$:
 1.08 ± 0.07

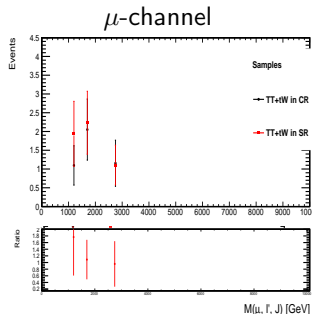
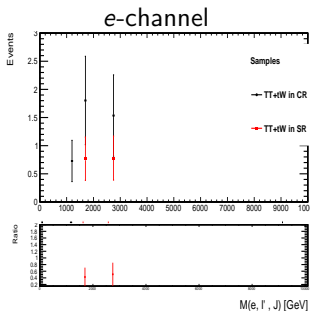
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Facciamo il fit del rapporto dati/MC nella regione $80 \text{ GeV} < M(\ell, \ell) < 300 \text{ GeV}$, per rimanere fuori dalla regione di segnale.



Lo scale factor è instabile, probabilmente a causa della poca statistica

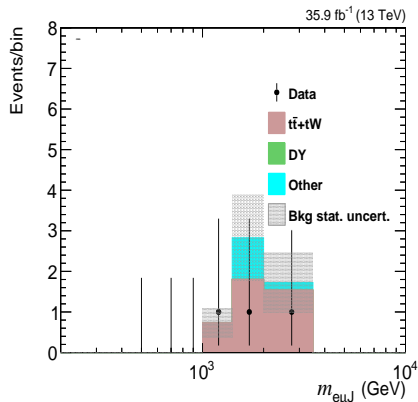
Fattori SR/CR per la stima di $t\bar{t} + tW$



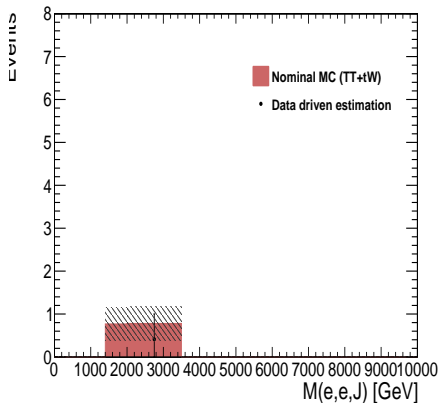
bin	400-600	600-800	800-1000	1000-1400	1400-2000	2000-3500
e-chan.	-	-	-	0	0.43 ± 0.28	0.51 ± 0.35
μ -chan.	-	-	-	1.77 ± 0.16	1.09 ± 0.59	0.96 ± 0.68

Confronti Dati/MC per il canale $eejj$

Risultati nella CR $e\mu$

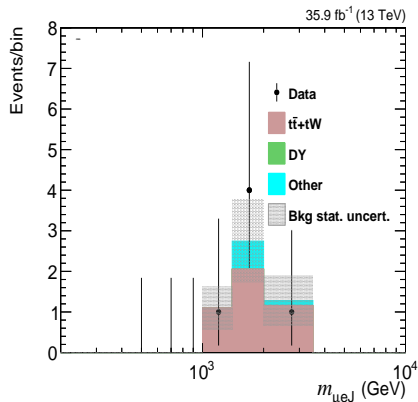


Risultati nella SR

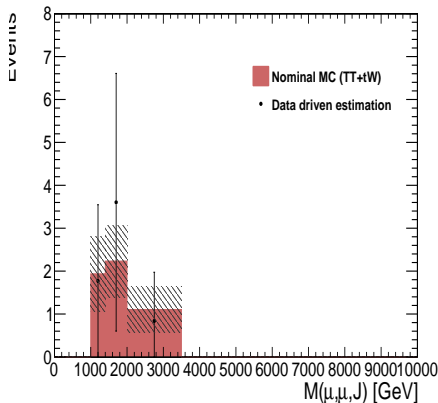


Confronti Dati/MC per il canale $\mu\mu jj$

Risultati nella CR $e\mu$



Risultati nella SR



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endcap $ \eta \geq 2.0$	$35.0 \leq E_T \leq 112.5$	$0.0809 - 0.000343 \times E_T$
	$E_T \geq 112.5$	0.0423

- Abbiamo 0 eventi di QCD nella SR

Stima del fondo QCD nel canale muonico

- Evaluate multijet from poorly identified, non-isolated lepton candidates
- $QCD_{SR} = QCD_{CR} \times W_{SR/CR}^{(\mu1)} \times W_{SR/CR}^{(\mu2)}$, $W_{SR/CR} = FR/(1 - FR)$

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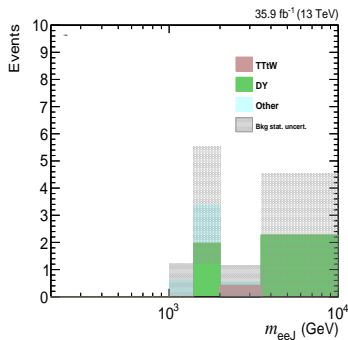
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Endcap	$p_T > 250$	0.238683

- Abbiamo 0 eventi di QCD nella SR

Distribuzioni $M_{\ell\ell J}$ dei fondi stimati

Mostriamo le distribuzioni $M_{\ell\ell J}$ dei fondi stimati con l'incertezza statistica

canale elettronico



canale muonico

