Purpose of this page

In order to have information about the steps of the analysis centralized, we could write down any significant information, making it up to dated.

How to produce ntuples

How to produce distributions from LHE

Will come soon.

How to do full simulation

Will come soon.

Producing Ntuples from MiniAOD

These are the instruction on how to create Ntuples from MiniAOD via CRAB3.

Samples for Run2 (data, background and signal)

List of samples from Data Run2

The following table contains the list of Data samples (`Run2015B-PromptReco-v1`), as well as the correspondent number of events and luminosity.

Data Run2 (Run2015B-PromptReco-v1 from DAS)	Number of events (from DAS)	Luminosity (1/pb)
`/MET/Run2015B-PromptReco-v1/MINIAOD`	299090	40.215
`/DoubleMuon/Run2015B-PromptReco-v1/MINIAOD`	1631653	46.337
`/SingleMuon/Run2015B-PromptReco-v1/MINIAOD`	3633477	46.337
`/DoubleEG/Run2015B-PromptReco-v1/MINIAOD`	5018488	40.240
`/SingleElectron/Run2015B-PromptReco-v1/MINIAOD`	2718409	40.240
`/SinglePhoton/Run2015B-PromptReco-v1/MINIAOD`	737246	40.240

These are the instructions to compute luminosity:

The following table shows the paths to the Data Ntuples in `T2_SPRACE` which includes events after the good vertex selection:

- `offlineSlimmedPrimaryVertices`
- `!isFake && ndof > 4 && abs(z) < 24 && position.Rho < 2`

Path of Ntuple for Data Run2 (Run2015B-PromptReco-v1) in T2_SPRACE	Number of events
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/MET_Run2015B.root	137584
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/DoubleMuon_Run2015B.root	1152197
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/SingleMuon_Run2015B.root	2010988
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/DoubleEG_Run2015B.root	4773783
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/SingleElectron_Run2015B.root	2217177
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/SinglePhoton_Run2015B.root	561242

The following table contains the list of Data samples (Run2015B-17Jul2015-v1) **INTENDED** to be produced in Ntuple format, as well as the correspondent number of events and luminosity. According to MiniAOD Analysis Documentation, this datasets correctly include $E_T^{missing}$ filters. It is important to use the recommendations provided by MET group concerning Spring15 MC and 50 ns about:

- Met corrections for Run-II; and
- MET Filters for Run II.

Data Run2 (Run2015B-17Jul2015-v1 from DAS)	Number of events (from DAS)	Luminosity (1/pb)
/MET/Run2015B-17Jul2015-v1/MINIAOD	75938	
/DoubleMuon/Run2015B-17Jul2015-v1/MINIAOD	497402	
/SingleMuon/Run2015B-17Jul2015-v1/MINIAOD	1039658	
/DoubleEG/Run2015B-17Jul2015-v1/MINIAOD	4567275	
/SingleElectron/Run2015B-17Jul2015-v1/MINIAOD	1027225	
/SinglePhoton/Run2015B-17Jul2015-v1/MINIAOD	323203	

List of MC samples for background (Run2 Spring15)

The following table contains the list of MC background samples (Run2 Spring15) with correspondent number of events and cross sections (from different sources). As mentioned in the Exo Diboson twiki page, *"If only the lepton decay of the W is included in the sample, the cross section is multiplied by BR(W->lv) = 0.322 with l = e, mu, tau"*, and the references for cross sections come from:

- [1] https://twiki.cern.ch/twiki/bin/viewauth/CMS/StandardModelCrossSectionsat13TeVInclusive
- [2] https://twiki.cern.ch/twiki/bin/view/LHCPhysics/TtbarNNLO
- [3] https://twiki.cern.ch/twiki/bin/viewauth/CMS/SingleTopSigma
- [4] DAS

MC Background Spring15 (from DAS)	Number of events (from DAS)	Cross Section (pb) from DAS	Cross Section (pb) from other reference
/WJetsToLNu_TuneCUETP8M1_13TeV-amcatnloFXFX-pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	24089991	60290	61526.7 (NNLO) [1]
/TTJets_TuneCUETP8M1_13TeV-madgraphMLM-pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	4992231	502.2	502.2 (NNLO) [2]
/ST_t-channel_top_4f_leptonDecays_13TeV-powheg-pythia8_TuneCUETP8M1/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	1273800	103.02	136.02*0.322 (NLO) [3]
/ST_t-channel_antitop_4f_leptonDecays_13TeV-powheg-pythia8_TuneCUETP8M1/RunIISpring15DR74-Asympt25ns_MCRUN2_74_V9-v1/MINIAODSIM	1695400	80.95	80.95*0.322 (NLO) [3]
/ST_tW_top_5f_inclusiveDecays_13TeV-powheg-pythia8_TuneCUETP8M1/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	998400	38.09	35.6 (NNLO) [3]
/ST_tW_antitop_5f_inclusiveDecays_13TeV-powheg-pythia8_TuneCUETP8M1/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM	1000000	38.09	35.6 (NNLO) [3]
/WW_TuneCUETP8M1_13TeV-pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	989608	63.21	118.7 (NNLO) [1]
/WZ_TuneCUETP8M1_13TeV-pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM	996920	22.82	66.1 (NLO) [1]
/ZZ_TuneCUETP8M1_13TeV-pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM	998848	10.32	15.4 (NLO) [1]
/QCD_Pt_120to170_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	3446207	471100	---
/QCD_Pt_170to300_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM (Being produced)	3438066	117276	---
/QCD_Pt_300to470_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	2930578	7823	---
/QCD_Pt_470to600_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM (Being produced)	1939229	648.2	---
/QCD_Pt_600to800_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM (Being produced)	1890256	186.9	---
/QCD_Pt_800to1000_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM (Being produced)	1911296	32.293	---
/QCD_Pt_1000to1400_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM (Being produced)	1461216	9.4183	---
/QCD_Pt_1400to1800_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	197959	0.84265	---
/QCD_Pt_1800to2400_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	194924	0.114943	---
/QCD_Pt_2400to3200_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	198383	0.00682981	---
/QCD_Pt_3200toInf_TuneCUETP8M1_13TeV_pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v1/MINIAODSIM	188696	0.000165445	---
/DYJetsToLL_M-50_TuneCUETP8M1_13TeV-amcatnloFXFX-pythia8/RunIISpring15DR74-Asympt50ns_MCRUN2_74_V9A-v2/MINIAODSIM	19925500	6104	6025.2 (NNLO) [1]

The following table shows the paths to the MC background Ntuples in `T2_SPRACE` site which includes events after the good vertex selection:

- `offlineSlimmedPrimaryVertices`
- `!isFake && ndof > 4 && abs(z) < 24 && position.Rho < 2`

Path of Ntuple for MC Spring15 in T2_SPRACE	Number of events
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/WJetsToLNu.root	24089978
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/TTJets.root	4992231
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/ST_t-channel_top_4f_leptonDecays.root	1273800
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/ST_t-channel_antitop_4f_leptonDecays.root	1695400
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/ST_tW_top_5f_inclusiveDecays.root	998400
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/ST_tW_antitop_5f_inclusiveDecays.root	1000000
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/WW.root	989608
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/WZ.root	996920
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/ZZ.root	998847
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/QCD_Pt_120to170.root	3446207
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/QCD_Pt_300to470.root	2930577
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/QCD_Pt_1400to1800.root	197959
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/QCD_Pt_1800to2400.root	194924
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/QCD_Pt_2400to3200.root	198383
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/QCD_Pt_3200toInf.root	188696
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/RunIISamples_25Jul2015/Ntuples_DataMC_27Jul2015/DYJetsToLL_M-50.root	19925488

List of MC samples for background (Phys14)

The following table contains the list of MC background samples (Phys14) with correspondent number of events and cross sections.

MC Background Phy14 (from DAS)	Number of events (from DAS)	Cross Section (pb) from DAS
/ZJetsToNuNu_HT-100to200_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4986424	372.6
/ZJetsToNuNu_HT-200to400_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4546470	100.8
/ZJetsToNuNu_HT-400to600_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v2/MINIAODSIM	4433784	11.99
/ZJetsToNuNu_HT-600toInf_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4463806	4.113
/WJetsToLNu_HT-100to200_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	5262265	1817.0
/WJetsToLNu_HT-200to400_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4936077	471.6
/WJetsToLNu_HT-400to600_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4640594	55.61
/WJetsToLNu_HT-600toInf_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4581841	18.81
/TTJets_MSDecaysCKM_central_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	25446993	831.76
/TToLeptons_s-channel-CSA14_Tune4C_13TeV-aMCatNLO-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	500000	2.3328
/TToLeptons_t-channel-CSA14_Tune4C_13TeV-aMCatNLO-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	3991000	136.02
/T_tW-channel-DR_Tune4C_13TeV-CSA14-powheg-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	986100	35.6
/TBarToLeptons_s-channel-CSA14_Tune4C_13TeV-aMCatNLO-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	250000	1.34784
/TBarToLeptons_t-channel_Tune4C_CSA14_13TeV-aMCatNLO-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	1999800	26.2278
/Tbar_tW-channel-DR_Tune4C_13TeV-CSA14-powheg-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	971800	35.6
/QCD_HT-100To250_13TeV-madgraph/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4123612	28730000
/QCD_HT_250To500_13TeV-madgraph/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	971800	670500
/QCD_HT-500To1000_13TeV-madgraph/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	849033	26740.0
/QCD_HT_1000ToInf_13TeV-madgraph/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	333733	769.7
/QCD_HT_250To500_13TeV-madgraph/Phys14DR-PU20bx25_PHYS14_25_V1_ext1-v2/MINIAODSIM	2004219	670500
/QCD_HT-500To1000_13TeV-madgraph/Phys14DR-PU20bx25_PHYS14_25_V1_ext1-v1/MINIAODSIM	3214312	26740.0
/QCD_HT_1000ToInf_13TeV-madgraph/Phys14DR-PU20bx25_PHYS14_25_V1_ext1-v1/MINIAODSIM	1130720	769.7
/DYJetsToLL_M-50_HT-100to200_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4054159	194.3
/DYJetsToLL_M-50_HT-200to400_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4666496	52.24
/DYJetsToLL_M-50_HT-400to600_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4931372	6.546
/DYJetsToLL_M-50_HT-600toInf_Tune4C_13TeV-madgraph-tauola/Phys14DR-PU20bx25_PHYS14_25_V1-v1/MINIAODSIM	4493574	2.179

The following table shows the paths to the MC background Ntuples in T2_SPRACE site which includes events after the good vertex selection.

Path of Ntuple for MC Phys14 in T2_SPRACE	Number of events
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/ZJetsToNuNu_HT-100to200_PHYS14.root	4986410
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/ZJetsToNuNu_HT-200to400_PHYS14.root	4546455
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/ZJetsToNuNu_HT-400to600_PHYS14.root	4433769
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/ZJetsToNuNu_HT-600toInf_PHYS14.root	4463773
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/WJetsToLNu_HT-100to200_PHYS14.root	5262249
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/WJetsToLNu_HT-200to400_PHYS14.root	4936055
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/WJetsToLNu_HT-400to600_PHYS14.root	4640575
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/WJetsToLNu_HT-600toInf_PHYS14.root	4581825
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/TTJets_MSDecaysCKM_centra.root	25446877
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/TToLeptons_s-channel_PHYS14.root	499999
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/TToLeptons_t-channel_PHYS14.root	3990985
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/T_tW-channel-DR_PHYS14.root	986096
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/TBarToLeptons_s-channel_PHYS14.root	250000
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/TBarToLeptons_t-channel_PHYS14.root	1999793
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/Tbar_tW-channel-DR_PHYS14.root	971797
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/QCD_HT-100To250_PHYS14.root	4123591
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/QCD_HT_250to500_PHYS14.root	663953
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/QCD_HT_500to1000_PHYS14.root	849028
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/QCD_HT_1000toInf_PHYS14.root	333732
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/QCD_HT_250to500_ext1_PHYS14.root	2004211
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/QCD_HT_500to1000_ext1_PHYS14.root	3214303
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/QCD_HT_1000toInf_ext1_PHYS14.root	1130715
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/DYJetsToLL_HT-100to200_PHYS14.root	4054144
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/DYJetsToLL_HT-200to400_PHYS14.root	4666479
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/DYJetsToLL_HT-400to600_PHYS14.root	4931352
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/Backgrounds_18Jun2015/DYJetsToLL_HT-600toInf_PHYS14.root	4493550

List of MC samples for signal (i2HDM)

The following table shows the path of MC samples for i2HDM signal in T2_SPRACE, as well as the number of generated events, the number events after the good primary vertex selection, and the cross section. There are samples considering cases of **h1h1** and **h1h2** DM production.

Path of Ntuple for i2HDM signal in T2_SPRACE	Number of generated events (from LHE)	Number of events in level of Ntuple	Cross Section (pb)
h1h1 DM production			
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM1_h1h1j_13tev-single_Ntuple.root	50000	50000	0.17
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM2_h1h1j_13tev-single_Ntuple.root	50000	50000	0.77
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM3_h1h1j_13tev-single_Ntuple.root	50000	50000	0.000043
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM4_h1h1j_13tev-single_Ntuple.root	50000	50000	0.00012
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM5_h1h1j_13tev-single_Ntuple.root	50000	50000	0.000023
h1h2 DM production			
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM1_h1h2j_13tev-single_Ntuple.root	50000	50000	0.17
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM2_h1h2j_13tev-single_Ntuple.root	50000	50000	0.77
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM3_h1h2j_13tev-single_Ntuple.root	50000	50000	0.000043
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM4_h1h2j_13tev-single_Ntuple.root	50000	50000	0.00012
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/I2HDM_13TeV/i2HDM_Ntuples_30Jul2015/i2hdm_BM5_h1h2j_13tev-single_Ntuple.root	50000	50000	0.000023

List of MC samples for signal (EFT)

The following table shows the path of MC samples for EFT signal in T2_SPRACE, as well as the number of generated events, the number events after the good primary vertex selection, and the cross section (from Monojet twiki page). These are samples with **Axial-Vector** and **Vector** cases.

Path of Ntuple for EFT signal in T2_SPRACE	Events in MiniAOD (from DAS)	Number of events in level of Ntuple	Cross Section (pb)
Axial-Vector			
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/EFT_Samples_30Jul2015/Monojet1_M-1_AV_Tune4C_13TeV_PU20bx25_tsg_PHYS14_25_V1.root	194600	194598	9.5695x10-7
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/EFT_Samples_30Jul2015/Monojet2_M-10_AV_Tune4C_13TeV_PU20bx25_tsg_PHYS14_25_V1.root	190400	190399	9.5381x10-7
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/EFT_Samples_30Jul2015/Monojet3_M-100_AV_Tune4C_13TeV_PU20bx25_tsg_PHYS14_25_V1.root	190000	190000	8.0087x10-7
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/EFT_Samples_30Jul2015/Monojet7_M-1000_V_Tune4C_13TeV_PU20bx25_tsg_PHYS14_25_V1.root	194800	194798	4.6629x10-8
Vector			
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/EFT_Samples_30Jul2015/Monojet5_M-10_V_Tune4C_13TeV_PU20bx25_tsg_PHYS14_25_V1.root	191800	191799	9.5463x10-7
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/EFT_Samples_30Jul2015/Monojet6_M-100_V_Tune4C_13TeV_PU20bx25_tsg_PHYS14_25_V1.root	189400	189399	9.0451x10-7
/pnfs/sprace.org.br/data/cms/store/user/adesouza/DarkMatter/EFT_Samples_30Jul2015/Monojet7_M-1000_V_Tune4C_13TeV_PU20bx25_tsg_PHYS14_25_V1.root	197200	197198	1.2438x10-7

Kinematic selections

This is the list of the standard Monojet selection applied in the signal region:

- 1 or 2 jets in the event
- p_T(Jet1) > 110 GeV
  - CH fraction > 0.2
  - NH fraction < 0.7
  - EM fraction < 0.7
  - CEM fraction < 0.99
- p_T(Jet2) > 30 GeV
  - NH fraction < 0.7
  - EM fraction < 0.9
- ΔΦ(Jet1, Jet2) < 2.5
- lepton veto
- photon veto
- MET > 200 GeV (PF MET with Type-1 corrections)

Kinematic distributions

Here we create distributions from Ntuples

Results from Physics14 samples

These figures were made with Physics14 samples for background while Spring15 samples are not ready. It does not have any selection other than good primary vertex.

Results from Run2 Spring15 samples

See Chang-Seong's presentation in the Monojet meeting on 10/Aug/2015.

Computing limits

As preliminary results, only statistical uncertainties are taken into acccount.

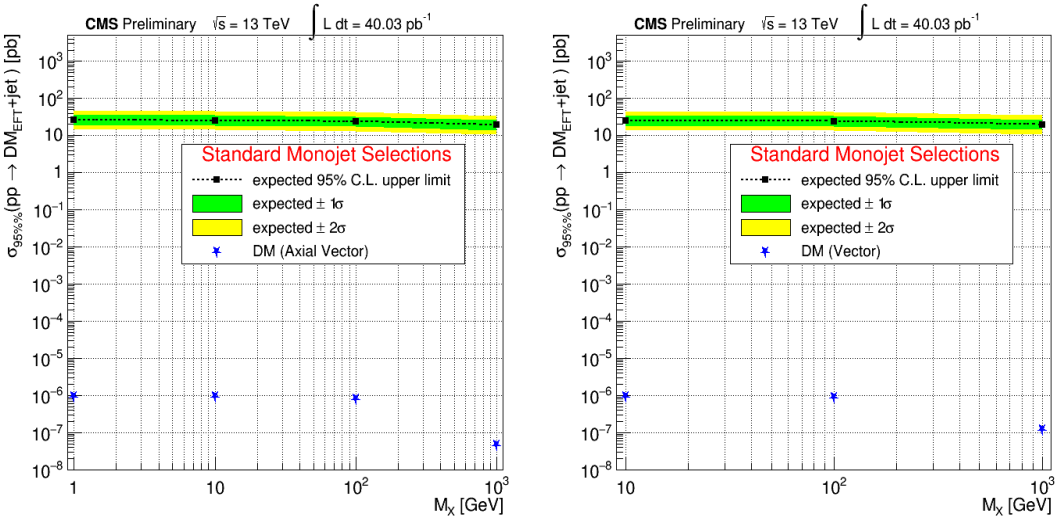
Results from Run2 Spring15 samples

From preliminary results, the following figures show the expected limits using Spring15 MC samples for background. To compute these limits, we use the expected number of events got from page 19 of Chang-Seong's presentation in the Monojet meeting on 10/Aug/2015.

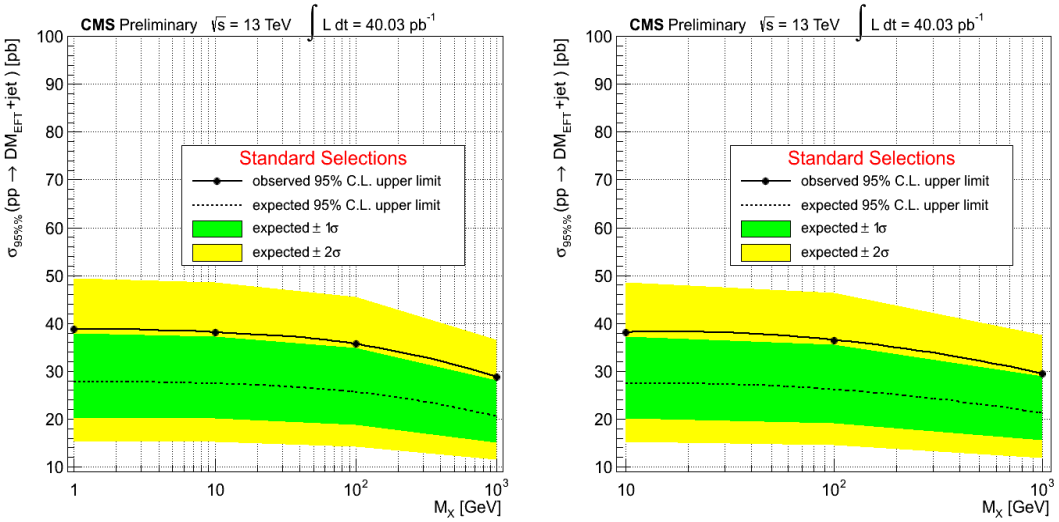
Limits considering EFT Dark Matter model

- Figure on the letf (right) shows theoretical cross-sections for Axial Vector (Vector) Dark Matter. It is considered **Lumi = 40.03 pb^{-1}**. It takes into account the **standard Monojet selection** above, which leads to EFT signal samples with efficiencies from 11 to 14%. EFT signals present very low cross sections, as is showed in the table

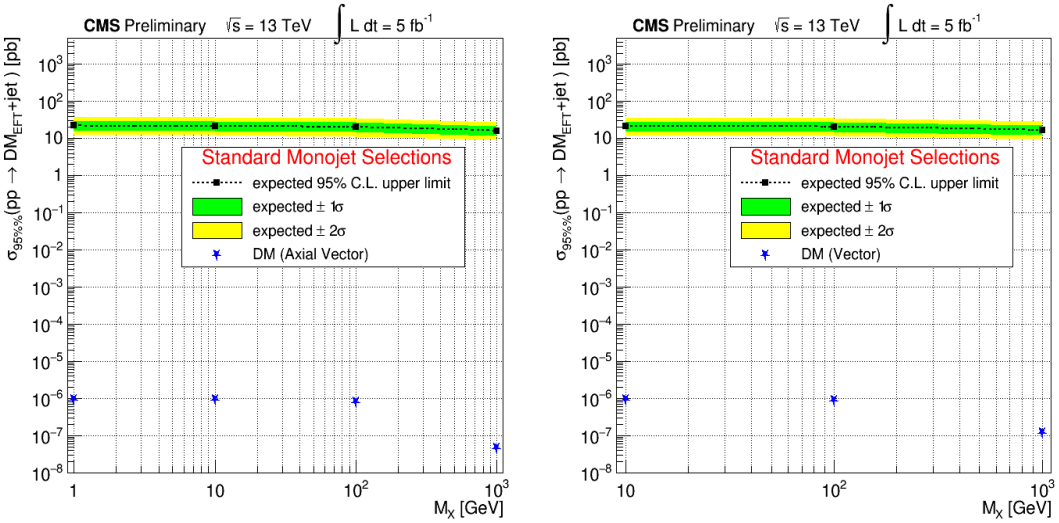
above. Here is the data card for Axial-Vector with DM mass = 1000 GeV using Lumi = 40.03 pb^{-1}:



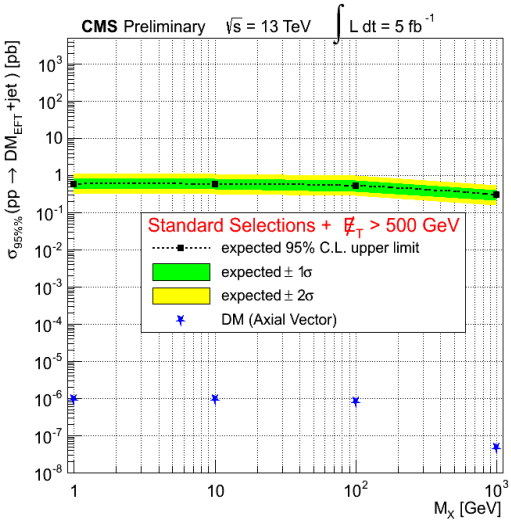
- Now we show the same plots, but including observed limits. Since the signal is not optimized because we are using the **standard monojet selections**, the number of observed events (940) is higher than the total number of expected events (871), leading to observed limits (30 - 40 pb) higher than the expected median limits (20 - 28 pb).

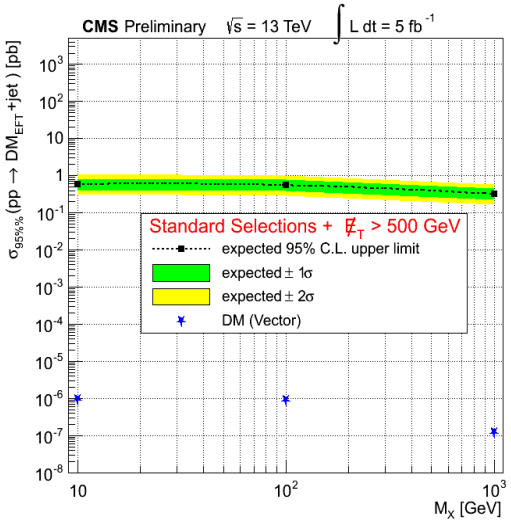


- Figure on the letf (right) shows theoretical cross-sections for Axial Vector (Vector) Dark Matter. It is considered **Lumi = 5 fb^{-1}**. It takes into account the **standard Monojet selection** above. EFT signal samples have from 11 to 14% of efficiency. As expected, the increasing in luminosity did not bring any significant improvement. Here is the data card for Axial-Vector with DM mass = 1000 GeV using Lumi = 5 fb^{-1}:



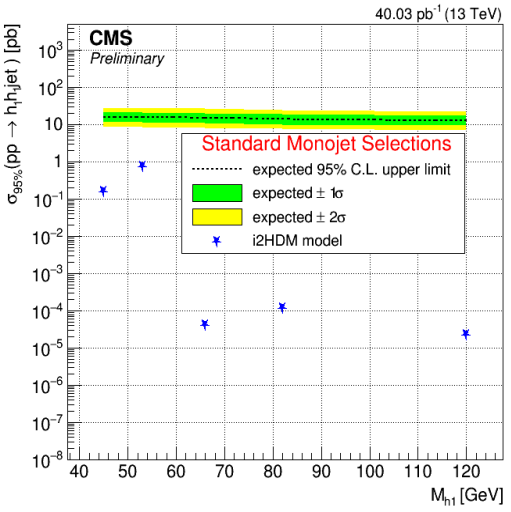
- Figure on the letf (right) shows theoretical cross-sections for Axial Vector (Vector) Dark Matter. It is considered **Lumi = 5 fb^{-1}**. It takes into account the **standard Monojet selection above + $E_T^{missing}$ > 500 GeV**. EFT signal samples have from 1.5 to 3% of efficiency. The high $E_T^{missing}$ cut improves the expected limits by 1 order of magnitude. The limits are between 0.3 and 0.6 pb, being compatible with the 0.4 pb found in the Search for New Physics in Monojet Final State (AN-15-072).

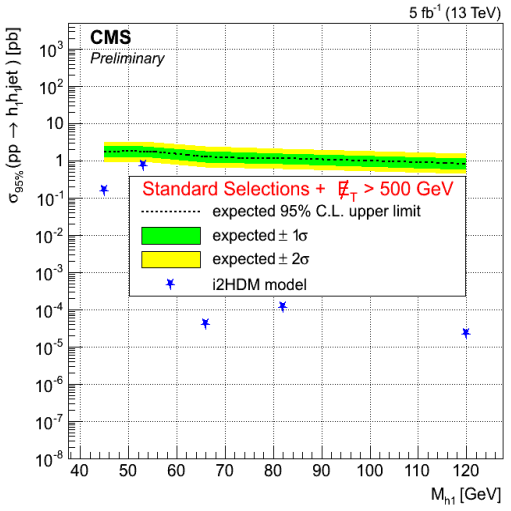




Limits considering i2HDM model

- These figures show limits considering the i2HDM model (with different λ_{345} for each mass point). It is considered:
  - left figure: **Lumi = 40.03 pb^{-1}** and **standard Monojet selection**, which leads to i2HDM signal samples with efficiencies from 17 to 21% and expected limits around 15 pb;
  - right figure: **Lumi = 5 fb^{-1}** and **standard Monojet selection + $E_T^{missing}$ > 500 GeV**, which leads to i2HDM signal samples with efficiencies from 0.5 to 1.1% and expected limits around 1 pb.





-- assantos - 2015-07-24

Comments

I	Attachment	History	Action	Size	Date	Who	Comment
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	Results_NoSelection_nelectrons.png	r1	manage	14.7 K	2015-07-24 - 15:47	UnknownUser	Number of electrons NoSelection
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							muons NoSelection
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	Results_NoSelection_nvtx.png	r1	manage	17.5 K	2015-07-24 - 13:16	UnknownUser	Vertex multiplicity
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							inv pb
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	tree.py.txt	r1	manage	6.3 K	2015-07-27 - 15:19	UnknownUser	Macro to create Ntuples from MiniAOD

Topic revision: r22 - 2015-08-14 - assantos