
Searches for Higgs→Invisible Decays in ATLAS & CMS

CERN Cross-Talk Seminar
August 15, 2013

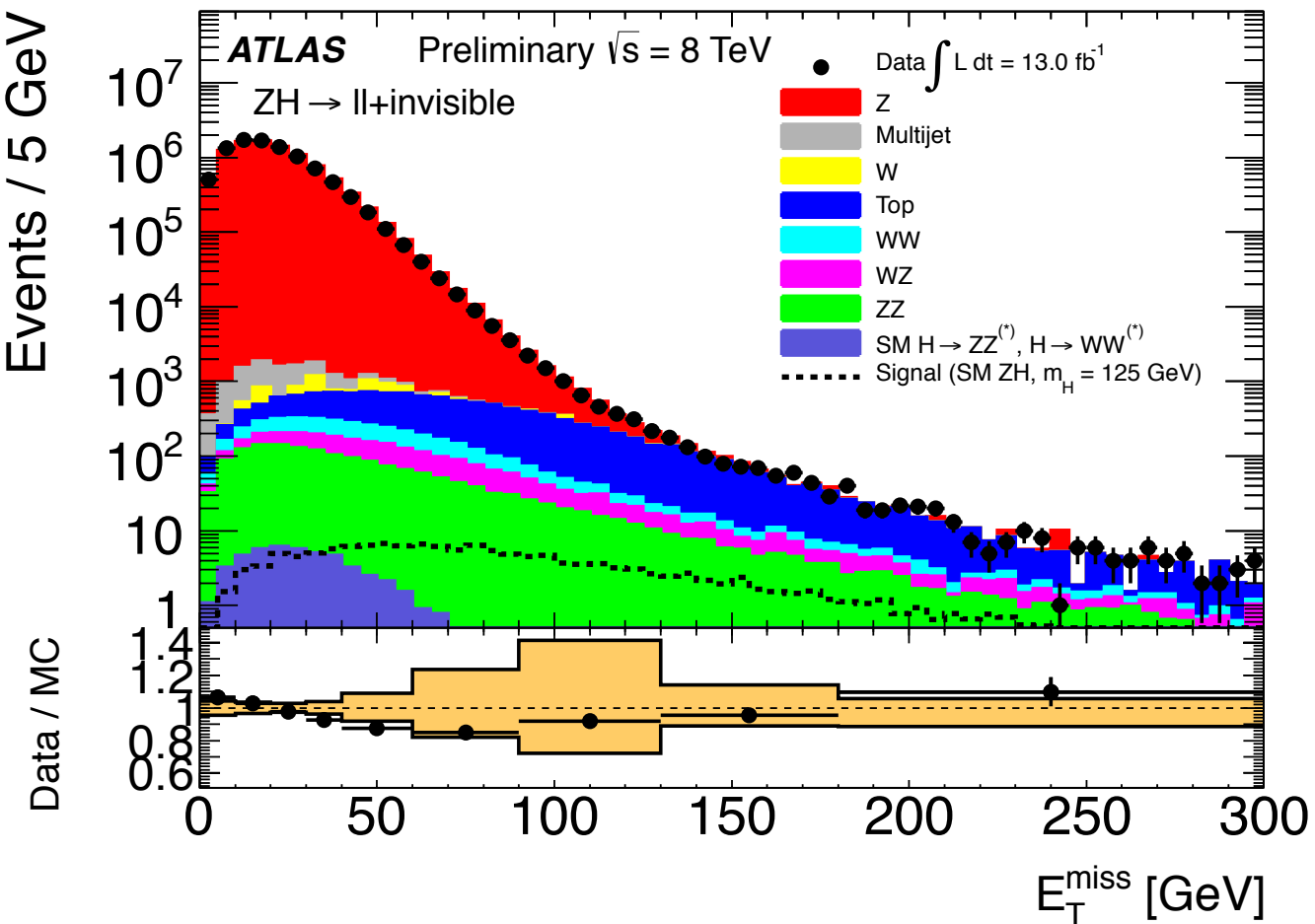
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** Massachusetts Institute of Technology (CMS)

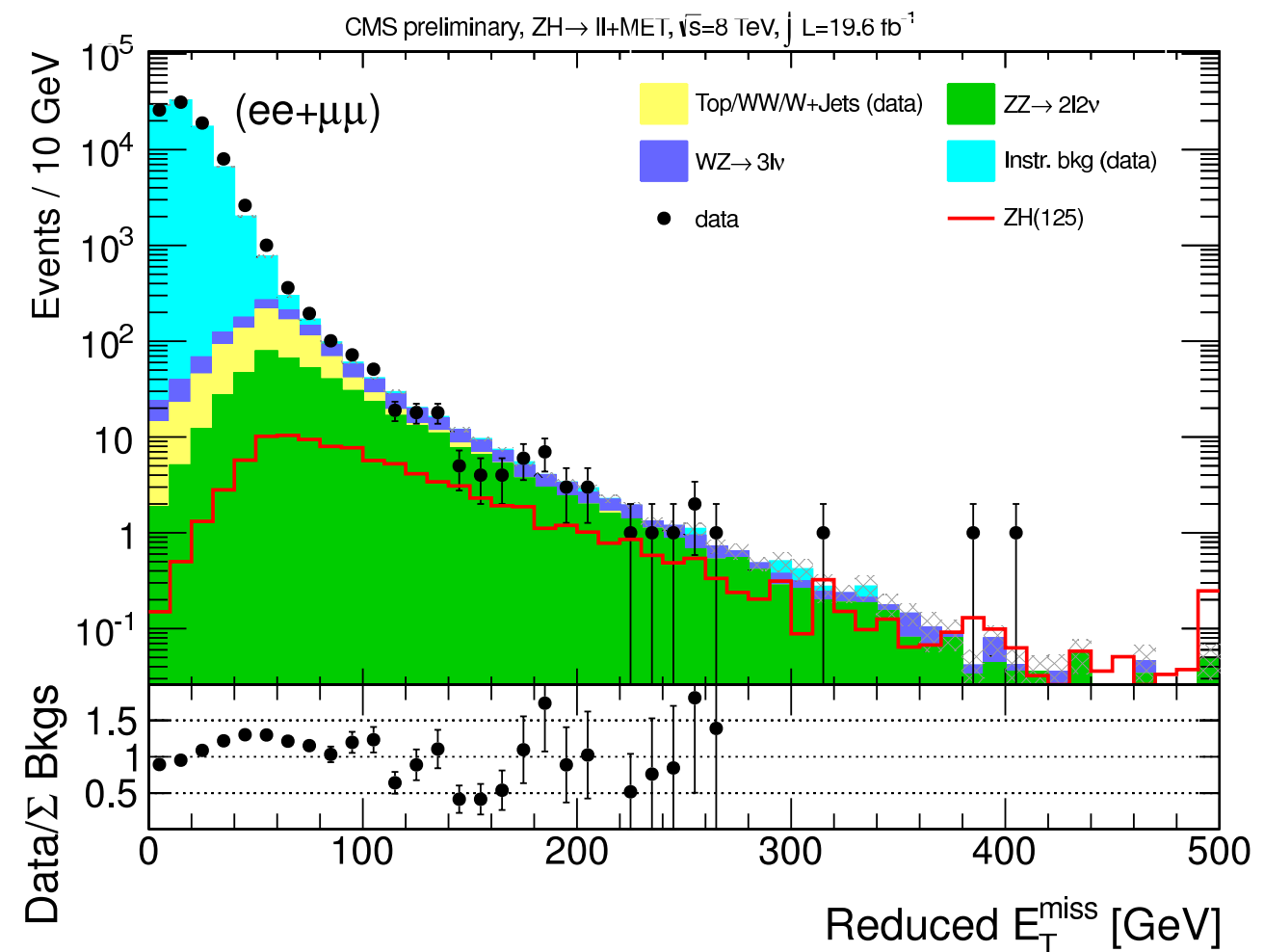
E_T^{miss} Distributions

ATLAS



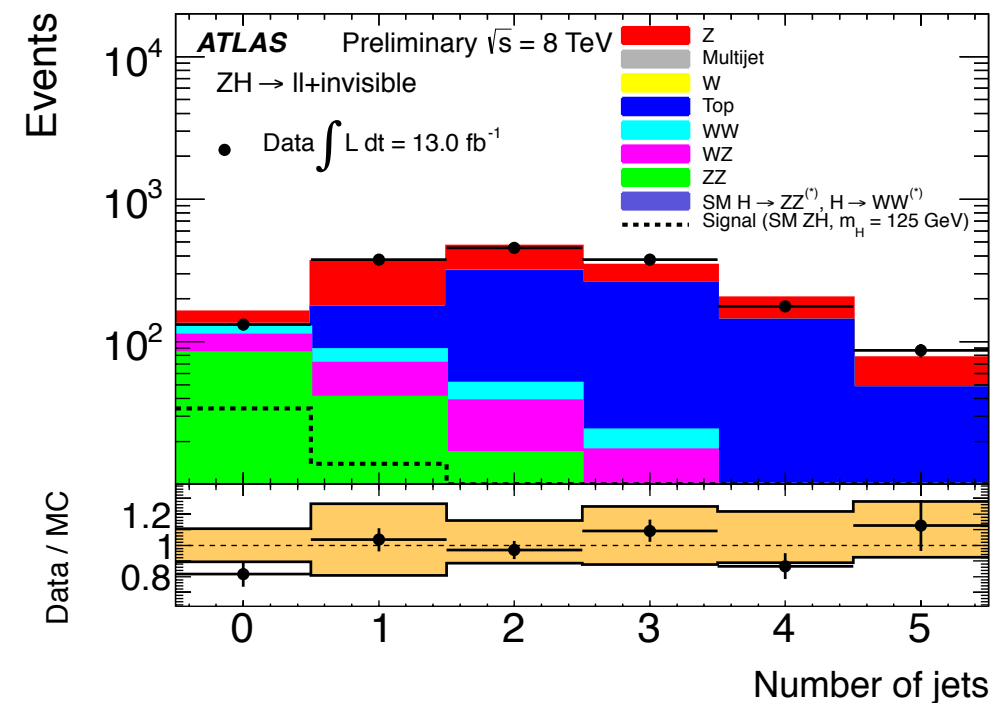
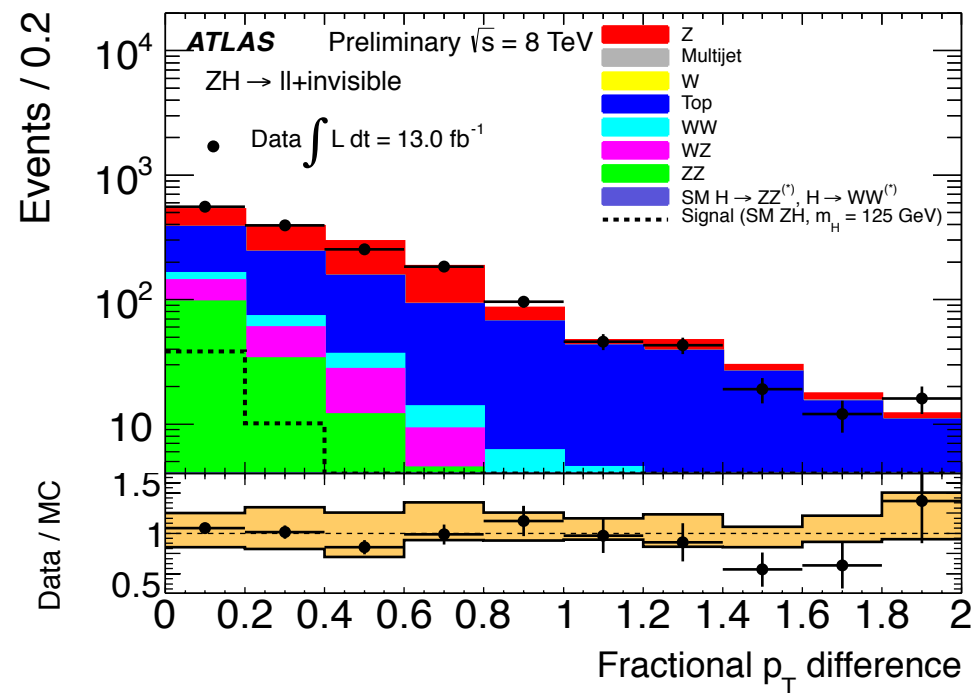
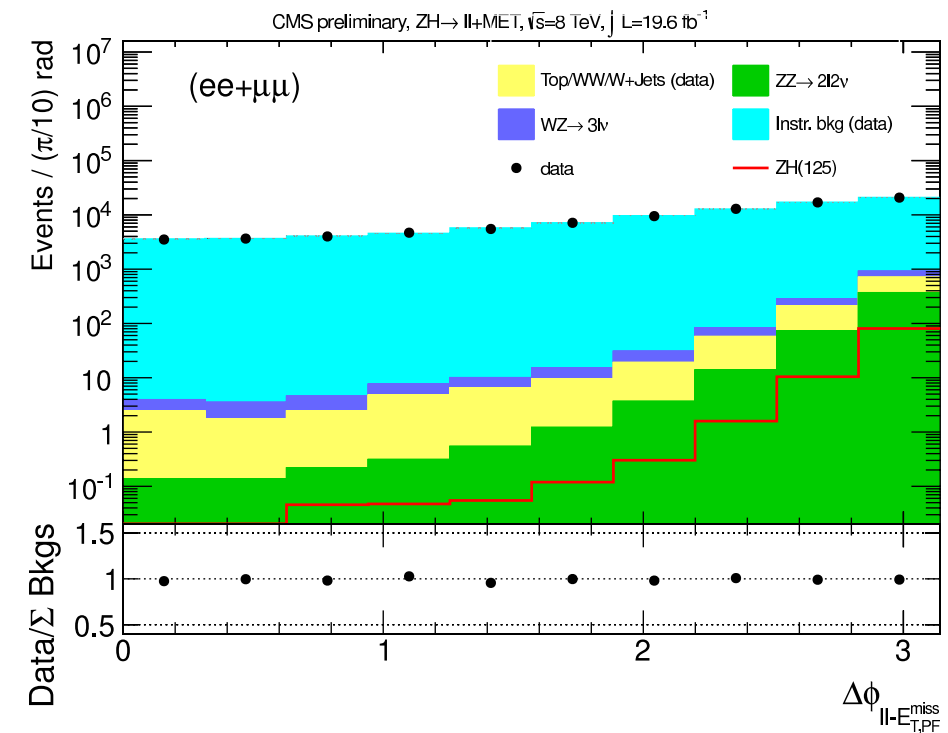
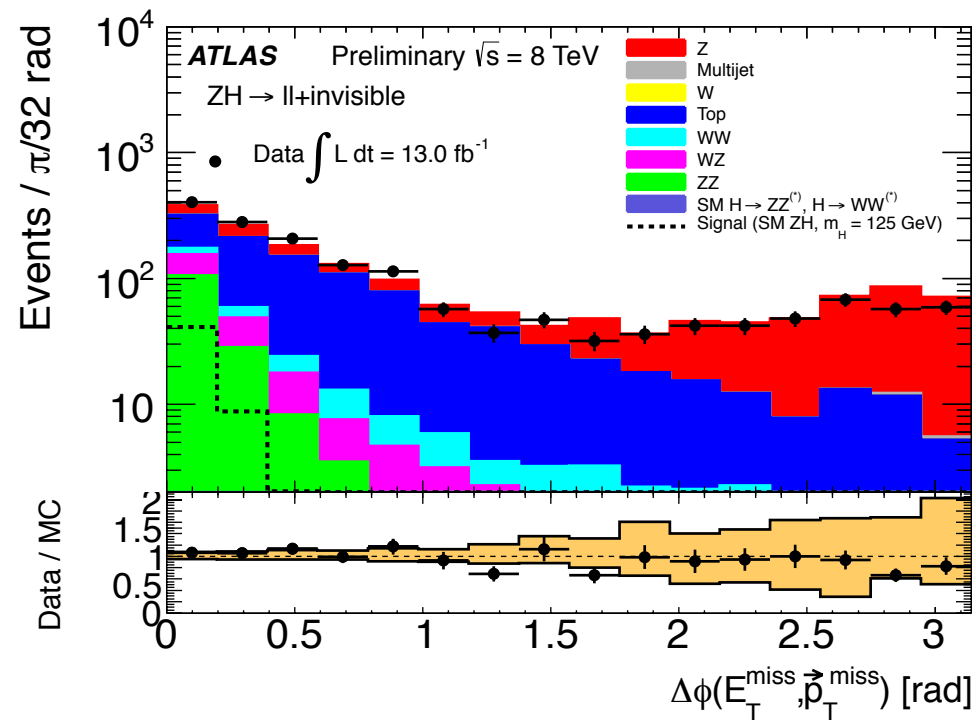
ATLAS-CONF-2013-011

CMS



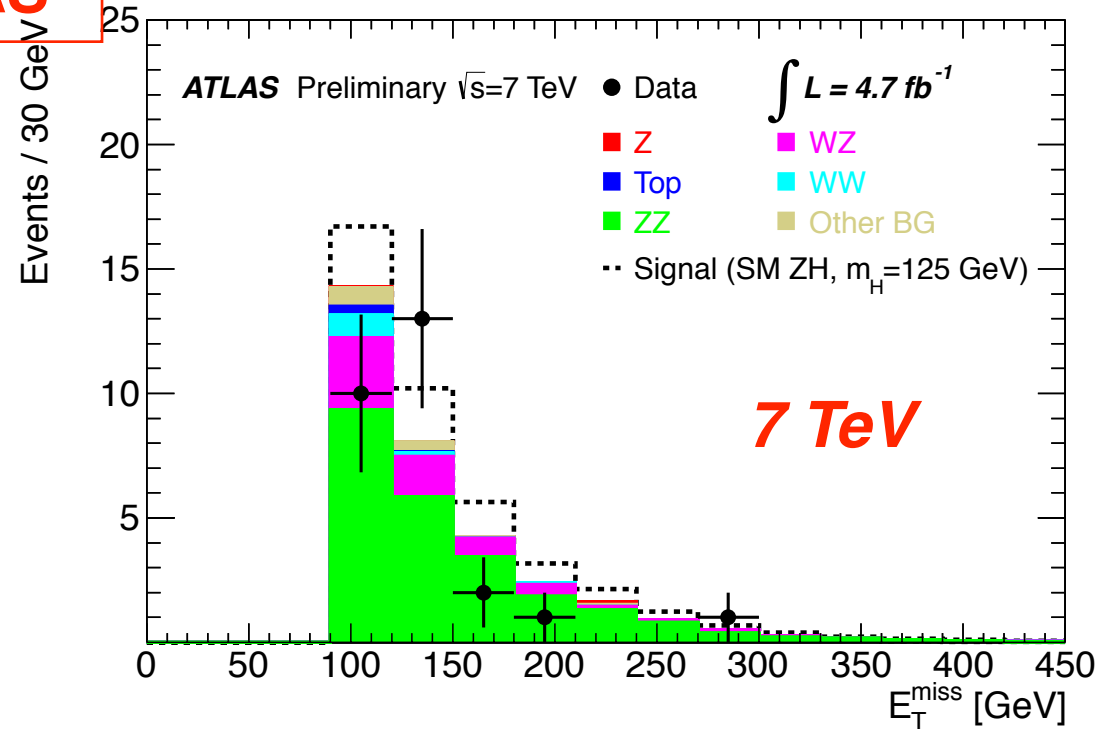
CMS-PAS-HIG-13-018

Other Distributions

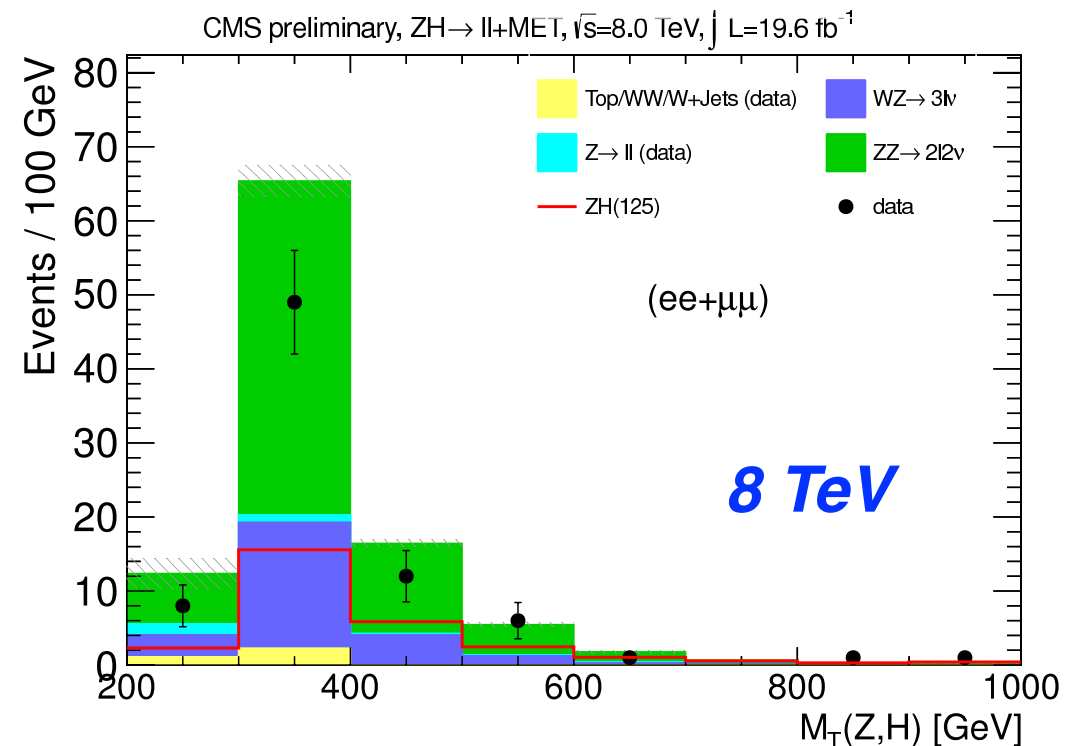
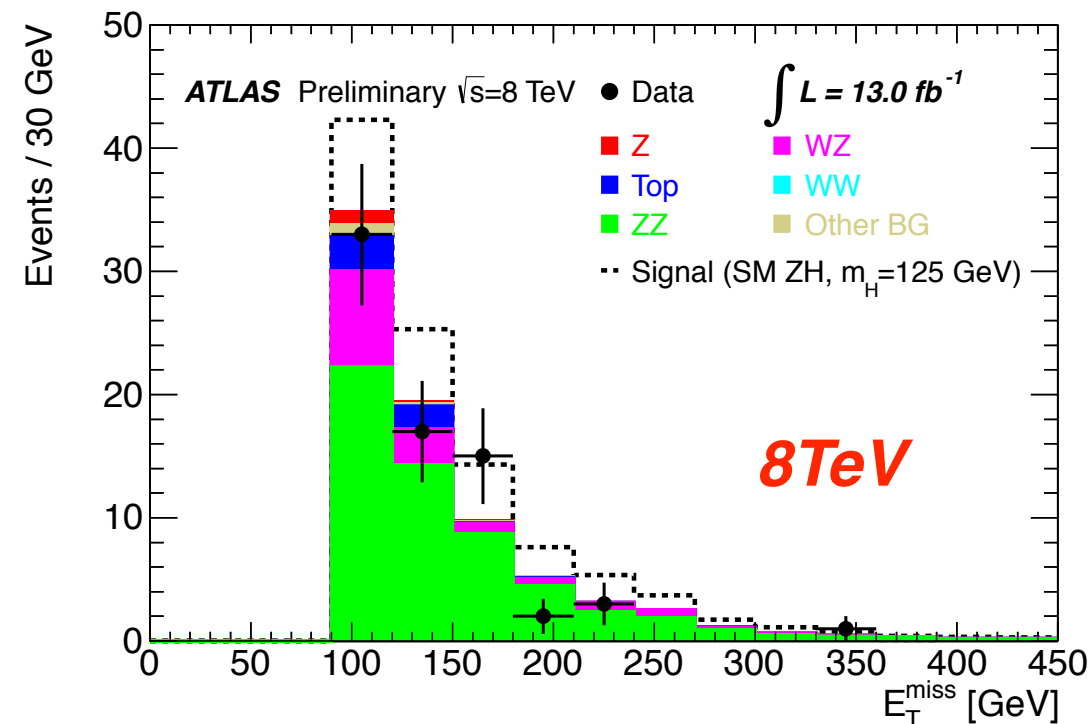
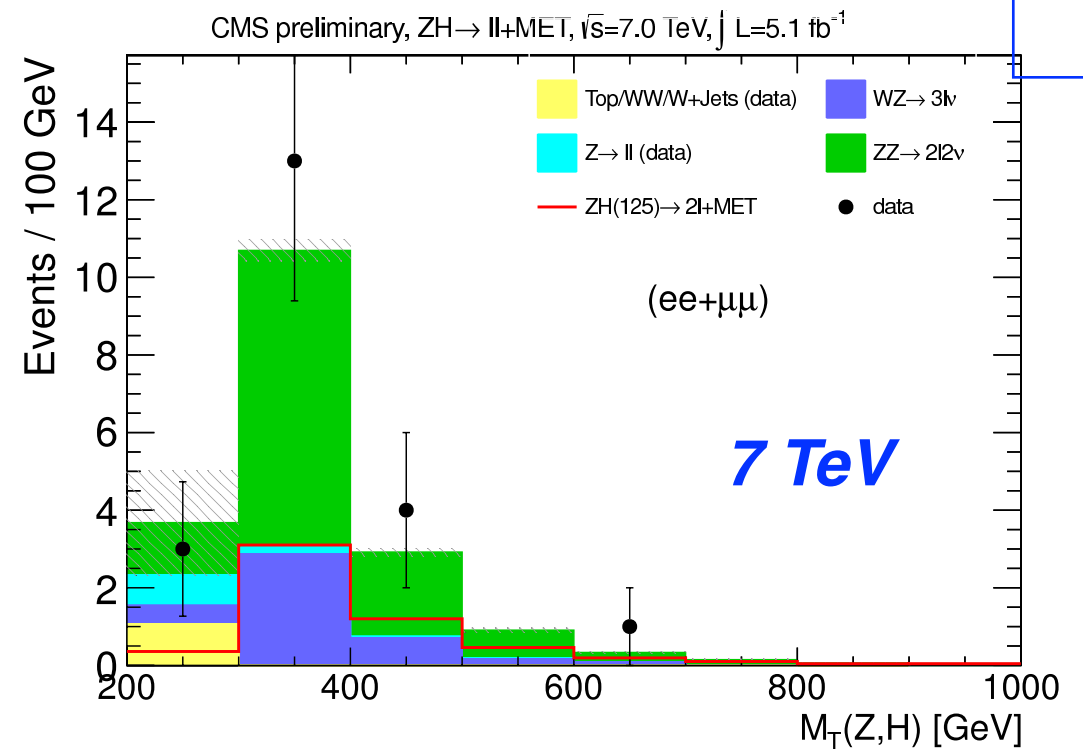


Signal Regions

ATLAS



CMS



BG/Signal Yields

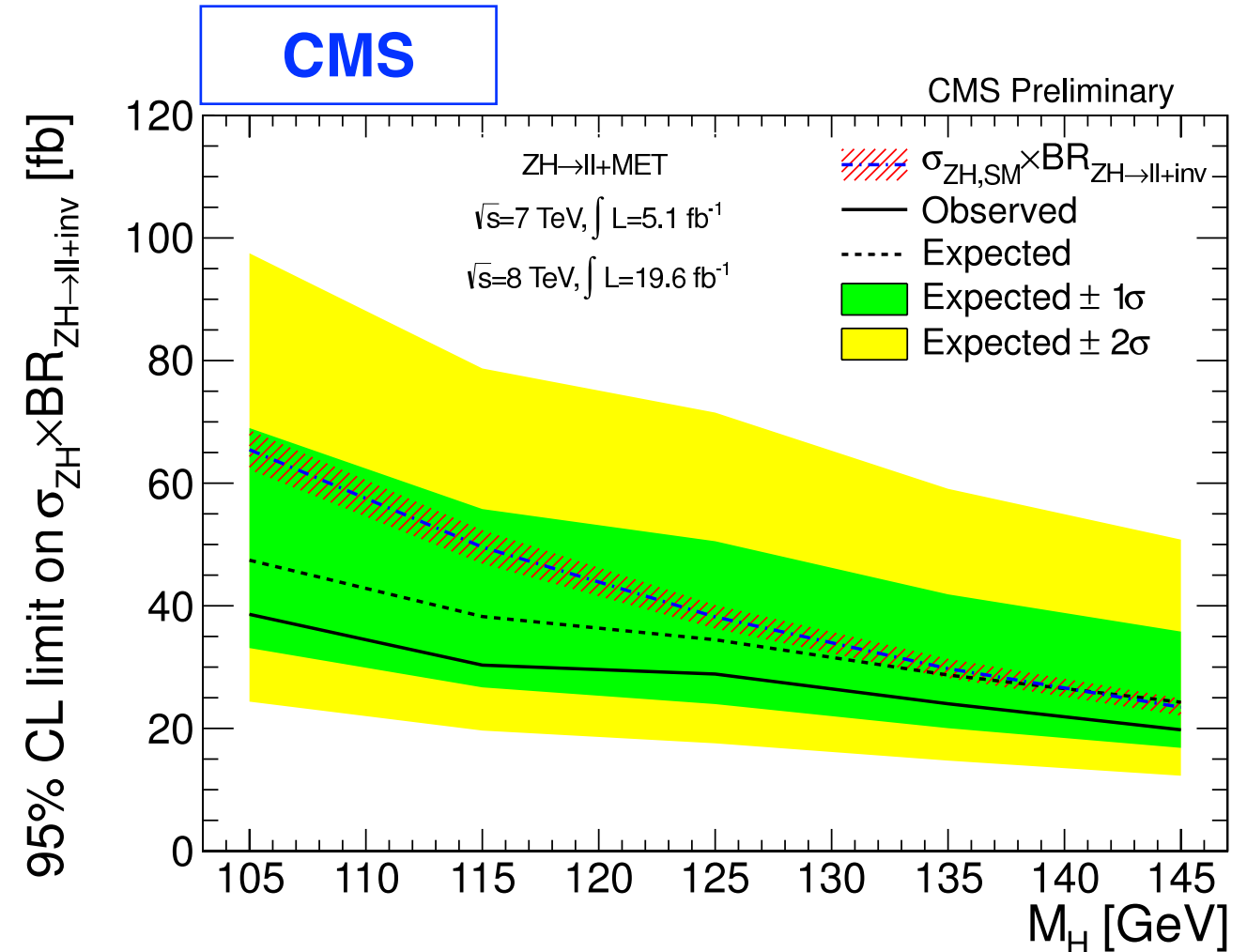
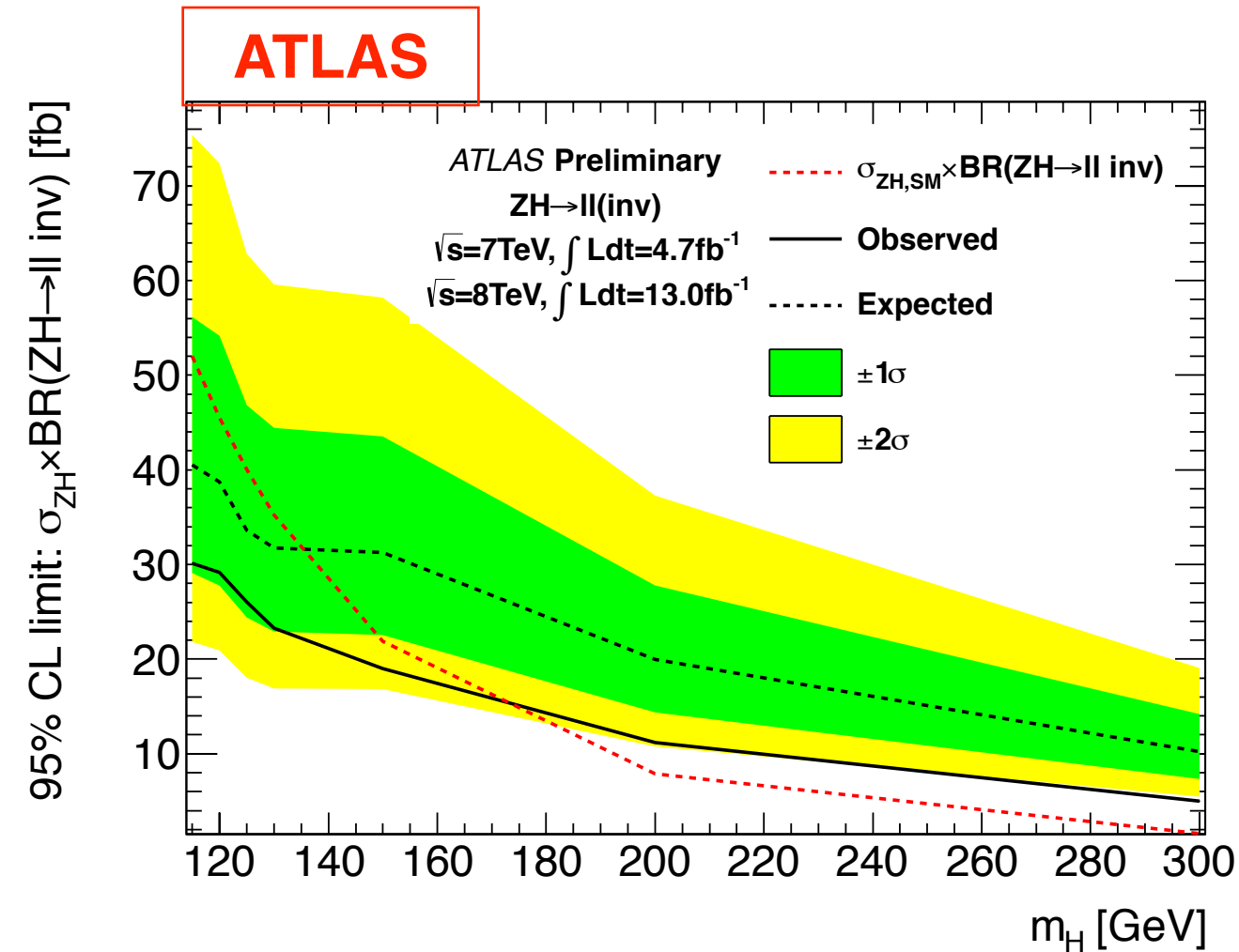
ATLAS

Data Period	2011 (7 TeV)	2012 (8 TeV) 13.0 fb⁻¹
ZZ	$23.5 \pm 0.8 \pm 2.5$	$56.5 \pm 1.2 \pm 5.7$
WZ	$6.2 \pm 0.4 \pm 0.7$	$13.9 \pm 1.2 \pm 2.1$
WW	$1.1 \pm 0.2 \pm 0.2$	used $e\mu$ data-driven
Top quark	$0.4 \pm 0.1 \pm 0.4$	used $e\mu$ data-driven
Top quark, WW and $Z \rightarrow \tau\tau$ ($e\mu$ data-driven)	used MC	$4.9 \pm 0.9 \pm 0.2$
Z	$0.16 \pm 0.13 \pm 0.09$	$1.4 \pm 0.4 \pm 0.7$
W + jets, multijet	$1.3 \pm 0.3 \pm 0.2$	$1.4 \pm 0.4 \pm 0.3$
Total BG	$32.7 \pm 1.0 \pm 2.6$	$78.0 \pm 2.0 \pm 6.5$
Observed	27	71

CMS

process	$\sqrt{s} = 7$ TeV	$\sqrt{s} = 8$ TeV 19.6 fb⁻¹
$m_H = 125$ GeV	5.9 ± 0.6	27.3 ± 3.0
$Z/\gamma^* \rightarrow \ell^+\ell^-$	0.4 ± 0.4	0.5 ± 0.5
WZ	4.2 ± 0.6	22.1 ± 3.0
ZZ	15.1 ± 1.5	64.2 ± 6.8
W + jets/WW/top	0.1 ± 0.3	1.8 ± 1.0
total bkg.	19.8 ± 1.7	88.6 ± 7.5
data	22	78

Limits



At $M_H=125$ GeV:

- ATLAS: $\text{BR}(H \rightarrow \text{inv}) < 65\%$ (obs), 84% (exp) at 95% CL w/ $4.7+13.0\text{ fb}^{-1}$**
- CMS: $\text{BR}(H \rightarrow \text{inv}) < 75\%$ (obs), 91% (exp) at 95% CL w/ $5.1+19.6\text{ fb}^{-1}$**