Studies VBF SUSY, DY + Jets CR

August 2nd 2024

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Previous status

The analysis has been performed since some years ago by current and former collaborators from the BSM3G. It has also had a couple of convener rounds. Unfortunately, not many of them are not still active, so the analysis has been taken by the next members:

How workload is distributed?

- **Alfredo Gurrola:** Directing, advising and reviewing
- **Denis Rathjens:** Directing, advising and reviewing
- **Umar Sohail:** Analyzer 2 leptons channel
- **Edmund Ghampson:** Analyzer 1 lepton channel
- **Tomas Atehortua:** Analyzer 0 leptons channel

Report on the last weeks and current status

There have been a couple of issues during this time

1. Running the analyzer locally, or interactively ✓
2. Running with condor ✓
3. Running Plotter ✓
4. Debugging ⚠️
5. Learning how it works ⚠️
6. Already running! ✓

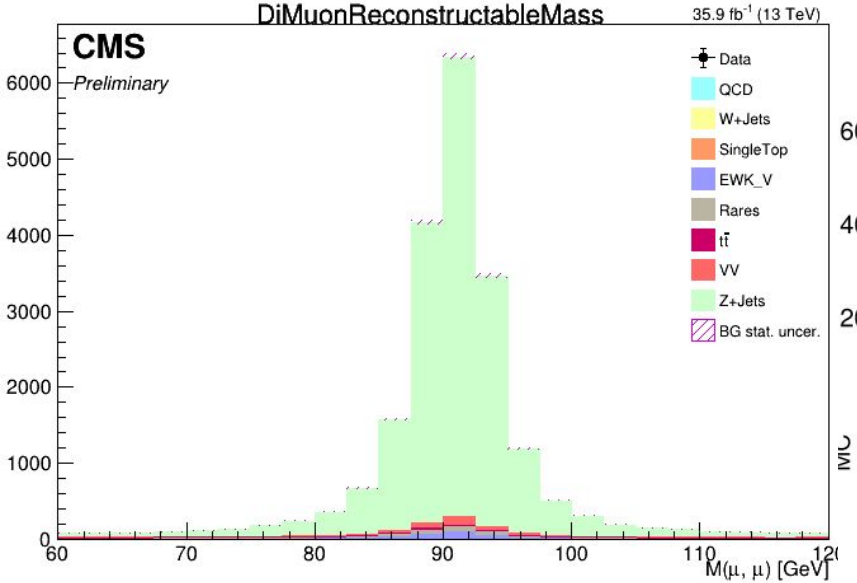
Current results on DY+ Jets, 0 Leptons, 2016 only Data

	Object	Selection cuts
Central	Trigger	HLT_IsoMu24 (2016, 2018) / HLT_IsoMu27 (2017)
	Muon selection	$N(\mu) \geq 2$ with $p_T(\mu) > 30\,\text{GeV}$, $\lvert\eta(\mu)\rvert < 2.1$, tight ID, isolation $I < 0.15$
	Additional μ veto	$N(\mu) = 0$ with $3\,\text{GeV} < p_T(\mu) < 30\,\text{GeV}$, $\lvert\eta(\mu)\rvert < 2.1$, tight ID, isolation $I < 0.15$
	Dimuon selection	$N(\mu\mu) \geq 1$ with $60\,\text{GeV} < m(\mu_1, \mu_2) < 120\,\text{GeV}$, $q(\mu_1) \times q(\mu_2) < 0$
	p_T^{miss}	$p_T^{miss} > 250\,\text{GeV}$
	Electron veto	$N(e) = 0$ with $p_T(e) > 5\,\text{GeV}$, $\lvert\eta(e)\rvert < 2.1$, medium ID
	Tau veto	$N(\tau_h) = 0$ $p_T(\tau_h) > 20\,\text{GeV}$, $\lvert\eta(\tau_h)\rvert < 2.1$, 1 or 3prong, $\Delta R(\tau_h, \mu \text{ or } e) > 0.3$, DeepTau2017v2p1, tight Isolation
	b-jet veto	$p_T(b) > 30\,\text{GeV}$, $\lvert\eta(b)\rvert < 2.4$, DeepCSV Medium WP

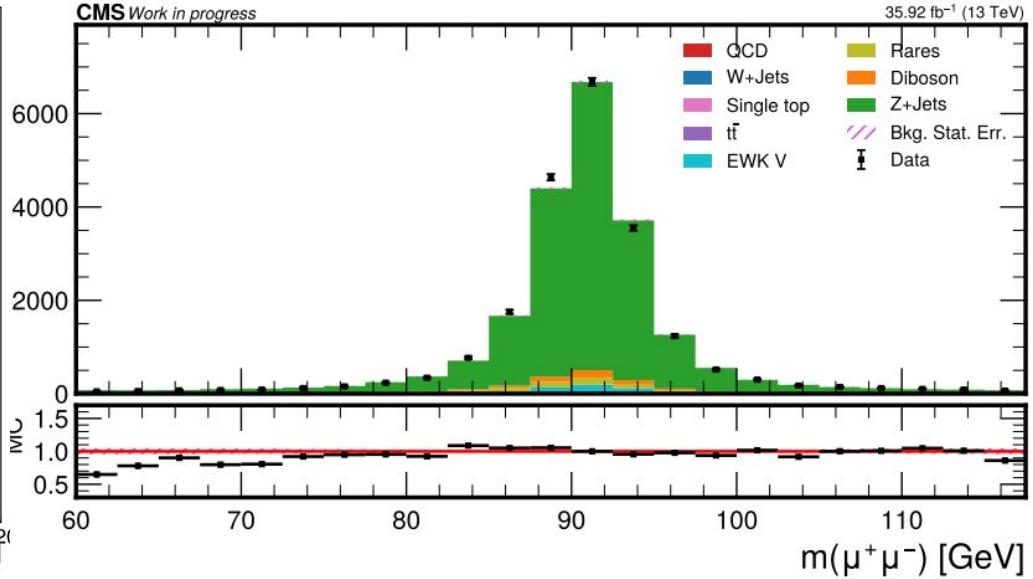
The Cutfow was

1. NRecoVertex
2. NRecoTriggers
3. NRecoMuons
4. NDimuonCombination

Current results



Our first result



Previous result

Current results

Sample	Previous	Current
QCD	0.0±0	0.0 ± 0.0
W + Jets	1.7±0.5	2.5 ± 0.8
Single top	31.8±2.5	118.5 ± 4.8
ttbar	242.6±3.5	1040.2 ± 7.2
Rares	645.3±9.6	774.4 ± 13.9
Diboson	692.7±13.2	1015.6 ± 9.9
EWK V	801.9±9.3	729.3 ± 10.2
Z + Jets	23249.8±64.0	47214.4 ± 190.3

Current results

Possible sources of discrepancy and respective solutions:

1. Not correct configurations on the .config files
   a. Compare the results with Edmund's and Umar's results when are done.
2. Not the correct version from the analyzer
   a. Compare with Dale's repository (under discussion)
3. Differences from the cross directions and the weights at the plotter
   a. Crosscheck the configfiles shared by Dale that included the cross section and the weights with the AN.
4. Condor
   a. …

Current results

Challenges:

1. Reproducing the old results
2. Use combined fit issue and that it's unlikely you'll be spared Run3 data
3. Implement this and/or other regions with the W'+b framework

Thank you!