

First glance at Run 3 data

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Data samples 2022

- https://docs.google.com/presentation/d/1F4ndU7DBcyvrEEyLfYqb29NGkBPps20EAnBxe_l7AEll/edit#slide=id.g289f499aa6b_2_52
- Era C 5.0104 fb⁻¹
 - /{EGamma|Muon|SingleMuon|MuonEG}/Run2022C-22Sep2023-v1/NANOAOD
- Era D 2.9700 fb⁻¹
 - /{EGamma|Muon|MuonEG}/Run2022D-22Sep2023-v1/NANOAOD
- Era E 5.8070 fb⁻¹
 - /{EGamma|Muon|MuonEG}/Run2022E-22Sep2023-v1/NANOAOD
- Era F 17.7819 fb⁻¹
 - /{EGamma|MuonEG}/Run2022F-22Sep2023-v1/NANOAOD
 - /Muon/Run2022F-22Sep2023-v2/NANOAOD
- Era G 3.0828 fb⁻¹
 - /{Muon|MuonEG}/Run2022G-22Sep2023-v1/NANOAOD
 - /EGamma/Run2022G-22Sep2023-v2/NANOAOD

Data samples 2023

- https://docs.google.com/presentation/d/1TjPem5jX0fzqvTGI271_nQFoVBabsrdrO0i8Qo1uD5E/edit#slide=id.g289f499aa6b_2_58
- Era C 17.794 fb⁻¹
 - /Egamma{0|1}/Run2023C-22Sep2023_v{1|2|3|4}-v1/NANOAOD
 - /Muon0/Run2023C-22Sep2023_v{1|2|3|4}-v1/NANOAOD
 - /Muon1/Run2023C-22Sep2023_v{1|2|3}-v1/NANOAOD
 - /Muon1/Run2023C-22Sep2023_v4-v2/NANOAOD
 - /MuonEG/Run2023C-22Sep2023_v{1|2|3|4}-v1/NANOAOD
- Era D 9.451 fb⁻¹
 - /{Egamma|Muon}{0|1}/Run2023D-22Sep2023_v{1|2}-v1/NANOAOD
 - /MuonEG/Run2023D-22Sep2023_v{1|2}-v1/NANOAOD
- Later into Heavy ion era.

Data samples 2024

- Only with prompt reco now, available from 2024 A to I.
- These information including MC can be found from <https://twiki.cern.ch/twiki/bin/viewauth/CMS/PdmVRun3Analysis>
- Samples searched on <https://cmsweb.cern.ch/das/> and downloaded with *rucio*, or directly processed by *pocket-coffea* without downloading.
- Pocket-coffea currently also lacks config for 2024.

PocketCoffea

- A NANO AOD analysis tool: <https://github.com/PocketCoffea>.
- Setup on lxplus using singularity:
 - `apptainer shell -B /afs -B /cvmfs/cms.cern.ch -B /tmp -B /eos/cms/ -B /etc/sysconfig/ngbauth-submit -B ${XDG_RUNTIME_DIR} --env KRB5CCNAME="FILE:${XDG_RUNTIME_DIR}/krb5cc" /cvmfs/unpacked.cern.ch/gitlab-registry.cern.ch/cms-analysis/general/pocketcoffea:lxplus-el9-stable`
- Could process NANO AOD (containing Electrons, Muons, Jets... as edm objects).

How to run a PocketCoffea job

- Dataset json files
 - Note that year in 2023 should write “**2023_preBPix**” (era C) and “**2023_postBPix**” (era D).
 - Similarly, era C should be “Cv1~4”
 - `pocket-coffea build-datasets --cfg datasets/datasets_definitions.json -o`
 - Generated json e.g. :

```
"DATA_EGamma0_2023_preBPix_EraCv1": {
  "metadata": {
    "das_names": "[ '/EGamma0/Run2023C-22Sep2023_v1-v1/NANOAOB' ]",
    "sample": "DATA_EGamma0",
    "year": "2023_preBPix",
    "isMC": "False",
    "primaryDataset": "EGamma0",
    "era": "Cv1",
    "nevents": "67598081",
    "size": "64917127631"
  },
  "files": [
    "root://cmsdcadisk.fnal.gov//dcache/uscmsdisk/store/data/Run2023C/EGamma0/NANOAOB/22Sep2023_v1-v1/2530000/1c3ded29-7516-4adc-8cd7-f3eb008397c1.root",
    "root://cmsdcadisk.fnal.gov//dcache/uscmsdisk/store/data/Run2023C/EGamma0/NANOAOB/22Sep2023_v1-v1/2530000/29293dc5-bbfc-4372-a2ce-4dc543fcc2f0.root",
    "root://cmsdcadisk.fnal.gov//dcache/uscmsdisk/store/data/Run2023C/EGamma0/NANOAOB/22Sep2023_v1-v1/2530000/2a328c5c-f33b-4c55-88f9-79fdd7392cf0.root",
    "root://cmsdcadisk.fnal.gov//dcache/uscmsdisk/store/data/Run2023C/EGamma0/NANOAOB/22Sep2023_v1-v1/2530000/32b6dca6-8a7d-4ccd-9bcf-bc5df898fadf.root",
    "root://cmsdcadisk.fnal.gov//dcache/uscmsdisk/store/data/Run2023C/EGamma0/NANOAOB/22Sep2023_v1-v1/2530000/99399232-5136-4d0a-8c57-e474eb697bf1.root",
    "root://cmsdcadisk.fnal.gov//dcache/uscmsdisk/store/data/Run2023C/EGamma0/NANOAOB/22Sep2023_v1-v1/2530000/9a7479d8-9bba-491b-bc50-17f1d57d7293.root"
```

```
"DATA_EGamma0": {
  "sample": "DATA_EGamma0",
  "json_output": "datasets/DATA_EGamma0.json",
  "files": [
    {
      "das_names": [
        "/EGamma0/Run2023C-22Sep2023_v1-v1/NANOAOB"
      ],
      "metadata": {
        "year": "2023_preBPix",
        "isMC": false,
        "primaryDataset": "EGamma0",
        "era": "Cv1"
      },
      "das_parents_names": [
        "/EGamma0/Run2023C-PromptReco-v1/AOB"
      ]
    },
  ],
}
```

How to run a PocketCoffeea job

- Need to give a Configurator with compulsory members

Defines objects
and counts ←

- datasets,
- workflow(_options),

Event selections {

- skim,
- preselections,
- categories,
- weights_classes,
- weights,

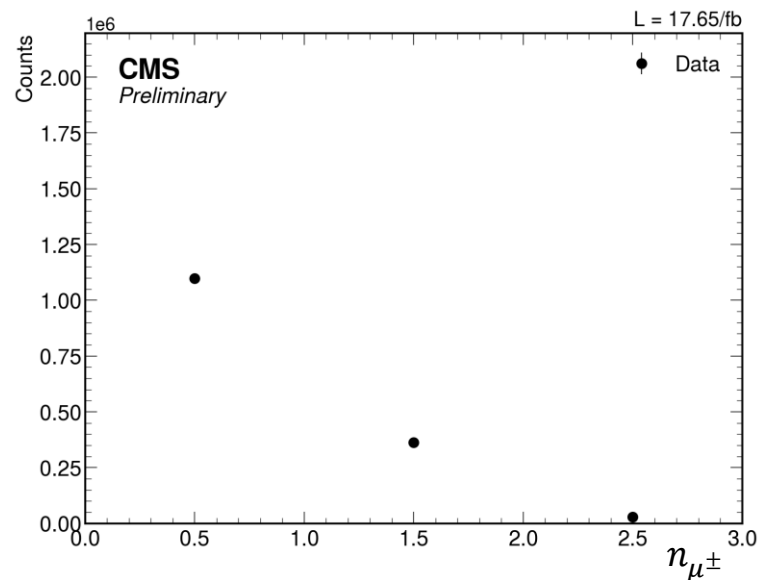
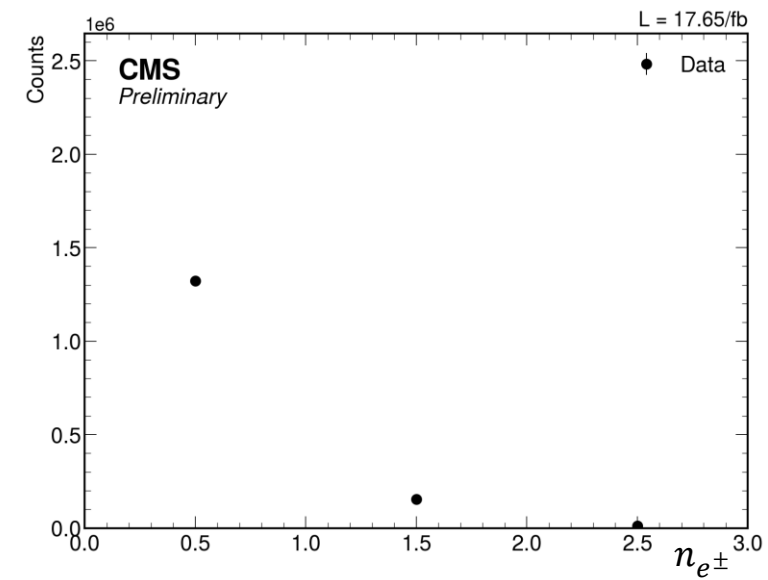
Syst ←

- variations,
- variables

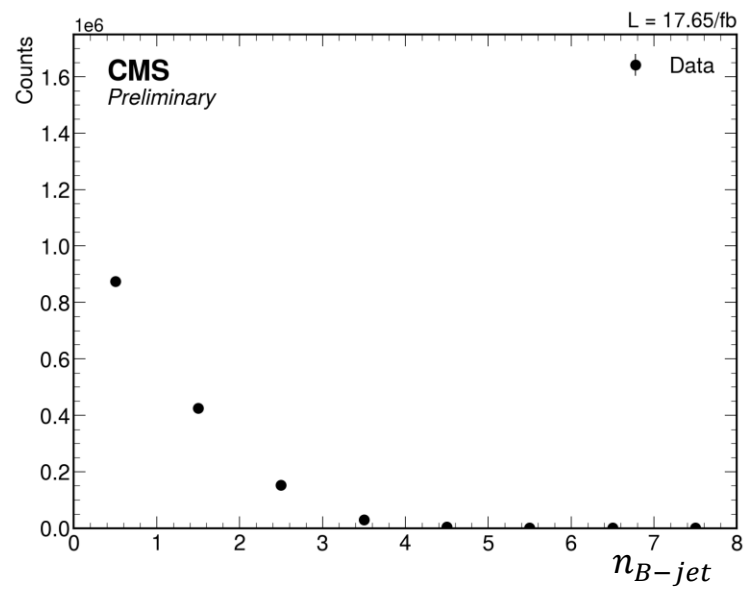
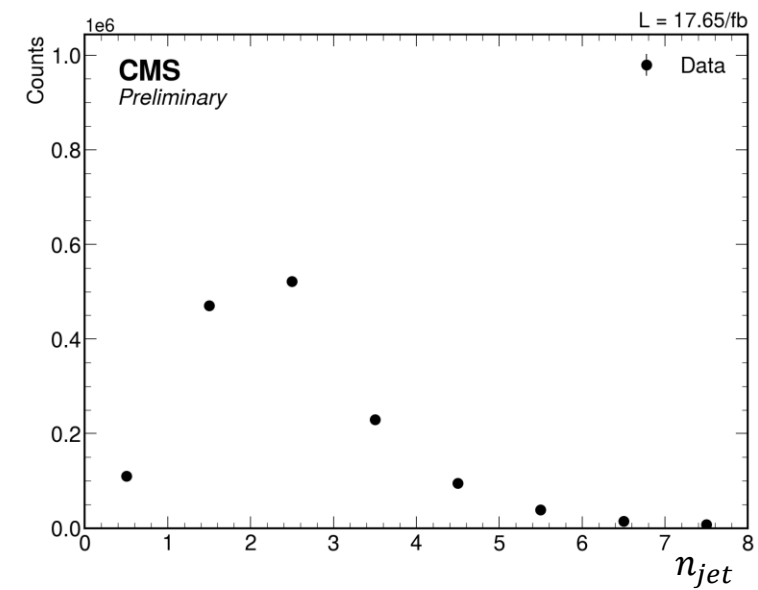
```
cfg = Configurator(  
    parameters = parameters,  
    datasets = {  
        "jsons": [  
            f"{localdir}/datasets/DATA_EGamma0.json",  
            f"{localdir}/datasets/DATA_EGamma1.json",  
            f"{localdir}/datasets/DATA_Muon0.json",  
            f"{localdir}/datasets/DATA_Muon1.json",  
            f"{localdir}/datasets/DATA_MuonEG.json"  
        ],  
        "filter" : {  
            "samples": ["DATA_EGamma0",  
                       "DATA_EGamma1",  
                       "DATA_Muon0",  
                       "DATA_Muon1",  
                       "DATA_MuonEG"],  
            "samples_exclude" : [],  
            "year": ['2023_preBPix']  
        }  
    },  
)
```

- My code at `/eos/home-t/tiyang/CMS/AnalysisConfigs/configs/data23_Emu/` as an example.
- `pocket-coffeea run --cfg example_config.py --test --process-separately -o output_test`

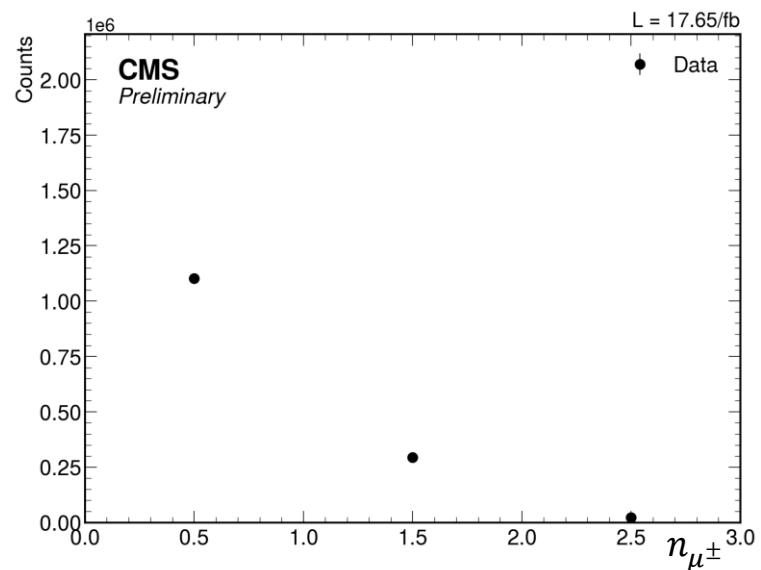
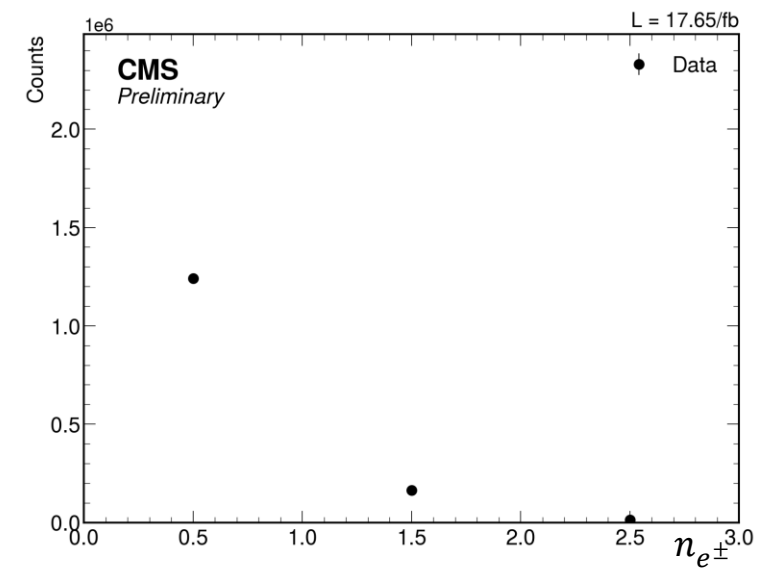
Data 2023 review



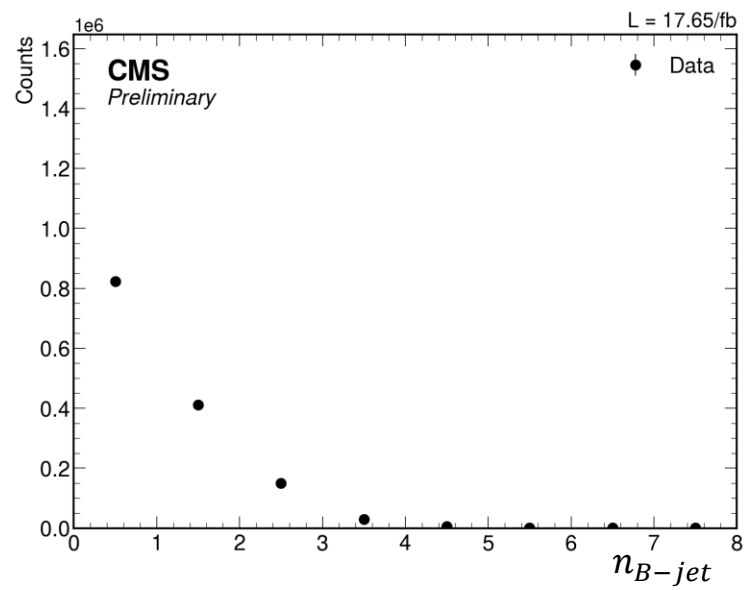
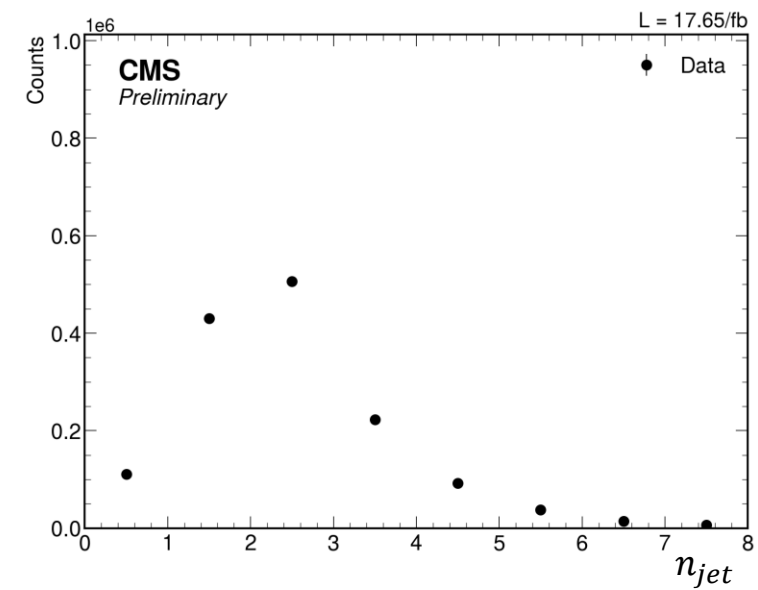
- Era: 2023C v1
- Data: EGamma0/1 + Muon 0/1 + MuonEG



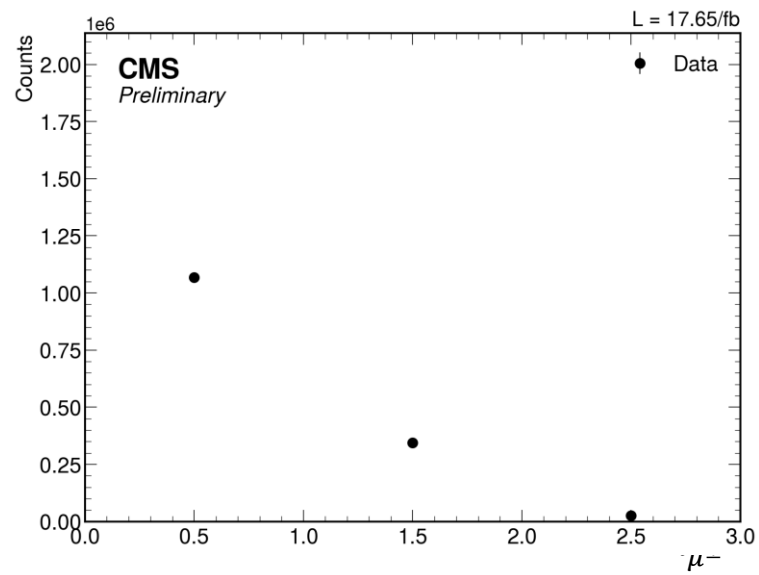
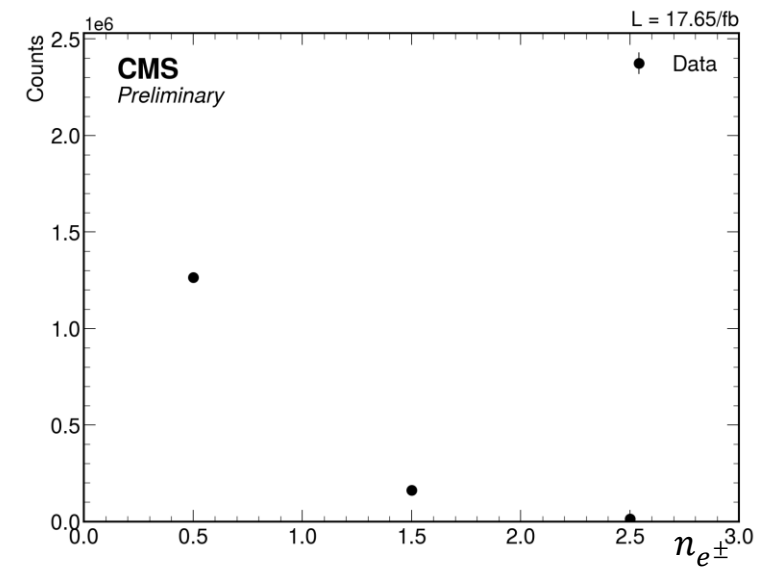
Data 2023 review



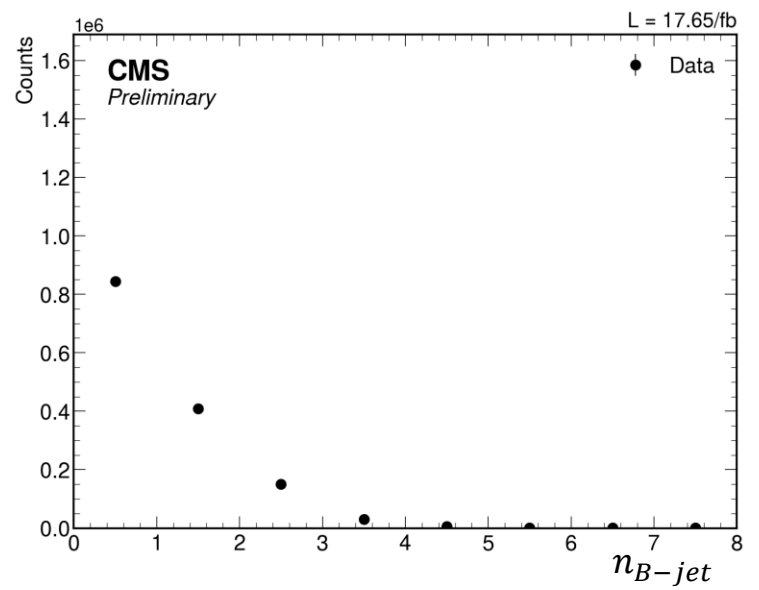
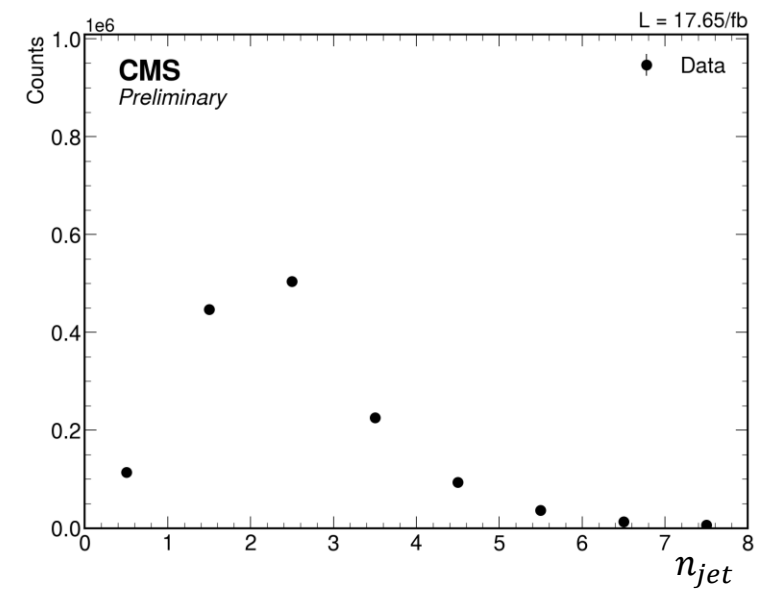
- Era: 2023C v2
- Data: EGamma0/1 + Muon 0/1 + MuonEG



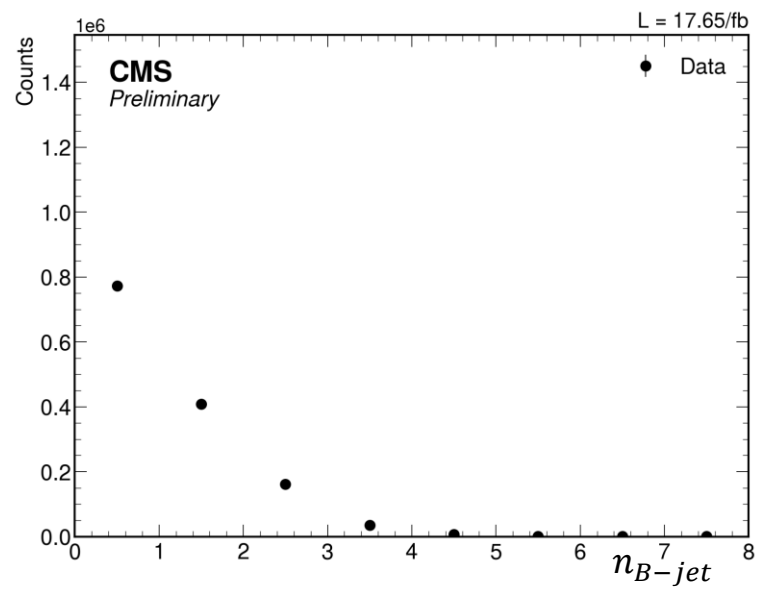
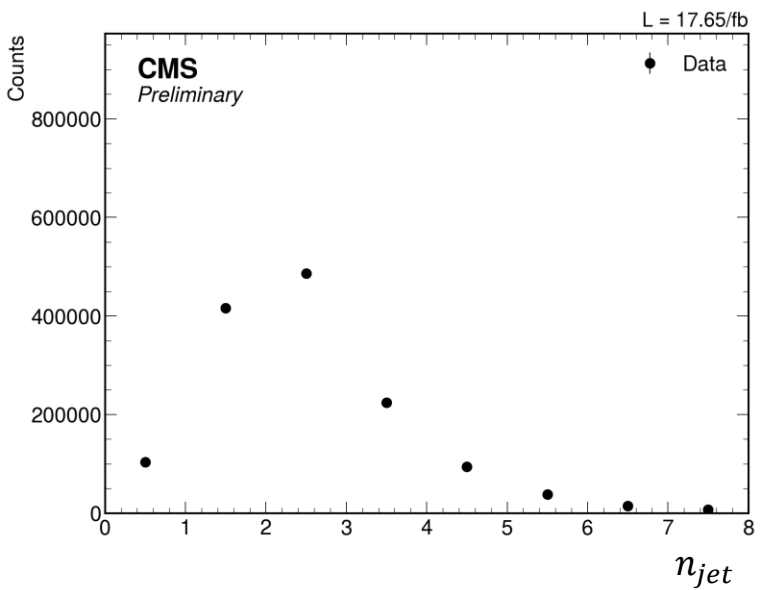
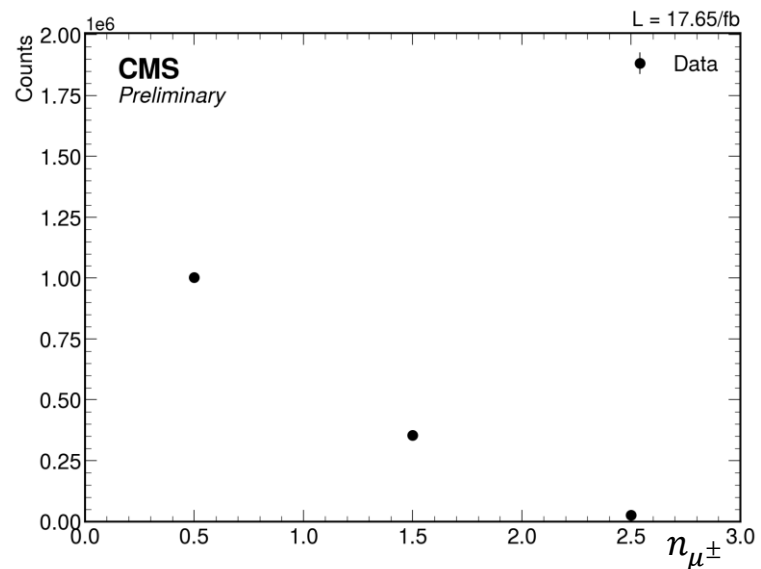
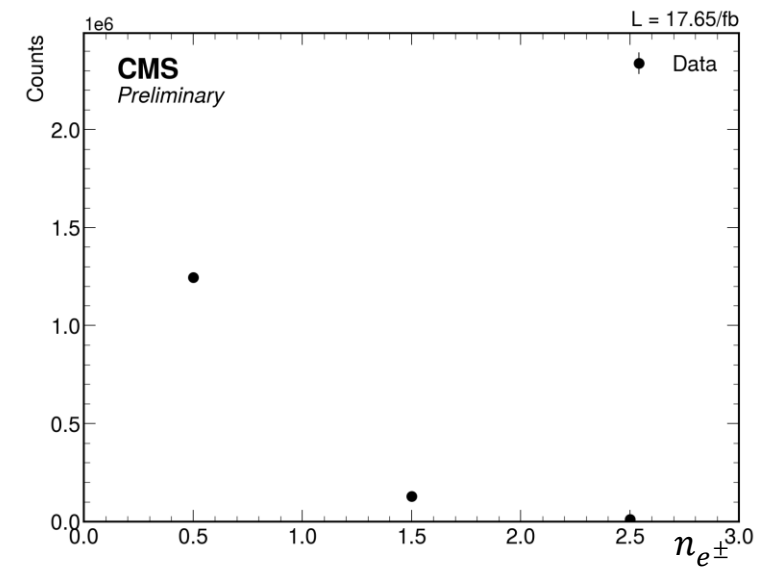
Data 2023 review



- Era: 2023C v3
- Data: EGamma0/1 + Muon 0/1 + MuonEG



Data 2023 review



- Era: 2023C v4
- Data: EGamma0/1 + Muon 0/1 + MuonEG

Issue with PocketCoffea running

- The lxplus local running using 2023C as an example succeed.
- The HTCondor run failed at the end .

- TODO:
 - Work around the HTCondor submission.
 - Complete the check of all Run 3 data.
 - Seek for the MC generation of TTHH samples.