

Weekly Report

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December 14, 2020

The settings I used last time

- **VBF Sample used:**

- mc16_13TeV.500372.MGPy8EG_A14_NNPFD23LO_VBFH125_sbi_4l_m4l130.root
- mc16_13TeV.500374.MGPy8EG_A14_NNPFD23LO_VBFH125_sbi5_4l_m4l130.root
- mc16_13TeV.500375.MGPy8EG_A14_NNPFD23LO_VBFH125_sbi10_4l_m4l130.root
- mc16_13TeV.500373.MGPy8EG_A14_NNPFD23LO_VBFH125_bkg_4l_m4l100.root

- **categories:**

VBF_4mu_13TeV, VBF_4e_13TeV, VBF_2e2mu_TeV, VBF_4l_13TeV

- **mcsets:**

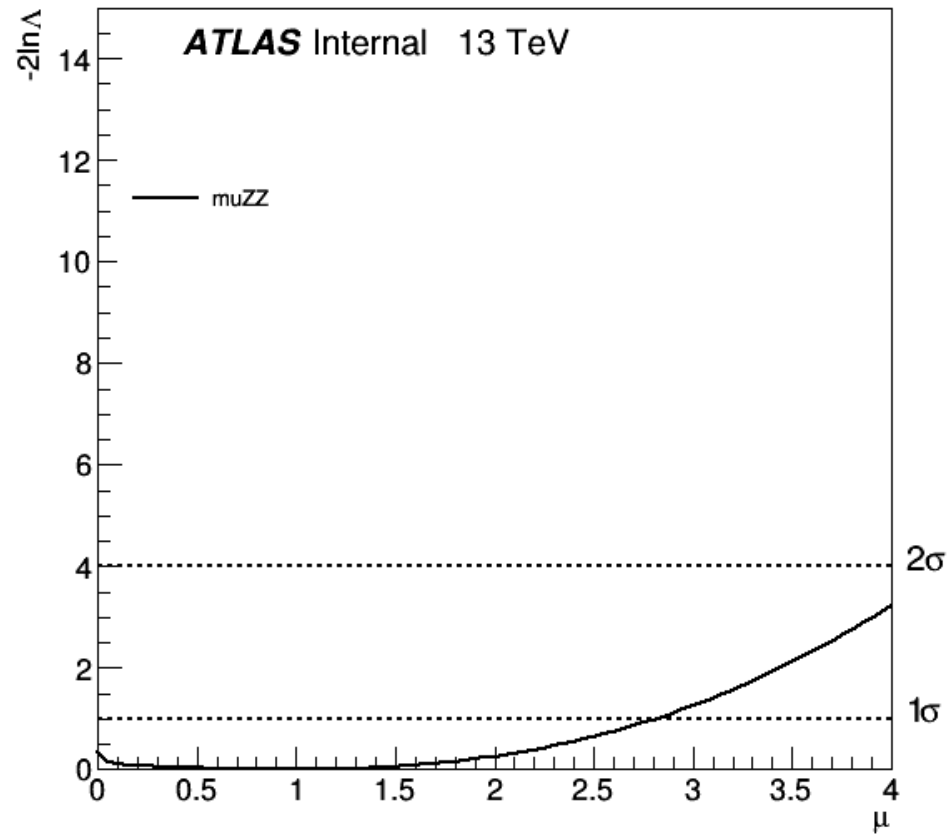
qqZZ, VBFSBI, VBFSBI5, VBFSBI10, VBFBKG, ggHSIG, ggHSBI

Introduction & Preview

- Last time I used these samples to do the statistic analysis
- But for ggH samples I need to deal with k-factor problems
- Theodota told me to remove VBFSBI10 and ggH samples
- But there will be problems if I remove ggHSBI and ggHSIG

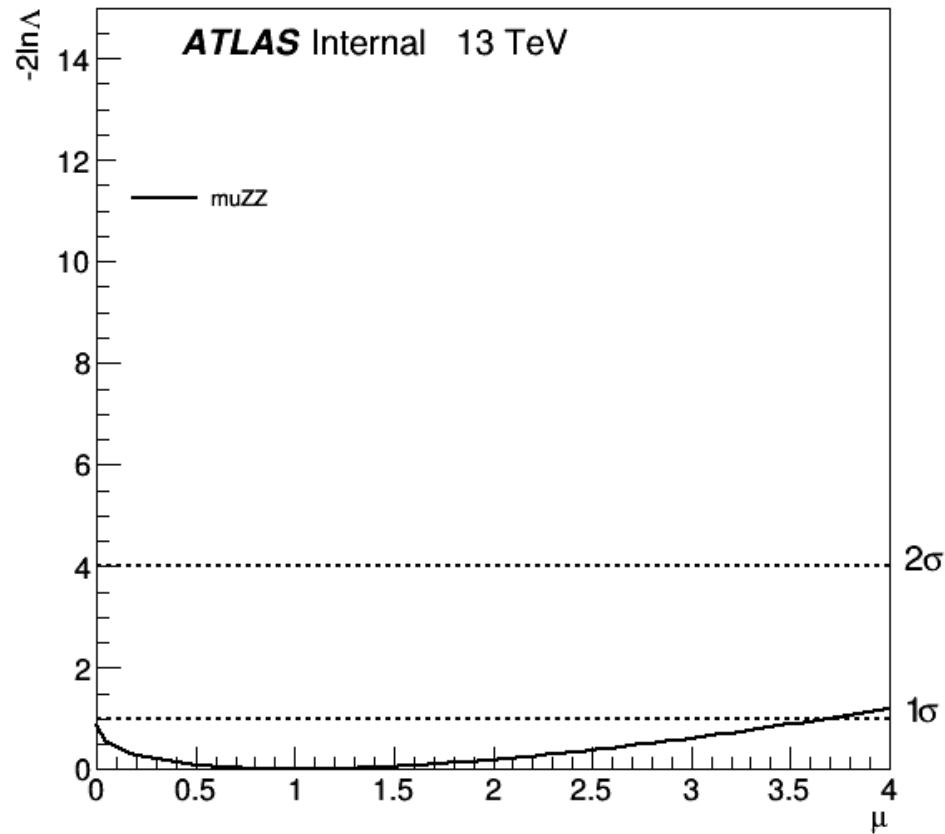
Problems if without ggH

- observable: m_{4l_fsr}
- cut: signal region
[220, 2000]GeV

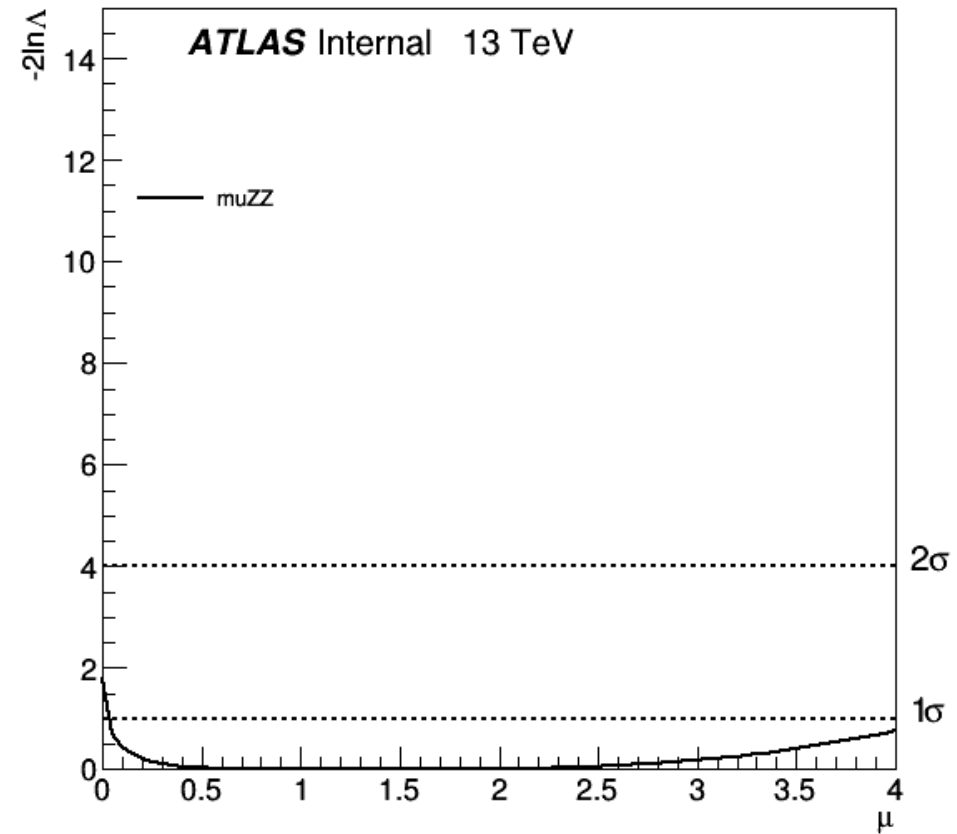


Only remove VBFSBI10

Problems if without ggH

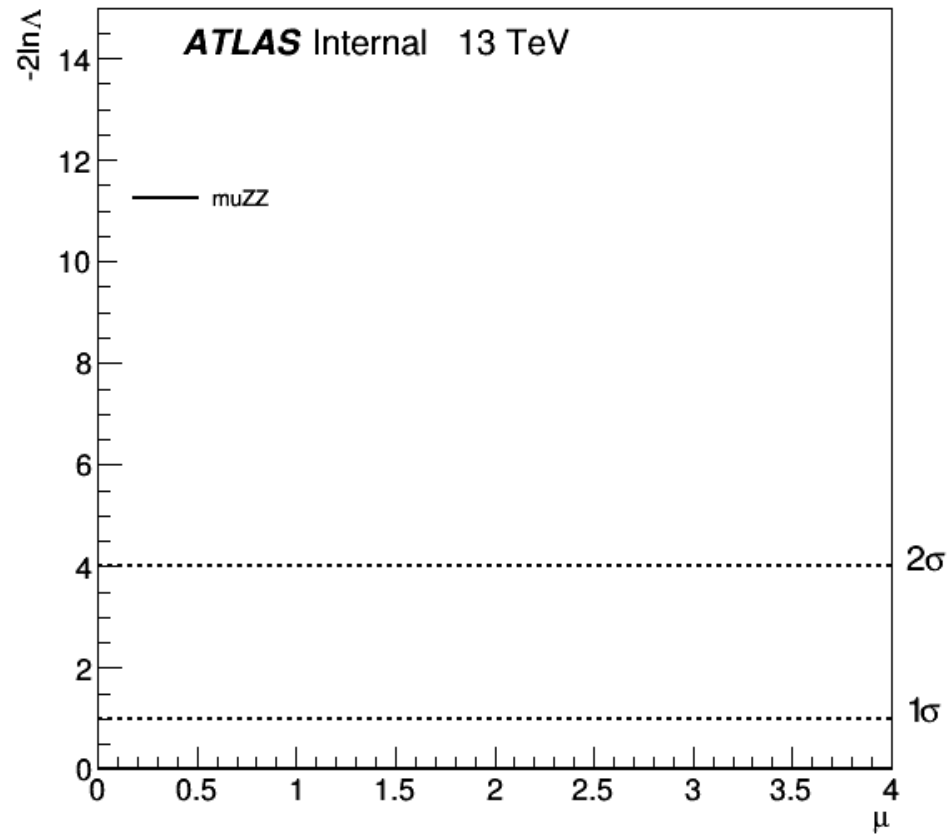


Remove VBF SBI10 and ggHSIG



Remove VBF SBI10 and ggHSBI

Problems if without ggH



Remove VBFSBI10, ggHSBI and ggHSIG

But I still did not find the reason
So I have to keep ggH samples

The settings I used this time

- **VBF Sample used:**

- mc16_13TeV.500372.MGPy8EG_A14_NNPDF23LO_VBFH125_sbi_4l_m4l130.root
- mc16_13TeV.500374.MGPy8EG_A14_NNPDF23LO_VBFH125_sbi5_4l_m4l130.root
- mc16_13TeV.500375.MGPy8EG_A14_NNPDF23LO_VBFH125_sbi10_4l_m4l130.root
- mc16_13TeV.500373.MGPy8EG_A14_NNPDF23LO_VBFH125_bkg_4l_m4l100.root

- **categories:**

VBF_4mu_13TeV, VBF_4e_13TeV, VBF_2e2mu_TeV, VBF_4l_13TeV

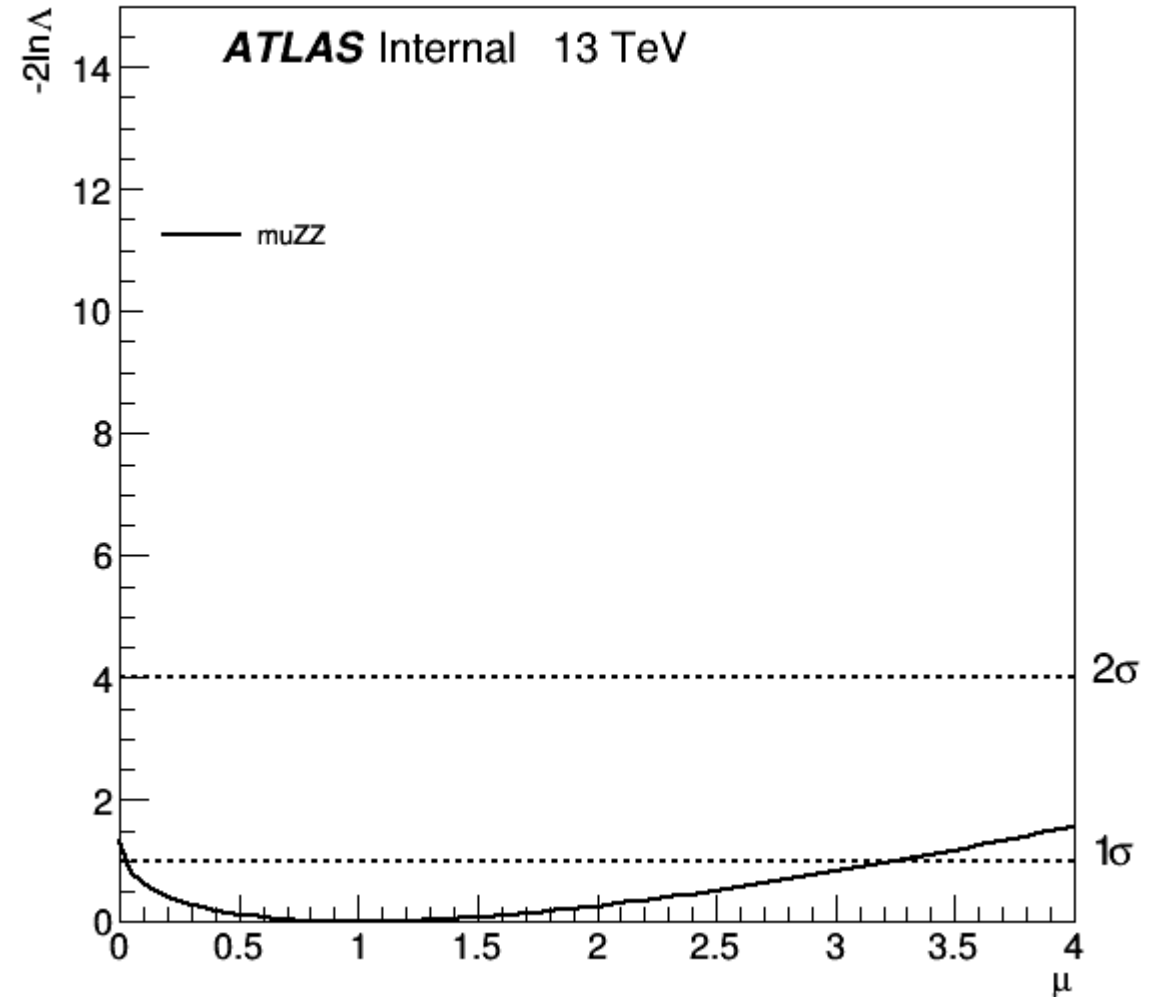
- **mcsets:**

qqZZ, VBFSBI, VBFSBI5, VBFBKG, ggHSIG, ggHSBI

Results (no floating)

- observable: m_{4l_fsr}
- cut: control region [130, 220]GeV

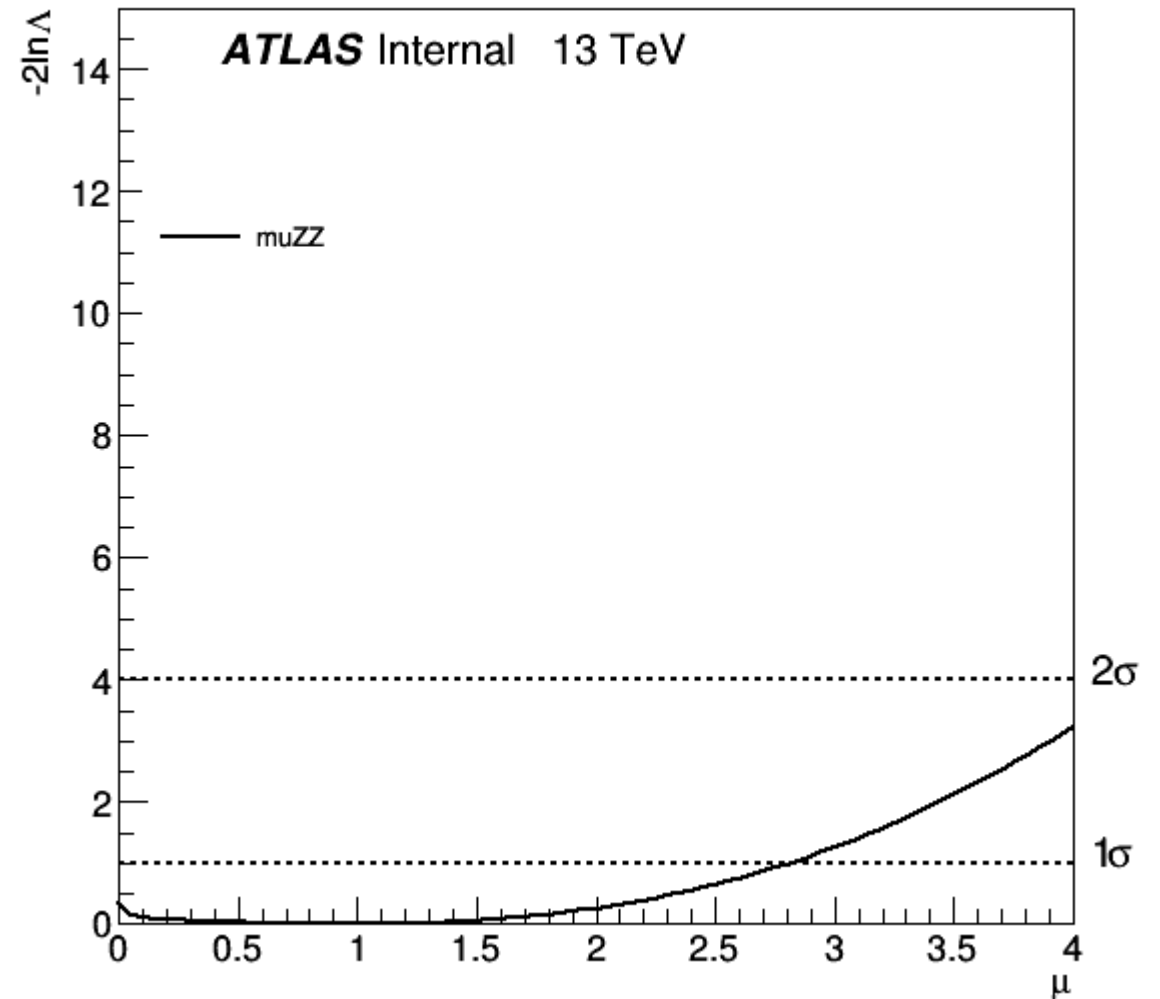
	Strength Value
μ_{qqZZ}	$1^{+2.26}_{-0.97}$



Results (no floating)

- observable: m_{4l_fsr}
- cut: signal region [220, 2000]GeV

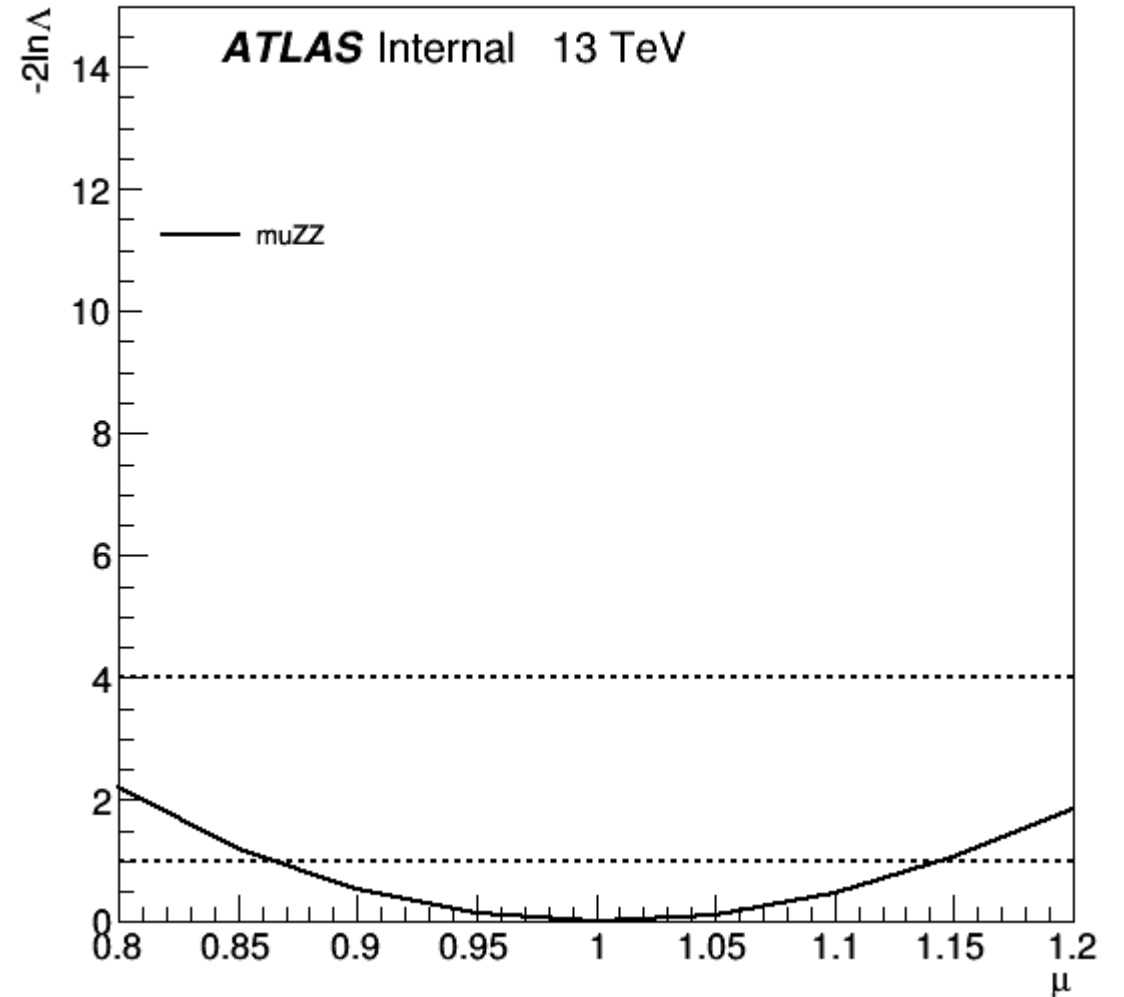
	Strength Value
μ_{qqZZ}	$1^{+1.82}_{-1.16}$



Results (no floating)

- observable: MELA_MCFM_ggZZ
- cut: control region [130, 220]GeV

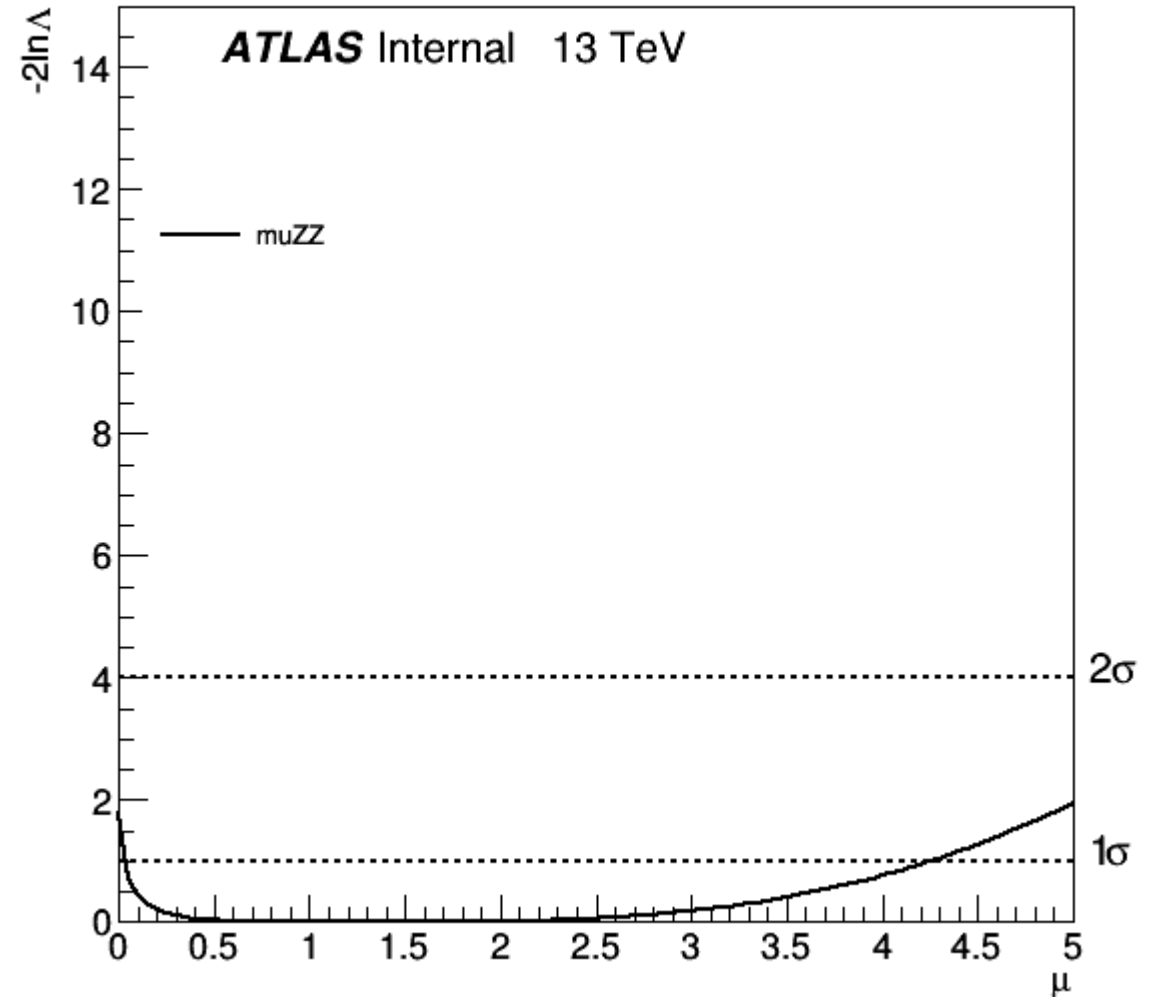
	Strength Value
μ_{qqZZ}	$1^{+0.14}_{-0.13}$



Results (no floating)

- observabile: MELA_MCFM_ggZZ
- cut: signal region [220, 2000]GeV

	Strength Value
μ_{qqZZ}	$1^{+3.26}_{-0.97}$



Next

- Add systematic to get floating figures
- Add data for m4l_fsr control region