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# Work Status

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# Object definitions

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## ➤ Electron:

- ›  $pt > 10 \text{ GeV}$ ;
- ›  $0 < |\eta| < 1.37, 1.52 < |\eta| < 2.47$ ;
- › ID, Isolation, Vertex

## ➤ Muon:

- ›  $pt > 10 \text{ GeV}$ ;
- ›  $|\eta| < 2.5$ ;
- › ID, Isolation, Vertex

## ➤ Jet:

- ›  $pt > 25 \text{ GeV}$ ;
- ›  $|\eta| < 2.5$
- › |JVT|, Btag tool

# Event selection

## ➤ GRL

## ➤ Trigger:

Channel	Trigger
Muon	HLT_mu20_loose_L1MU15
	HLT_mu50
Electron	HLT_e24_lhmedium_L1EM20VH (L1EM18VH)
	HLT_e60_lhmedium
	HLT_e120_lhloose

basic selection

- Select leptons and jets following object definitions
- overlap removal
- two same sign leptons(no additional leptons), more than 4 jets
- $pt_{\text{leading\_lepton}} > 25\text{GeV}$ ,  $pt_{\text{sub\_lepton}} > 10\text{GeV}$
- reject any events with b jets
- $m_{ljlj} < 300\text{GeV}$
- further cuts

# HWW framework(ongoing)

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- Trying to run on WW bkg, like W+jets, Z+jets, QCD,etc.
- To see what will happen after
  - › basic selection
  - › event selection

# Others, to do list

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- For pheno paper, updated the signal samples and plots
- QS: had looked at fake seeds. start to separate seeds into PPP, PSS and SSS to study their properies
- Finished 10 shifts till now. Hope could be promoted..
- Focus on HWW framework, try to have a look at all the existing bkg samples
- ID missing bkg, like DPS
- ...
- For pheno paper, mva once  $X+4j$  is done.

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# Backup



## Derivation: xAOD->DxAOD

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- at least one lepton with  $P_t > 20 \text{ GeV}$  passing Medium ID;
- at least one large coned jet with  $R=1.0$  or small-coned jet with  $R=0.4$  reconstructed by anti-kt algorithm with  $P_t > 200 \text{ GeV}$ ;
- objects which do not satisfy one of the following requirements are removed from the event:
  - track-particles associated with reconstructed electrons;
  - track-particles associated with reconstructed muons;
  - track-particles associated with  $R=0.4$  jets with  $P_t > 15 \text{ GeV}$  and  $\eta < 2.8$
  - track-particles associated with  $R=1.0$  jets with  $P_t > 200 \text{ GeV}$  and  $\eta < 2.8$

origin from EXOT11 derivation!

# Object definitions: Muons

➤ Three categories are created for leptons:

- signal: to be used in the final analysis;
- veto: reject events that would belong to other final state topologies with more than two leptons
- QCD: evaluate the shape of the multi-jet background which contains a mis-identified lepton

	Muons			
	Pre-Selection	Veto	Signal	QCD
$p_T$ threshold	7 GeV	25 GeV	25 GeV	25 GeV
$ \eta $	< 3.0	< 2.5	< 2.5	< 2.5
Identification	Loose	Loose	Medium	Medium
Isolation	-	-	Tight	fail Tight
$ d_0/\sigma(d_0) $	-	-	< 3	> 3
$ z_0 \sin \theta $	-	-	< 0.5 mm	< 0.5 mm

too high PT, lower to 15GeV?

Overlap removal:

- 1) muon is discarded:  $dR(\text{small-R jet, muon}) < 0.4 \ \&\& \ \# \text{tracks of small-R jet} > 2$
- 2) jet is discarded:  $dR(\text{small-R jet, muon}) < 0.4 \ \&\& \ \# \text{tracks of small-R jet} \leq 2$



# Electrons



	Electrons			
	Pre-Selection	Veto	Signal	QCD
$p_T$ threshold	7 GeV	25 GeV	25 GeV	25 GeV
$ \eta $	$< 2.47$	$< 2.47 \notin [1.37, 1.52]$		
Identification	LooseLH	LooseLH	TightLH (MediumLH for $E_T > 300$ GeV)	MediumLH and fail TightLH
Isolation	-	-	Tight	Medium and fail Tight
$ d_0/\sigma(d_0)^{BL} $	-	-	$< 5$	$< 5$
$ z_0 \sin \theta $	-	-	$< 0.5$ mm	$< 0.5$ mm

Overlap removal:

- 1) electron is discarded: share ID tracks with pre-slected muons
- 2) electron is discarded:  $0.2 < dR(\text{small-R jet, electron}) < 0.4$

# Jets

	Signal Small-R Jets
Algorithm	anti- $k_t$
$p_T$ threshold	20 GeV
$ \eta $	$< 4.5$
Quality	not “bad” jet
Pile-up Removal	JVT $< 0.64$ when $ \eta  < 2.4$ && $p_T < 50$ GeV
b-Tagging (if applied)	MV2c, 85% efficiency

	Signal Large-R Jets
Algorithm	anti- $k_t$
$p_T$ threshold	200 GeV
$ \eta $	$< 2.0$
Mass threshold	50 GeV
Tagger	R2D2

need to drop Boson tagger,  
since it contains mass constraint on W/Z

# MissingET

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- MET\_Core\_AntiKt4EMTopo with the MissingETAssociationMap using the METMaker tool

# Event selection

➤ Trigger:

Channel	Trigger
Muon	HLT_mu20_loose_L1MU15 HLT_mu50
Electron	HLT_e24_lhmedium_L1EM20VH (L1EM18VH) HLT_e60_lhmedium HLT_e120_lhloose

- Basic cuts:  $p_T(j) > 25 \text{ GeV}$ ,  $p_T(l) > 15 \text{ GeV}$
- two same leptons (no additional leptons?), more than 4 jets
- reject any events with b jets
- $m_{ljlj} < 300 \text{ GeV}$
- further cuts