Filters summary

- Existing inclusive $t\bar{t}$ sample: 436'810'367 events
  - Only 200 MC events in the most sensitive 10j4b l+jets category
  - $10\times$ statistics extension is feasible only with gen level filter
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- Variable definitions:
  - $HT = \sum\limits_{j:p_T>30,|\eta|<2.4} p_T(j)$
  - nJets= number of gen jets with $p_T > 30$
    No $\eta(j)$ cut due to different CMSSW filter logic.
    Includes jets from isolated leptons

- Lepton cuts are applied using LHE filter, similar to NoFullyHadronicDecays filter applied to single-top MC samples

- Currently waiting for new cmssw release containing all necessary filters

Filters summary (l+jets and OS)

Filter cuts	Filter eff.	Acceptance loss in different jet multiplicity regions[1]				
		OS $N_J = 7$	$N_J >= 8$	SL $N_J = 9$	$N_J > 9$	Ext ($\times 10$)
HT>500 && nJets+nLep>=6 && >= 1 lepton	0.023 ± 0.0003	—	—	—	—	100 M
HT>500 && nJets+nLep>=7 && >= 1 lepton	0.014 ± 0.0002	0.04	0.02	—	—	61 M
HT>500 && nJets+nLep>=8 && >= 1 lepton	0.006 ± 0.0002	0.14	0.04	0.11	0.08	26 M
HT>500 && nJets+nLep>=9 && >= 1 lepton	0.002 ± 0.0001	0.43	0.14	0.19	0.1	9M
HT>500 && nJets+nLep>=10 && >= 1 lepton	$0.0008 \pm 6.9 \times 10^{-5}$	—	—	—	0.19	3.5M

[1]Fraction of events passing offline cuts but rejected by gen filter

Filters summary (l+jets)

Filter cuts	Filter eff.	Bias^2 ($N_J^{rec} = 9$)	($N_J^{rec} >= 10$)	Ext ($\times 10$)
HT>500 && nJets+nLep>=8 && 1 lepton	0.005 ± 0.0002	0.11	0.08	21.8 M
HT>500 && nJets+nLep>=9 && 1 lepton	0.002 ± 0.0001	0.19	0.10	8.7M
HT>500 && nJets+nLep>=10 && 1 lepton	$0.0007 \pm 6.5 \times 10^{-5}$	—	0.19	3M

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^{2}Fraction of events passing offline cuts but rejected by gen filter

Filters summary (OS)

Filter cuts	Filter eff.	Bias[3] ($N_J^{rec} = 7$)	($N_J^{rec} >= 8$)	Ext ($\times 10$)
HT>500 && nJets+nLep>=5 && 2 lepton	$0.0046 \pm 5.5e - 05$	0.21	0.23	20 M
HT>500 && nJets+nLep>=6 && 2 lepton	$0.0033 \pm 4.7e - 05$	0.21	0.23	14.4 M
HT>500 && nJets+nLep>=7 && 2 lepton	$0.0020 \pm 3.6e - 05$	0.23	0.24	8.7 M
HT>500 && nJets+nLep>=8 && 2 lepton	$0.0009 \pm 2.4e - 05$	0.31	0.25	3.9 M

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[3]Fraction of events passing offline cuts but rejected by gen filter

Summary

- There are two options to get $10\times$ MC stat extension:
  - Two samples with different gen level cuts (12M in total):
    - OS **9M**: $HT > 500\&\&nJets + nLep >= 7\&\&nLep == 2$
    - SL **3M**: $HT > 500\&\&nJets + nLep >= 10\&\&nLep == 1$
  - Combined sample (26M in total):
    - SL+OS: $HT > 500\&\&nJets + nLep >= 8\&\&nLep >= 1$