

本周汇报

Done:

学习 Simplified ABCD method 完成 cutflow Merge

Ongoing:

学习 Signal region definition

To Do:

完成 Signal region definition

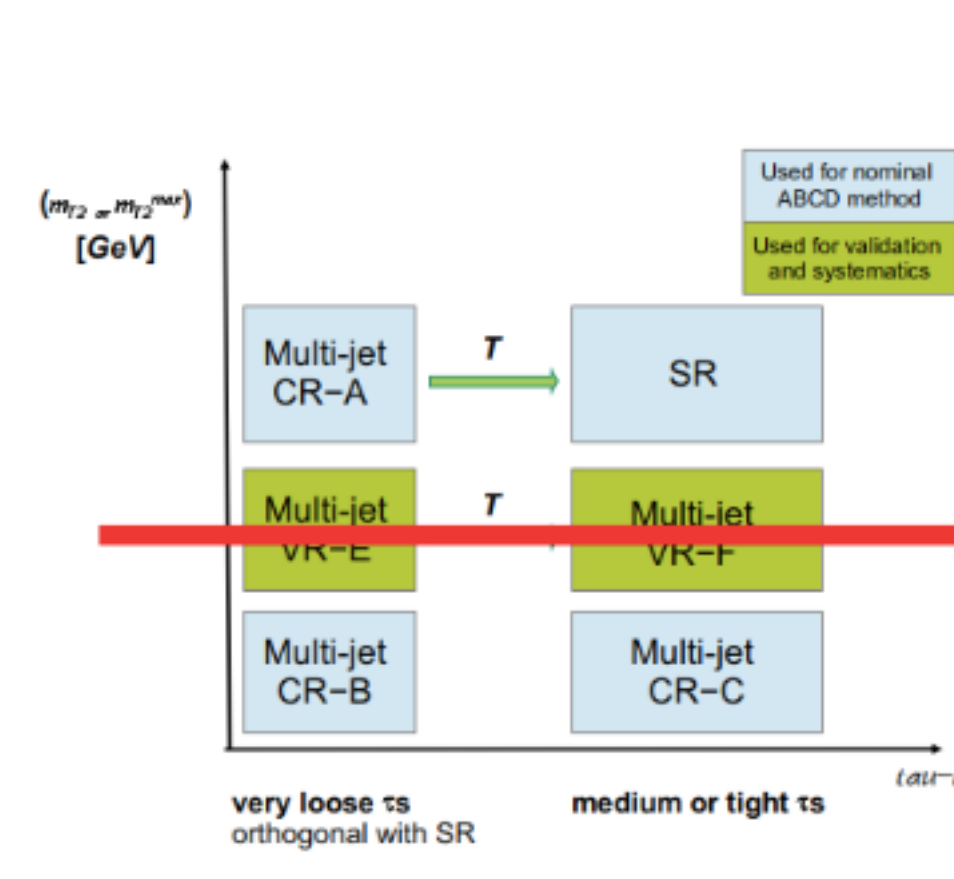
完成 Signal region definition

ABCD 方法

简单介绍及 cut 条件



preCR – A (lowMass)	preSR – lowMass
≥ 2 veryloose τ s; $m_{T2} > 35$ GeV $10 < E_T^{\text{miss}} < 150$ GeV	≥ 2 Medium ≥ 1 tight τ s (OS) $m_{T2} > 35$ GeV $10 < E_T^{\text{miss}} < 150$ GeV
preCR – B (lowMass)	preCR – C (lowMass)
≥ 2 veryloose τ s; $15 < m_{T2} < 35$ GeV $10 < E_T^{\text{miss}} < 150$ GeV	≥ 2 Medium ≥ 1 tight τ s (OS) $15 < m_{T2} < 35$ GeV $10 < E_T^{\text{miss}} < 150$ GeV



- PF(purity factor) = $\# \text{QCD} / \# \text{data}$
- Multi-jet events yields in a region $\rightarrow$ data * PF
- $\text{TF} = \# \text{multi-jet in C} / \# \text{multi-jet in B}$
- $\# \text{multi-jet in SR} = \# \text{multi-jet in A} \times \text{TF}$

修改 DiTauMET.cxx 文件

修改 ABC 区 Cutflow 条件



```
oTree->Branch("Weight_mc", &Var["totalWeight"]);
oTree->Branch("mergedRunNumber",&mergedRunNumber);
oTree->Branch("mergedlumiBlock",&lumiBlock);

mCutflow->setWeight([&]{return Var["totalWeight"]});
mCutflow->setFillTree(oTree);
mCutflow->registerCut("baseline",& {return fabs(Var["totalWeight"]) < 1000 ; }); //统计没有经过任何cut时的事例数
mCutflow->registerCut("== 2 base taus", [&]{return nBaseTau == 2;});
mCutflow->registerCut("Z/H-veto", [&]{return Var["Mtt_12"] > 120;},"Mtt",200,0,1000,&){return Var["Mtt_12"]});
mCutflow->registerCut("B veto", [&]{return Var["bVeto"]};},"bTag",2,0,2,&){return Var["bNumber"]});;// save 2 hist: btag, btag_N_1

mCutflow->registerCut("== 2 medium taus", [&]{return nTaus == 2;});
mCutflow->registerCut(">= 1 tight taus", [&]{return nTightTau>=1;});
mCutflow->registerCut("OS", [&]{return OS2Tau;});
mCutflow->registerCut("MT2 > 15 GeV", [&]{return Var["MT2"] > 15 ;});
mCutflow->registerCut("MT2 < 35 GeV", [&]{return Var["MT2"] < 35 ;});
mCutflow->registerCut("MET < 150 GeV", [&]{return Var["MET"] < 150;},"MET",160,0,800,&){return Var["MET"]});
mCutflow->registerCut("MET > 10 GeV", [&]{return Var["MET"] > 10;});
mCutflow->registerCut("dphi_tt >1.6", [&]{return Var["dPhitt"] > 1.6;},"dphi_tt",40,0,4,&){return Var["dPhitt"]});
//mCutflow->registerCut("MET > 60", [&]{return Var["MET"] > 60;},"MET",30,0,150,&){return Var["MET"]});
//mCutflow->registerCut("MT2 > 80", [&]{return Var["MT2"] > 80;},"MT2",120,0,600,&){return Var["MT2"]});

auto lastCut = mCutflow->registerCut("the END",&){return true ; };
```

```
oTree->Branch("Weight_mc", &Var["totalWeight"]);
oTree->Branch("mergedRunNumber",&mergedRunNumber);
oTree->Branch("mergedlumiBlock",&lumiBlock);

mCutflow->setWeight([&]{return Var["totalWeight"]});
mCutflow->setFillTree(oTree);
mCutflow->registerCut("baseline",& {return fabs(Var["totalWeight"]) < 1000 ; }); //统计没有经过任何cut时的事例数
mCutflow->registerCut("Z/H-veto", [&]{return Var["Mtt_12"] > 120;},"Mtt",200,0,1000,&){return Var["Mtt_12"]});
mCutflow->registerCut("B veto", [&]{return Var["bVeto"]};},"bTag",2,0,2,&){return Var["bNumber"]});;// save 2 hist: btag, btag_N_1
mCutflow->registerCut("== 2 veryloose taus", [&]{return nLooseTau == 2 ;});
mCutflow->registerCut("MT2 > 15 GeV", [&]{return Var["MT2"] > 15 ;});
mCutflow->registerCut("MT2 < 35 GeV", [&]{return Var["MT2"] < 35 ;});
mCutflow->registerCut("MET<150 GeV", [&]{return Var["MET"] < 150;},"MET",160,0,800,&){return Var["MET"]});
mCutflow->registerCut("MET > 10 GeV", [&]{return Var["MET"] > 10;});
mCutflow->registerCut("dphi_tt >1.6", [&]{return Var["dPhitt"] > 1.6;},"dphi_tt",40,0,4,&){return Var["dPhitt"]});
mCutflow->registerCut("== 2 base taus", [&]{return nBaseTau == 2;});

//mCutflow->registerCut("== 2 medium taus", [&]{return nTaus == 2;});
//mCutflow->registerCut(">= 1 tight taus", [&]{return nTightTau>=1;});
//mCutflow->registerCut("OS", [&]{return OS2Tau;});
//mCutflow->registerCut("MET > 60", [&]{return Var["MET"] > 60;},"MET",30,0,150,&){return Var["MET"]});
//mCutflow->registerCut("MT2 > 80", [&]{return Var["MT2"] > 80;},"MT2",120,0,600,&){return Var["MT2"]});

auto lastCut = mCutflow->registerCut("the END",&){return true ; };
```

```
oTree->Branch("Weight_mc", &Var["totalWeight"]);
oTree->Branch("mergedRunNumber",&mergedRunNumber);
oTree->Branch("mergedlumiBlock",&lumiBlock);

mCutflow->setWeight([&]{return Var["totalWeight"]});
mCutflow->setFillTree(oTree);
mCutflow->registerCut("baseline",& {return fabs(Var["totalWeight"]) < 1000 ; }); //统计没有经过任何cut时的事例数
mCutflow->registerCut("== 2 base taus", [&]{return nBaseTau == 2;});
mCutflow->registerCut("Z/H-veto", [&]{return Var["Mtt_12"] > 120;},"Mtt",200,0,1000,&){return Var["Mtt_12"]});
mCutflow->registerCut("B veto", [&]{return Var["bVeto"]};},"bTag",2,0,2,&){return Var["bNumber"]});;// save 2 hist: btag, btag_N_1
mCutflow->registerCut(">= 2 veryloose taus", [&]{return nLooseTau == 2 ;});// try == for sig contam
//mCutflow->registerCut("== 2 veryloose taus", [&]{return nLooseTau >= 2 ;});
mCutflow->registerCut("dphi_tt >1.6", [&]{return Var["dPhitt"] > 1.6;},"dphi_tt",40,0,4,&){return Var["dPhitt"]});
mCutflow->registerCut("MET < 150 GeV", [&]{return Var["MET"] < 150;},"MET",160,0,800,&){return Var["MET"]});
mCutflow->registerCut("MET > 60 GeV", [&]{return Var["MET"] > 60;});
mCutflow->registerCut("MT2 > 80 GeV", [&]{return Var["MT2"] > 80 ;});
//mCutflow->registerCut(">= 1 tight taus", [&]{return nTightTau>=1;});
//mCutflow->registerCut("OS", [&]{return OS2Tau;});
//mCutflow->registerCut("MET > 60", [&]{return Var["MET"] > 60;},"MET",30,0,150,&){return Var["MET"]});
//mCutflow->registerCut("MT2 > 80", [&]{return Var["MT2"] > 80;},"MT2",120,0,600,&){return Var["MT2"]});

auto lastCut = mCutflow->registerCut("the END",&){return true ; };
```

```
if( mergedRunNumber >= 348885 && tauVec.size() == 2 ){//from RunNumber branch(DATA) and random number(MC)
    tauVec = tauVec.passTrig(( tree->TrigHLT_tau80_medium1_tracktwoEF_L1TAU60_tau60_medium1_tracktwoEF_L1TAU40 ), *(tree->taus_TrigMatchHLT_tau80_medium1_tracktwoEF_L1TAU60_tau60_medium1_tracktwoEF_L1TAU40), {95,75} );
    if(tree->mcChannelNumber != 0 && tauVec.size() == 2 ){
        Var["totalWeight"] *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwoEF * tree->TauWeightTrigHLT_tau60_medium1_tracktwoEF;
        tree->Weight_mc *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwoEF * tree->TauWeightTrigHLT_tau60_medium1_tracktwoEF;
    }
}
else if( mergedRunNumber < 348885 && tauVec.size() == 2 ){
    tauVec = tauVec.passTrig(( tree->TrigHLT_tau80_medium1_tracktwo_L1TAU60_tau50_medium1_tracktwo_L1TAU12), *(tree->taus_TrigMatchHLT_tau80_medium1_tracktwo_L1TAU60_tau50_medium1_tracktwo_L1TAU12 ) , {95,60});
    if(tree->mcChannelNumber != 0 && tauVec.size() == 2 ){
        Var["totalWeight"] *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwo * tree->TauWeightTrigHLT_tau50L1TAU12_medium1_tracktwo;
        tree->Weight_mc *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwo * tree->TauWeightTrigHLT_tau50L1TAU12_medium1_tracktwo;
    }
}
```

```
if( mergedRunNumber >= 348885 ){//from RunNumber branch(DATA) and random number(MC)
    tauVec = tauVec.passTrig(( tree->TrigHLT_tau80_medium1_tracktwoEF_L1TAU60_tau60_medium1_tracktwoEF_L1TAU40 ), *(tree->taus_TrigMatchHLT_tau80_medium1_tracktwoEF_L1TAU60_tau60_medium1_tracktwoEF_L1TAU40), {95,75} );
    if(tree->mcChannelNumber != 0 ){ //MC
        Var["totalWeight"] *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwoEF * tree->TauWeightTrigHLT_tau60_medium1_tracktwoEF;
        tree->Weight_mc *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwoEF * tree->TauWeightTrigHLT_tau60_medium1_tracktwoEF;
    }
}
else if( mergedRunNumber < 348885 ){
    tauVec = tauVec.passTrig(( tree->TrigHLT_tau80_medium1_tracktwo_L1TAU60_tau50_medium1_tracktwo_L1TAU12), *(tree->taus_TrigMatchHLT_tau80_medium1_tracktwo_L1TAU60_tau50_medium1_tracktwo_L1TAU12 ) , {95,60});
    if(tree->mcChannelNumber != 0 ){
        Var["totalWeight"] *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwo * tree->TauWeightTrigHLT_tau50L1TAU12_medium1_tracktwo;
        tree->Weight_mc *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwo * tree->TauWeightTrigHLT_tau50L1TAU12_medium1_tracktwo;
    }
}
```

```
if( mergedRunNumber >= 348885 ){//from RunNumber branch(DATA) and random number(MC)
    tauVec = tauVec.passTrig(( tree->TrigHLT_tau80_medium1_tracktwoEF_L1TAU60_tau60_medium1_tracktwoEF_L1TAU40 ), *(tree->taus_TrigMatchHLT_tau80_medium1_tracktwoEF_L1TAU60_tau60_medium1_tracktwoEF_L1TAU40), {95,75} );
    if(tree->mcChannelNumber != 0 ){
        Var["totalWeight"] *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwoEF * tree->TauWeightTrigHLT_tau60_medium1_tracktwoEF;
        tree->Weight_mc *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwoEF * tree->TauWeightTrigHLT_tau60_medium1_tracktwoEF;
    }
}
else if( mergedRunNumber < 348885 ){
    tauVec = tauVec.passTrig(( tree->TrigHLT_tau80_medium1_tracktwo_L1TAU60_tau50_medium1_tracktwo_L1TAU12), *(tree->taus_TrigMatchHLT_tau80_medium1_tracktwo_L1TAU60_tau50_medium1_tracktwo_L1TAU12 ) , {95,60});
    if(tree->mcChannelNumber != 0 ){
        Var["totalWeight"] *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwo * tree->TauWeightTrigHLT_tau50L1TAU12_medium1_tracktwo;
        tree->Weight_mc *= tree->TauWeightTrigHLT_tau80L1TAU60_medium1_tracktwo * tree->TauWeightTrigHLT_tau50L1TAU12_medium1_tracktwo;
    }
}
```

运行提交

运行 .cxx 提交作业



```
sheny@lxs1c710:ABCD/A/build
► ls
CMakeCache.txt  CMakeFiles  cmake_install.cmake  Makefile  mini_analysis
```

```
24855437.1882  sheny      08/14 03:11    0+00:00:00    I 0  0.0  sub.sh.1882
24855437.1883  sheny      08/14 03:11    0+00:00:00    I 0  0.0  sub.sh.1883
24855437.1884  sheny      08/14 03:11    0+00:00:00    I 0  0.0  sub.sh.1884
24855437.1885  sheny      08/14 03:11    0+00:00:00    I 0  0.0  sub.sh.1885
24855437.1886  sheny      08/14 03:11    0+00:00:00    I 0  0.0  sub.sh.1886
24855437.1887  sheny      08/14 03:11    0+00:00:00    I 0  0.0  sub.sh.1887
24855437.1888  sheny      08/14 03:11    0+00:00:00    I 0  0.0  sub.sh.1888
```

```
8599 jobs; 0 completed, 0 removed, 8269 idle, 330 running, 0 held, 0 suspended
```

```
cutflow_Data.csv
cutflow_ggHiggs.csv
cutflow_MultiBoson.csv
cutflow_SingleTopS.csv
cutflow_SingleTopT.csv
cutflow_SingleTopWt.csv
cutflow_ttbar.csv
cutflow_ttHiggs.csv
cutflow_ttV.csv
cutflow_ttX_M.csv
cutflow_ttX_X.csv
cutflow_ttX_Z.csv
cutflow_VBFHiggs.csv
cutflow_VHiggs.csv
cutflow_W.csv
cutflow_Z.csv
```

- /afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABCD/A
- /afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABCD/B
- /afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABCD/C

Merge .csv 文件

编写 .cxx 文件 Merge .csv



```
#include "mergecfcsv.h"

int main(){
    std::string file1="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_Data.csv";
    std::string file2="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_ggHiggs.csv";
    std::string file3="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_MultiBoson.csv";
    std::string file4="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_SingleTopS.csv";
    std::string file5="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_SingleTopT.csv";
    std::string file6="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_SingleTopWt.csv";
    std::string file7="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_ttbar.csv";
    std::string file8="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_ttHiggs.csv";
    std::string file9="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_ttV.csv";
    std::string file10="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_ttX_M.csv";
    std::string file11="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_ttX_X.csv";
    std::string file12="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_ttX_Z.csv";
    std::string file13="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_VBFHiggs.csv";
    std::string file14="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_VHiggs.csv";
    std::string file15="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_W.csv";
    std::string file16="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/A/run/cutflow_Z.csv";

    std::string Tfile="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/cb/a/Top.csv";
    std::string Hfile="/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABC/cb/a/Higgs.csv";
    mergecutflowcsv(file1,true);
    mergecutflowcsv(file2,true, "./Higgs.csv");
    mergecutflowcsv(file3);
    mergecutflowcsv(file4,true, "./Top.csv");
    mergecutflowcsv(file5,false, "./Top.csv");
    mergecutflowcsv(file6,false, "./Top.csv");
    mergecutflowcsv(file7,false, "./Top.csv");
    mergecutflowcsv(file8,false, "./Higgs.csv");
    mergecutflowcsv(file9,false, "./Top.csv");
    mergecutflowcsv(file10,false, "./Top.csv");
    mergecutflowcsv(file11,false, "./Top.csv");
    mergecutflowcsv(file12,false, "./Top.csv");
    mergecutflowcsv(file13,false, "./Higgs.csv");
    mergecutflowcsv(file14,false, "./Higgs.csv");
    mergecutflowcsv(file15);
    mergecutflowcsv(file16);
    mergecutflowcsv(Tfile);
    mergecutflowcsv(Hfile);

    return 1;
}
```

```
#ifndef HEADER_MERGE_CUTFLOW_CSV
#define HEADER_MERGE_CUTFLOW_CSV

#include <cmath>
#include <iostream>
#include <sstream>
#include <fstream>
#include <cstdlib>
#include <vector>
#include <string>
#include <iomanip>
#include <limits>

//combine cutflow csv file from MiniAnalysis
//Jiarong 2022 0628
```

From Jiarong.Yuan

```
void mergecutflowcsv(std::string filename, bool TitleProp = false, std::string ofile="/cutflow.csv"){
    //merge a cutflow file (filename), write a line to ofile
    //can choose output cutflow title or not
    std::ifstream input_file(filename);
    if (!input_file.is_open()) {
        std::cout<< "Could not open the file - " << filename << " " << std::endl;
    }
    std::string line;
    //std::cout<<filename<<std::endl;
    std::string::size_type pos2 = filename.find_last_of("/");
    std::string::size_type pos1 = filename.find_last_of(".");
    std::string procname = filename.substr(pos2+1, pos1-pos2-1);
    //std::cout<<"abc: "<<procname<<std::endl;
    align_thisfile(procname);
    bool hasTitle=false;
    std::string title;
    while (getline(input_file, line)){
        //std::cout<<line<<" is title: "<<isTitle(line)<<std::endl;
        if (isTitle(line)){
            if (hasTitle==false){
                title=line;
            }
        }
        else{//data
            //deal with a line
            align_thisline("thisline");
            std::string::size_type apos = line.find(" ");
            line = line.substr(apos+2); //remove 'proc,_' head
            //std::cout<<line<<std::endl;
            std::istringstream nums (line);
            std::string sval;
            while (getline(nums,sval,' ')){//deal with sval ~ 'v+-e'
                std::istringstream meas (sval);
                std::string vt,pm,et;
                getline(meas,vt,' ');
                getline(meas,pm,' ');
                getline(meas,et,' ');
                //std::cout<<std::stod(vt)<<"+"<<std::stod(et)<<std::endl;
                //std::cout<<sval<<std::endl; //sval is 'v+-e'.
                double value = std::stod(vt);
                double error2 = std::stod(et) * std::stod(et);
                measure tmp(value,error2);
                thisline.addTo(tmp);
            }
            // add the line.
            thisfile = thisfile + thisline;
        }
    }
}
```

- [/afs/ihep.ac.cn/users/s/sheny/Publicfs/GitHub/code/mergecfcsv.h](https://github.com/sheny/mergecfcsv)
- [/afs/ihep.ac.cn/users/s/sheny/Publicfs/ABCD/ABCD/cb/a/fcombine.cxx](#)

Merge .csv 文件

运行 .cxx .out 文件完成 Merge



```
sheny@lxslc710:ABCD/cb/a  
▶ g++ fcombine.cxx
```

```
sheny@  
▶ ls  
a.out
```

```
sheny@lxslc710:ABCD/cb/a  
▶ ./a.out
```

```
sheny@lxslc710:ABCD/cb/a  
▶ ls  
a.out cutflow.csv fcombine.cxx Higgs.csv Top.csv
```

- /afs/ihep.ac.cn/users/s/sheny/
Publicfs/ABCD/ABCD/cb/a

1. g++ fcombine.cxx

2. ./a.out

cutflow.csv

ABC



```
Out name, baseline, == 2 base taus, Z/H-veto, B veto, >= 2 veryloose taus, dphi_tt >1.6, MET < 150 GeV, MET > 60 GeV, MT2 > 80 GeV, the END
cutflow_Data, 21015300 +- 4584.245601383067,20568606 +- 4535.265229432564,112890 +- 335.9917586786914,107760 +- 328.2679844273578,107760 +- 328.2679844273578,104109 +-
322.6624736469985,103900 +- 322.3384120765007,3972 +- 63.02563764056656,98 +- 9.893275493990856,98 +- 9.893275493990856
cutflow_MultiBoson, 10830.16735299999 +- 41.66164840081641,10468.06009 +- 41.01534755735506,169.9567294 +- 4.780468791815471,159.8577724 +- 4.710141156385617,159.857772
4 +- 4.710141156385617,143.9146158000001 +- 4.563948261116971,127.2103573 +- 4.287392563436708,49.1475719 +- 2.542527932111955,1.978518025 +- 0.3376454794667834,1.97851
8025 +- 0.3376454794667834
cutflow_W, 303344.58824 +- 2839.769409528176,297922.5286599999 +- 2824.687728373581,3686.017922029999 +- 165.2398636944826,3628.816470929999 +- 164.9933121964684,3628.8
16470929999 +- 164.9933121964684,3456.633861040001 +- 164.7347779751701,3366.75205834 +- 162.4647459678563,889.7542357899997 +- 47.99525091389937,21.19179675 +- 5.22310
5584430439,21.19179675 +- 5.223105584430439
cutflow_Z, 172200.7208585001 +- 1220.873424304178,167401.3097475999 +- 1202.93622527239,3191.509829118001 +- 200.2189265772288,3103.177886883 +- 199.4791009525641,3103.
177886883 +- 199.4791009525641,2984.904876161199 +- 199.3964107128527,2945.7490880052 +- 197.4403323476675,432.58934073 +- 69.08628424380908,4.162759840000001 +- 1.8766
54473539455,4.162759840000001 +- 1.876654473539455
Top, 178492.8596000001 +- 172.2916786488057,173943.7161699999 +- 169.9802768590981,1194.21836483 +- 13.98728142498266,252.4039615360001 +- 6.745907279961253,252.4039615
360001 +- 6.745907279961253,237.2672123240001 +- 6.557720900188267,212.332226204 +- 6.22601544408699,98.64733455300001 +- 4.036873589592783,1.35788519 +- 0.462859446328
6559,1.35788519 +- 0.4628594463286559
Higgs, 2483.1118438 +- 13.23818590288039,2401.5718801 +- 12.87941981723795,14.80904645 +- 1.553634968605543,11.326478794 +- 1.550205530829077,11.326478794 +- 1.55020553
0829077,6.177397134 +- 1.18477571434051,6.078543224000001 +- 1.184658325328667,1.982798364 +- 0.7780649003969905,0.019195981 +- 0.006088151648824461,0.019195981 +- 0.00
6088151648824461
```

```
Out name, baseline, Z/H-veto, B veto, >= 2 veryloose taus, MT2 > 15 GeV, MT2 < 35 GeV, MET<150 GeV, MET > 10 GeV, dphi_tt >1.6, == 2 base taus, the END
cutflow_Data, 21015300 +- 4584.245601383067,114687 +- 338.6582869206067,109388 +- 330.741986146301,109388 +- 330.741986146301,30308 +- 174.0913981217912,22678 +- 150.58
86898143416,22631 +- 150.4371347108153,21454 +- 146.4765424905981,20932 +- 144.6767400102725,20564 +- 143.3969954357482,20564 +- 143.3969954357482
cutflow_MultiBoson, -10830.167353 +- 41.6616484008164,-177.1261824 +- 4.843985860635073,-165.4927328 +- 4.768962410394218,-165.4927328 +- 4.768962410394218,-72.34764292
7 +- 3.17937327802662,-38.66111085799998 +- 2.27704999477703,-33.60902601799999 +- 2.057964102494628,-33.31621617799998 +- 2.043198898768719,-31.332003868 +- 2.01245489
3332038,-29.89240713099999 +- 1.994303811787253,-29.89240713099999 +- 1.994303811787253
cutflow_W, -303344.5882399997 +- 2839.769409528175,-3743.844618629998 +- 165.7797339564229,-3682.953167529998 +- 165.529117095611,-3682.953167529998 +- 165.529117095611
,-1533.7007611 +- 78.07829298245359,-1017.718129900001 +- 67.44236057245556,-984.7208608000009 +- 67.32125452588492,-967.1808608000008 +- 67.09290209060106,-943.4422263
000007 +- 66.94629336758661,-923.8803385000003 +- 66.73685529256657,-923.8803385000003 +- 66.73685529256657
cutflow_Z, -172200.7208584999 +- 1220.873424304178,-3302.440305117999 +- 202.4903822877519,-3210.127886883 +- 201.7554165737397,-3210.127886883 +- 201.7554165737397,-66
7.2847444069996 +- 72.02044511701156,-551.6554268000003 +- 67.83006045081591,-548.99900753 +- 67.80736103266464,-536.70956633 +- 67.6939092504025,-519.7201419200004 +-
67.65543455911137,-488.9039766200002 +- 67.07975176222472,-488.9039766200002 +- 67.07975176222472
Top, -178492.8596 +- 172.2916786488057,-1232.62600713 +- 14.19718143320409,-260.702027396 +- 6.85947590060177,-260.702027396 +- 6.85947590060177,-125.846877964 +- 4.806
710808712644,-66.20282898000001 +- 3.551957669275571,-59.46132329999999 +- 3.373447733629328,-58.06714480000001 +- 3.319747141668765,-55.59553347000001 +- 3.24075555772
241,-53.21291570000001 +- 3.165316069937988,-53.21291570000001 +- 3.165316069937988
Higgs, -2483.1118438 +- 13.23818590288039,-18.41874125 +- 1.847862932745258,-12.882351194 +- 1.677903238020936,-12.882351194 +- 1.677903238020936,-7.299185193 +- 1.1221
94234252139,-3.11747622 +- 0.9560516902327086,-3.09681138 +- 0.9560287945862167,-2.94935318 +- 0.9550633795604994,-2.550079496 +- 0.9525262114868566,-1.922843856 +- 0.8
327988267941054,-1.922843856 +- 0.8327988267941054
```

```
Out name, baseline, == 2 base taus, Z/H-veto, B veto, == 2 medium taus, >= 1 tight taus, OS, MT2 > 15 GeV, MT2 < 35 GeV, MET < 150 GeV, MET > 10 GeV, dphi_tt >1.6, the
END
cutflow_Data, 21015300 +- 4584.245601383067,20568606 +- 4535.265229432563,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0
cutflow_MultiBoson, -10846.106427 +- 41.71237625642675,-10483.449027 +- 41.06747034532977,-4.880674489999999 +- 0.4707428223738743,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0
+- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0
cutflow_W, -303710.7982399999 +- 2841.080295907174,-298280.52866 +- 2825.991835448981,-10.5537696 +- 2.985908472060256,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0
+- 0,0 +- 0,0 +- 0
cutflow_Z, -172413.8408585 +- 1221.827016427533,-167605.3697475999 +- 1203.893213940748,-60.218462 +- 16.69841597509733,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0
+- 0,0 +- 0,0 +- 0
Top, -178756.31571 +- 172.4912299575938,-174200.7932099999 +- 170.1771967851578,-398.3566755099998 +- 8.015646543028385,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0
+- 0,0 +- 0,0 +- 0
Higgs, -2488.2646618 +- 13.28575020212497,-2406.2392481 +- 12.91147307603371,-1.6984682 +- 0.06633488949274433,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0
+- 0,0 +- 0
```

Higgs.csv

ABC



```
cut name, baseline, == 2 base taus, Z/H-veto, B veto, >= 2 veryloose taus, dphi_tt >1.6, MET < 150 GeV, MET > 60 GeV, MT2 > 80 GeV, the END
cutflow_ggHiggs, 1443.0156138 +- 5.632225686545238,1419.2532101 +- 5.590164442958048,4.55866805 +- 0.3250055132652377,4.40511935 +- 0.3156504773347422,4.40511935 +- 0.3
156504773347422,1.48644824 +- 0.1919255083025094,1.46959124 +- 0.1915377799865515,0.37092324 +- 0.1065930340448962,0.00403706 +- 0.00403706,0.00403706 +- 0.00403706
cutflow_ttHiggs, 445.42143 +- 0.8320060735011915,415.11619 +- 0.8091173822079897,3.6339366 +- 0.07152886766101361,0.368119644 +- 0.02423426207227332,0.368119644 +- 0.02
423426207227332,0.258521594 +- 0.02002670932956658,0.216095584 +- 0.01843199401072358,0.124988154 +- 0.01391539242897052,0.011644827 +- 0.003612388681026448,0.011644827
+- 0.003612388681026448
cutflow_VBFHiggs, 306.3548 +- 0.8277473700944268,296.27248 +- 0.8077409183383061,2.1564418 +- 0.06585326956408466,2.0932398 +- 0.06492044757410488,2.0932398 +- 0.064920
44757410488,1.2124273 +- 0.04750814106358614,1.1728564 +- 0.04678555551806989,0.29688697 +- 0.0230060030520297,0.003514094 +- 0.002778198170159213,0.003514094 +- 0.0027
78198170159213
cutflow_VHiggs, 288.32 +- 11.92267587414839,270.93 +- 11.54653194686612,4.46 +- 1.516146430922818,4.46 +- 1.516146430922818,4.46 +- 1.516146430922818,3.22 +- 1.16798972
5982211,3.22 +- 1.167989725982211,1.19 +- 0.7702596964660685,0 +- 0,0 +- 0
```

```
cut name, baseline, Z/H-veto, B veto, >= 2 veryloose taus, MT2 > 15 GeV, MT2 < 35 GeV, MET<150 GeV, MET > 10 GeV, dphi_tt >1.6, == 2 base taus, the END
cutflow_ggHiggs, -1443.0156138 +- 5.632225686545238,-4.92588005 +- 0.3317999014355046,-4.68842435 +- 0.3254713026910216,-4.68842435 +- 0.3254713026910216,-3.23944859 +-
0.2622081894989708,-0.73279987 +- 0.1215730453804235,-0.72965677 +- 0.1215324064519888,-0.6248447699999999 +- 0.114085147243657,-0.36590533 +- 0.09206666241364624,-0.2
8133806999999999 +- 0.08064612085621541,-0.2813380699999999 +- 0.08064612085621541
cutflow_ttHiggs, -445.42143 +- 0.8320060735011915,-4.3634145 +- 0.07873667104408658,-0.403352344 +- 0.02515910207704609,-0.403352344 +- 0.02515910207704609,-0.196343503
+- 0.017177638560772,-0.05546105 +- 0.00884452033791347,-0.05127733999999999 +- 0.008466433979013302,-0.04976744999999999 +- 0.008330712789797221,-0.028964976 +- 0.005
921084798882296,-0.027005796 +- 0.005727686789112338,-0.027005796 +- 0.005727686789112338
cutflow_VBFHiggs, -306.3548 +- 0.8277473700944268,-2.5494467 +- 0.07215802279850037,-2.4405745 +- 0.07067338161165347,-2.4405745 +- 0.07067338161165347,-1.2933931 +- 0.
05168842696282795,-0.5292152999999999 +- 0.03281163655992946,-0.5158772699999999 +- 0.03239212490162077,-0.47474096 +- 0.03100382847858632,-0.35520919 +- 0.026360083389
85292,-0.27449999 +- 0.02274384981767819,-0.27449999 +- 0.02274384981767819
cutflow_VHiggs, -288.32 +- 11.92267587414839,-6.58 +- 1.814690056180394,-5.35 +- 1.644323569131088,-5.35 +- 1.644323569131088,-2.57 +- 1.089770618066022,-1.8 +- 0.94768
13810558905,-1.8 +- 0.9476813810558905,-1.8 +- 0.9476813810558905,-1.34 +- 0.8285529554590942,-1.34 +- 0.8285529554590942
```

```
cut name, baseline, == 2 base taus, Z/H-veto, B veto, == 2 medium taus, >= 1 tight taus, OS, MT2 > 15 GeV, MT2 < 35 GeV, MET < 150 GeV, MET > 10 GeV, dphi_tt >1.6, the
END
cutflow_ggHiggs, -1445.5247018 +- 5.647190513366569,-1421.7325681 +- 5.599985177158955,-0.07605271 +- 0.04772365585846185,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0,0 +- 0,0 +- 0
cutflow_ttHiggs, -446.20431 +- 0.8386485029823461,-415.80337 +- 0.8091705214993129,-1.61070701 +- 0.04584087421661481,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0,0 +- 0
cutflow_VBFHiggs, -307.07565 +- 0.8222325871987866,-296.98331 +- 0.81200127825025,-0.01170848 +- 0.004624336338784194,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0,0 +- 0
cutflow_VHiggs, -289.46 +- 11.96833321728636,-271.72 +- 11.57722764741196,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0
```

Top.csv

ABC



```
Out name, baseline, == 2 base taus, Z/H-veto, B veto, >= 2 veryloose taus, dphi_tt >1.6, MET < 150 GeV, MET > 60 GeV, MT2 > 80 GeV, the END
cutflow_SingleTopS, 156.42 +- 2.318232085016511,154.87 +- 2.307704487147347,0.5760700000000001 +- 0.1486670790765393,0.3703055 +- 0.1242156916722682,0.3703055 +- 0.1242
156916722682,0.3370395 +- 0.1196783660551062,0.2703297 +- 0.09936177011496927,0.0855979 +- 0.06057747513168571,0 +- 0,0 +- 0
cutflow_SingleTopT, 3582.77 +- 14.6979726493146,3531.9 +- 14.59155920386851,10.91513513 +- 0.8191526177068268,4.60688275 +- 0.5378952707372942,4.60688275 +- 0.537895270
7372942,4.130652630000001 +- 0.5045029062285736,4.02649003 +- 0.4872870374970146,1.7213125 +- 0.3079217601642827,0 +- 0,0 +- 0
cutflow_SingleTopWt, 11583.34 +- 50.83064430046112,11311.81 +- 50.22630386560412,139.72 +- 5.690483283518194,45.31 +- 3.234532423705164,45.31 +- 3.234532423705164,43.26
+- 3.158021532542171,39.09 +- 2.991203771059405,15.75 +- 1.850162155055605,0.21 +- 0.21,0.21 +- 0.21
cutflow_ttbar, 162176.2000000001 +- 163.8959935446867,158002.2699999999 +- 161.6657657019568,1034.12 +- 12.74493232622284,200.8800000000001 +- 5.892537653676893,200.880
000000001 +- 5.892537653676893,188.460000000001 +- 5.722586827650585,167.987576 +- 5.436617974051146,80.59512520000001 +- 3.573397812822011,1.1348897 +- 0.41231548014
36516,1.1348897 +- 0.4123154801436516
cutflow_ttV, 865.5899999999999 +- 4.010835324467959,820.3899999999999 +- 3.913527820266518,8.0347002 +- 0.3581209116218601,1.07716417 +- 0.1289178933891646,1.07716417 +
- 0.1289178933891646,0.94212125 +- 0.1107150592706272,0.83248994 +- 0.1021335281632892,0.46379226 +- 0.0727236766779857,0.01299549 +- 0.01161085223314379,0.01299549 +-
0.01161085223314379
cutflow_ttX_M, 12.2996 +- 0.1572629114991834,11.65617 +- 0.1549874048010999,0.1488043 +- 0.01740258740936244,0.005559826 +- 0.002835697380345089,0.005559826 +- 0.002835
697380345089,0.002667646 +- 0.002065955504311746,0.000340336 +- 0.000340336,0.000340336 +- 0.000340336,0 +- 0,0 +- 0
cutflow_ttX_X, 12.17 +- 0.331058907144937,11.57 +- 0.323882694814033,0.1984542 +- 0.042663915643199,0.00228099 +- 0.001161421396703625,0.00228099 +- 0.00116142139670362
5,0.001817998 +- 0.001065146855109191,0.001817998 +- 0.001065146855109191,0.000708704 +- 0.000708704,0 +- 0,0 +- 0
cutflow_ttX_Z, 104.07 +- 1.070373766494676,99.25 +- 1.053280589396766,0.505201 +- 0.07520041941784633,0.1517683 +- 0.040926228508134,0.1517683 +- 0.040926228508134,0.13
29133 +- 0.03865338293151067,0.1231822 +- 0.03740839503694324,0.030457653 +- 0.01736829165657374,0 +- 0,0 +- 0
```

```
Out name, baseline, Z/H-veto, B veto, >= 2 veryloose taus, MT2 > 15 GeV, MT2 < 35 GeV, MET<150 GeV, MET > 10 GeV, dphi_tt >1.6, == 2 base taus, the END
cutflow_SingleTopS, -156.42 +- 2.318232085016511,-0.5760700000000001 +- 0.1486670790765393,-0.3703055 +- 0.1242156916722682,-0.3703055 +- 0.1242156916722682,-0.3396035
+- 0.1203616538768473,-0.1624457 +- 0.07584607107721533,-0.1624457 +- 0.07584607107721533,-0.1291797 +- 0.06816157085814557,-0.1291797 +- 0.06816157085814557,-0.1291797
+- 0.06816157085814557
cutflow_SingleTopT, -3582.77 +- 14.6979726493146,-11.59373213 +- 0.8447068068299833,-4.738008950000002 +- 0.54668486367836,-4.738008950000002 +- 0.54668486367836,-2.467
8352 +- 0.3788881563200676,-0.9542742000000001 +- 0.227619828957211,-0.9199112000000002 +- 0.2237175535005468,-0.9199112000000002 +- 0.2237175535005468,-0.8767629 +- 0.
2195171245059938,-0.8767629 +- 0.2195171245059938,-0.8767629 +- 0.2195171245059938
cutflow_SingleTopWt, -11583.34 +- 50.83064430046111,-142.18 +- 5.731945568478474,-45.82 +- 3.249446106646485,-45.82 +- 3.249446106646485,-23.2084885 +- 2.32545919005951
4,-14.2984885 +- 1.848718595306557,-12.7184885 +- 1.718825309515848,-12.4284885 +- 1.691112191615994,-11.3984885 +- 1.609397540892942,-11.2184885 +- 1.599675105961285,-
11.2184885 +- 1.599675105961285
cutflow_ttbar, -162176.2 +- 163.8959935446867,-1068.09 +- 12.95447799025495,-208.48 +- 6.0133351810788,-208.48 +- 6.0133351810788,-99.18260410000002 +- 4.18682363029812
4,-50.5953592 +- 3.022850698464414,-45.50535919999999 +- 2.892546688509418,-44.4353592 +- 2.84658151915711,-43.04535920000001 +- 2.80303876983655,-40.84284530000001 +-
2.721209524255714,-40.84284530000001 +- 2.721209524255714
cutflow_ttV, -865.5899999999999 +- 4.010835324467959,-9.161945799999998 +- 0.3756857326613255,-1.12059487 +- 0.1310095653341388,-1.12059487 +- 0.1310095653341388,-0.566
20481 +- 0.09086659241423274,-0.14815158 +- 0.05419789961872692,-0.1110089 +- 0.05142939156372064,-0.1100964 +- 0.05121603422468886,-0.10163337 +- 0.04427593302632029,-
0.1015295 +- 0.04398484115151492,-0.1015295 +- 0.04398484115151492
cutflow_ttX_M, -12.2996 +- 0.1572629114991834,-0.1665965 +- 0.01859400623967035,-0.005559826 +- 0.002835697380345089,-0.005559826 +- 0.002835697380345089,-0.00252233 +-
0.00190688,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0
cutflow_ttX_X, -12.17 +- 0.331058907144937,-0.2108927 +- 0.04340969550883766,-0.00284455 +- 0.001290928001216567,-0.00284455 +- 0.001290928001216567,-0.001673424 +- 0.0
009748862647468165,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0
cutflow_ttX_Z, -104.07 +- 1.070373766494676,-0.6467700000000001 +- 0.08520122623213823,-0.1647137 +- 0.04292480425173771,-0.1647137 +- 0.04292480425173771,-0.0779461 +-
0.03019529441518993,-0.0441098 +- 0.02270834936889954,-0.0441098 +- 0.02270834936889954,-0.0441098 +- 0.02270834936889954,-0.0441098 +- 0.02270834936889954,-0.0441098
+- 0.02270834936889954,-0.0441098 +- 0.02270834936889954
```

```
Out name, baseline, == 2 base taus, Z/H-veto, B veto, == 2 medium taus, >= 1 tight taus, OS, MT2 > 15 GeV, MT2 < 35 GeV, MET < 150 GeV, MET > 10 GeV, dphi_tt >1.6, the
END
cutflow_SingleTopS, -156.58 +- 2.318232085016511,-155.04 +- 2.307704487147347,-0.0627091 +- 0.0450741,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0
cutflow_SingleTopT, -3586.530000000001 +- 14.70610757474594,-3535.61 +- 14.61162893041019,-0.9251678000000001 +- 0.2354880106431536,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0,0 +- 0,0 +- 0,0 +- 0
cutflow_SingleTopWt, -11599.8 +- 50.89304274652874,-11327.96 +- 50.29052296407347,-44.18000000000001 +- 3.288981605299732,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0,0 +- 0,0 +- 0
cutflow_ttbar, -162418.01 +- 164.0854548703206,-158238.15999999999 +- 161.8509168957656,-349.4510249999998 +- 7.3024970079162,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0,0 +- 0,0 +- 0
cutflow_ttV, -866.6899999999997 +- 4.018432530228671,-821.42 +- 3.919030492353945,-3.40578331 +- 0.2150792475911965,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0,0 +- 0
cutflow_ttX_M, -12.31571 +- 0.1572014105963429,-11.66321 +- 0.1549375819769045,-0.0600897 +- 0.01117172877546712,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0,0 +- 0
cutflow_ttX_X, -12.18 +- 0.331058907144937,-11.57 +- 0.323882694814033,-0.1183378 +- 0.03311769800031397,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0
cutflow_ttX_Z, -104.21 +- 1.07712580509428,-99.37 +- 1.053280589396766,-0.1535628 +- 0.0419523813543403,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +- 0,0 +-
0,0 +- 0
```

下周工作安排

2022.8.15-2022.8.22



1. 阅读文献
2. 学习完成 ABCD 方法优化信号区
3. 复习备考

Question?



谢谢！