

Pixel Phase1 Failure Scenarios

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Scenarios

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1) One Barrel Pixel Cooling Loop is not working

2) One Forward Pixel Cooling Loop is not working

3) Random 5% of the modules are not working

4) Two layer in Sector 2 are not working

Scenarios

Adam Hunyadi
(University of Debrecen)

5) Pixel efficiency loss of 0.5%.

6) Double column efficiency loss on Layer 1: 3%, everywhere else: 0%.

Validation

Validation is done using MC

The payloads are preferred against GT

Occupancy plots / Clusters are studied

Scenario 1)

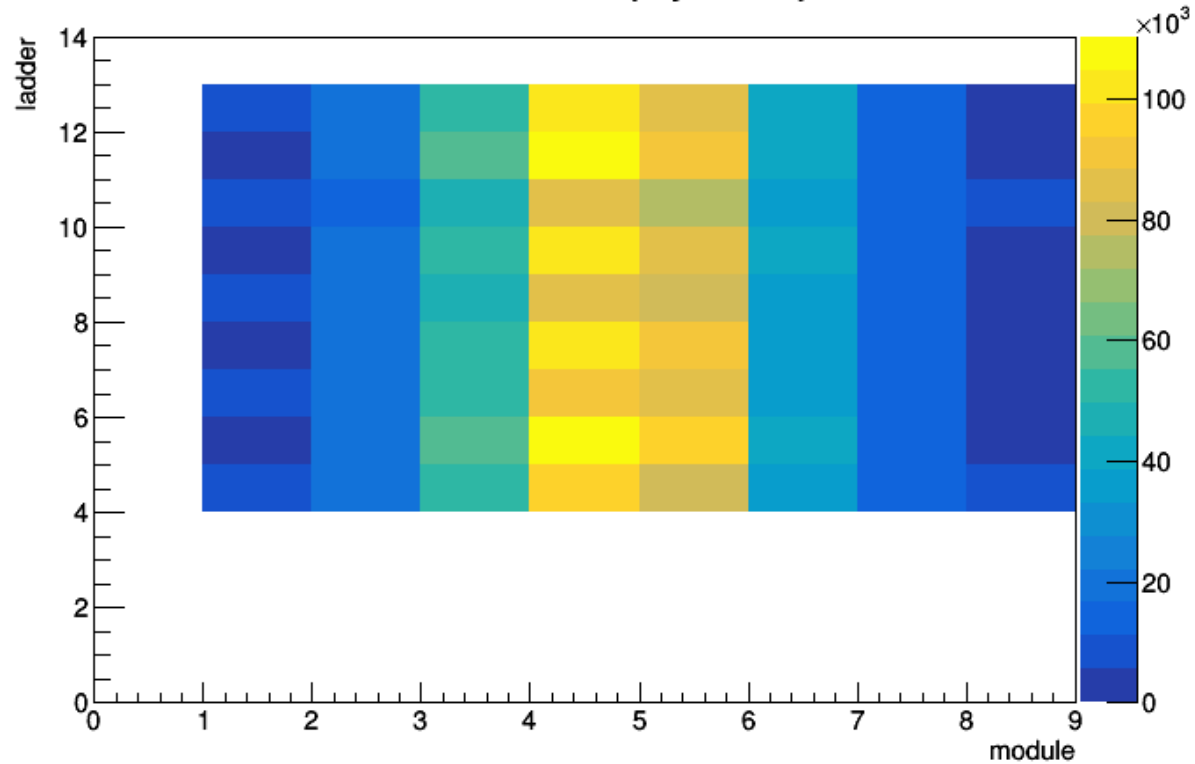
One Barrel Pixel Cooling Loop is not working

Containing #L1D1PN cooling loop from Lea ([list](#))

It is located in layer 1

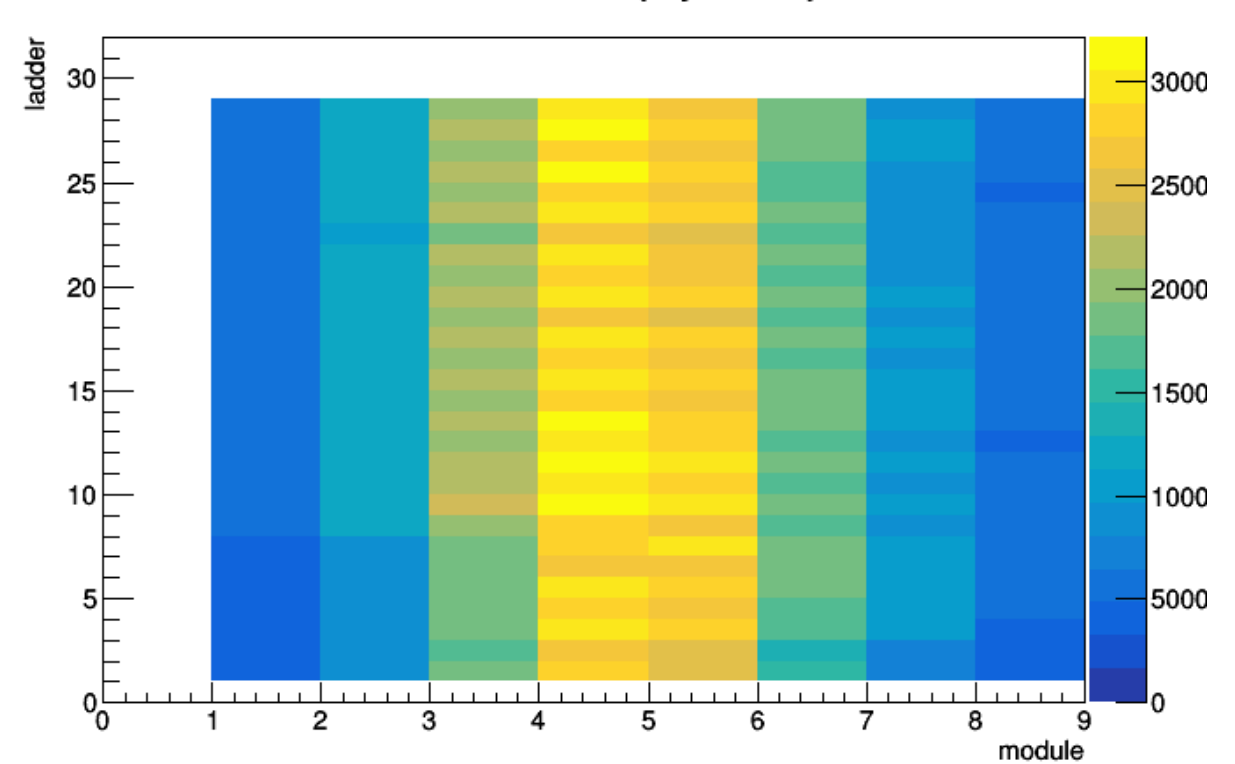
Scenario 1)

ladder:module {layer==1}



Layer 1

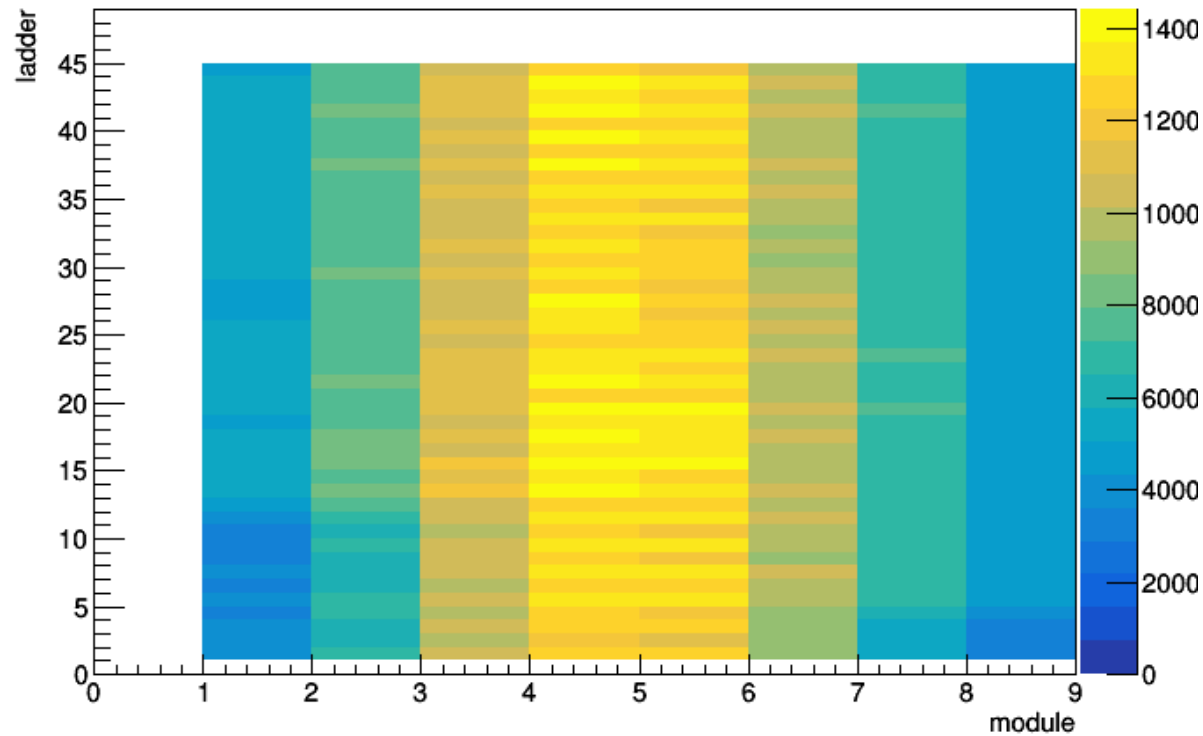
ladder:module {layer==2}



Layer 2

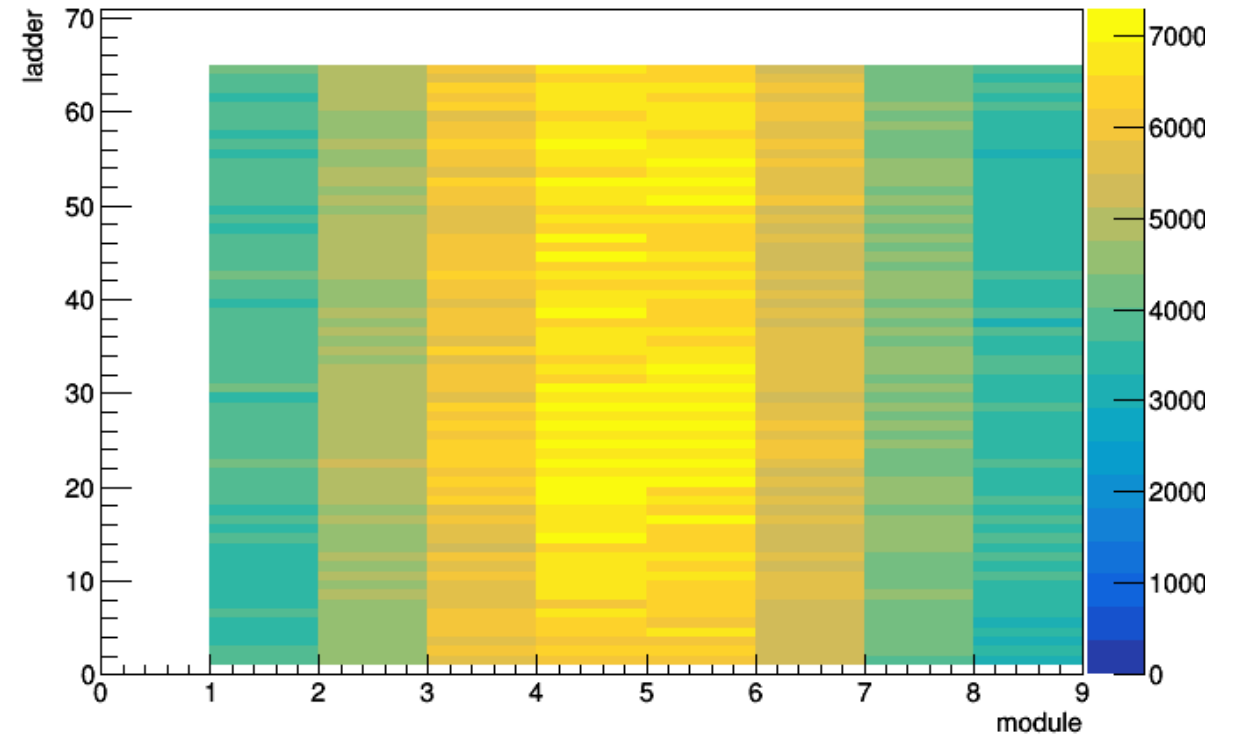
Scenario 1)

ladder:module {layer==3}



Layer 3

ladder:module {layer==4}



Layer 4

Scenario 2)

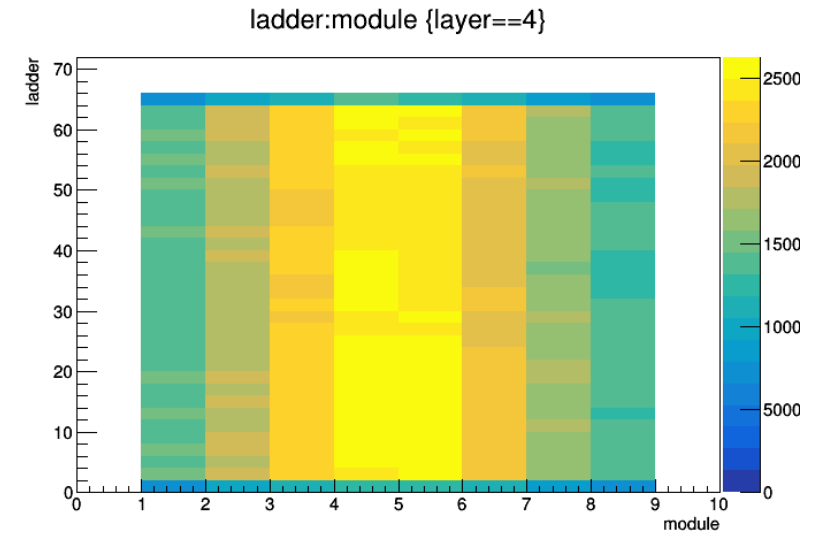
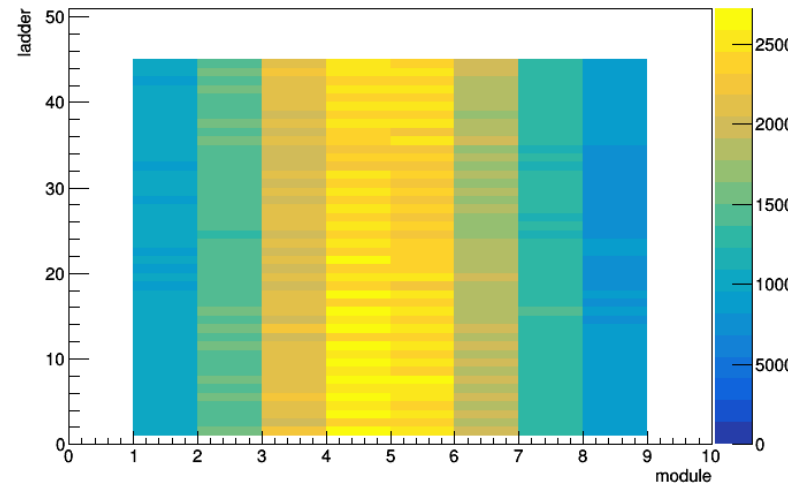
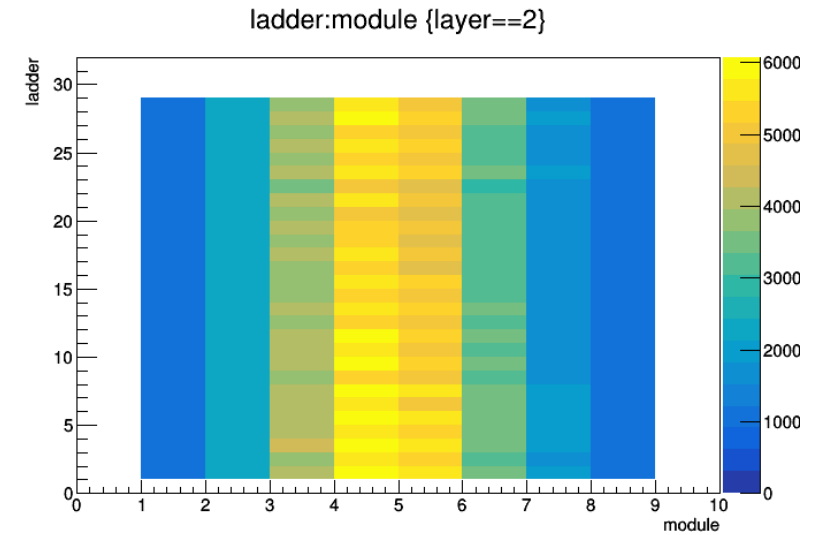
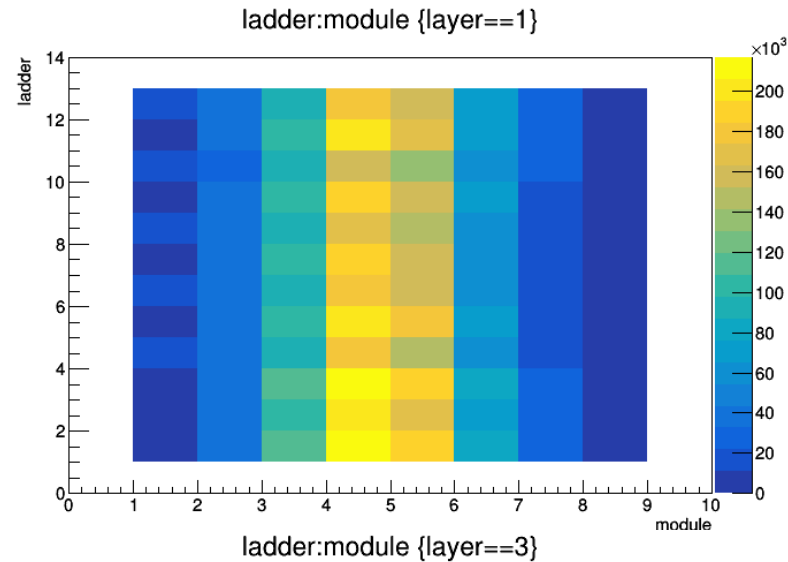
One Forward Pixel Cooling Loop is not working

Containing detidselectorTestOpt0a.log cooling loop from Andrea's list
([list](#))

Barrel Pixel has no bad modules

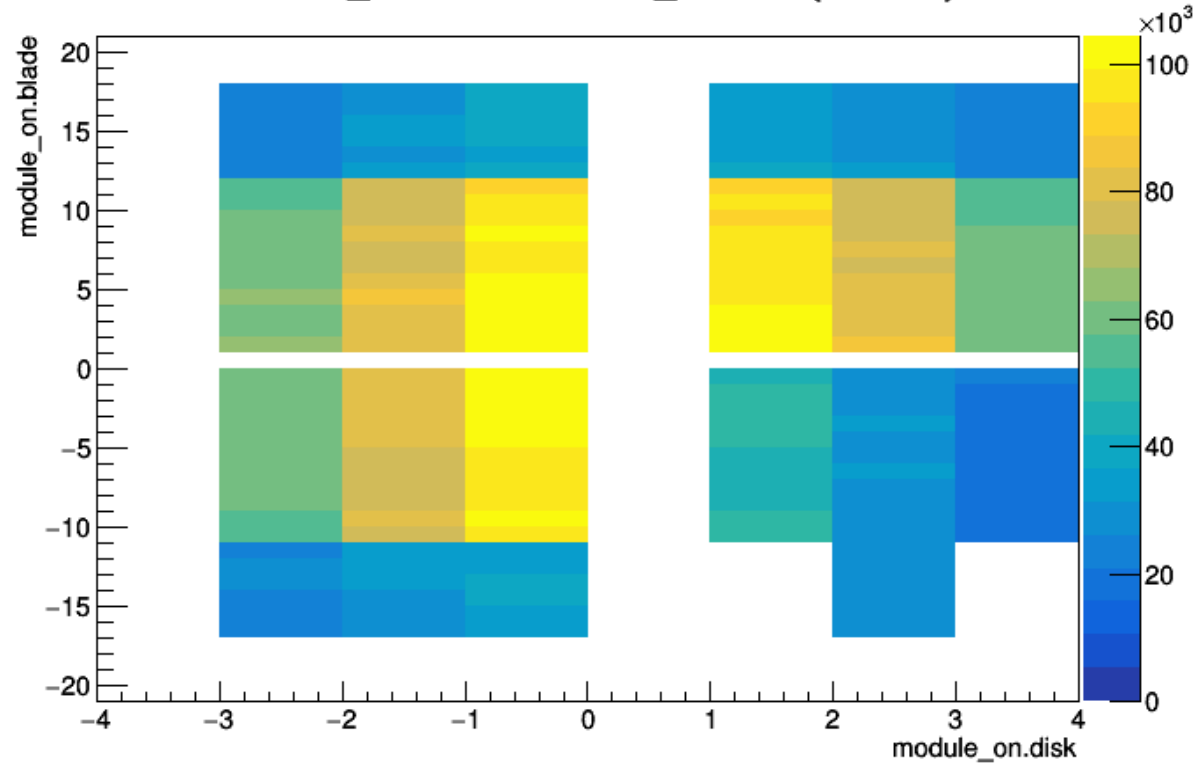
Scenario 2)

Barrel Pixel has no bad modules



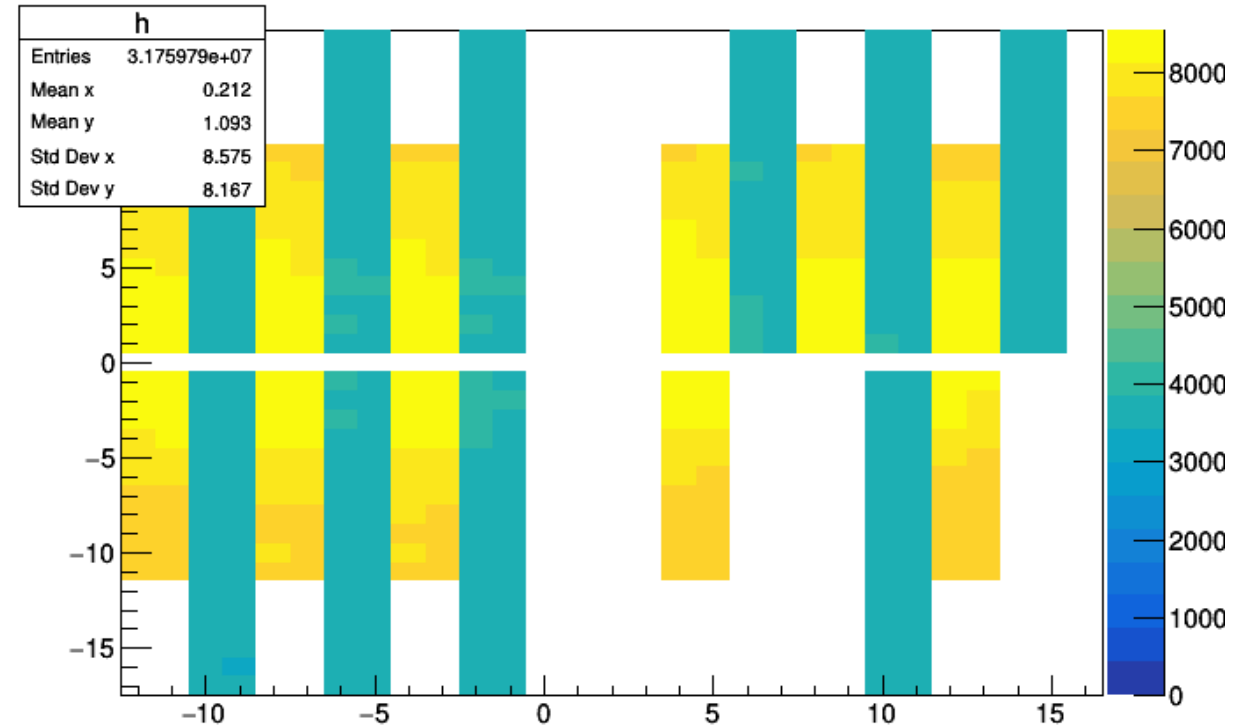
Scenario 2)

module_on.blade:module_on.disk {det==1}



Blade vs disk

module_on.blade:module_on.disk*4+ring*2+panel-3 {det==1}



Inner and outer rings

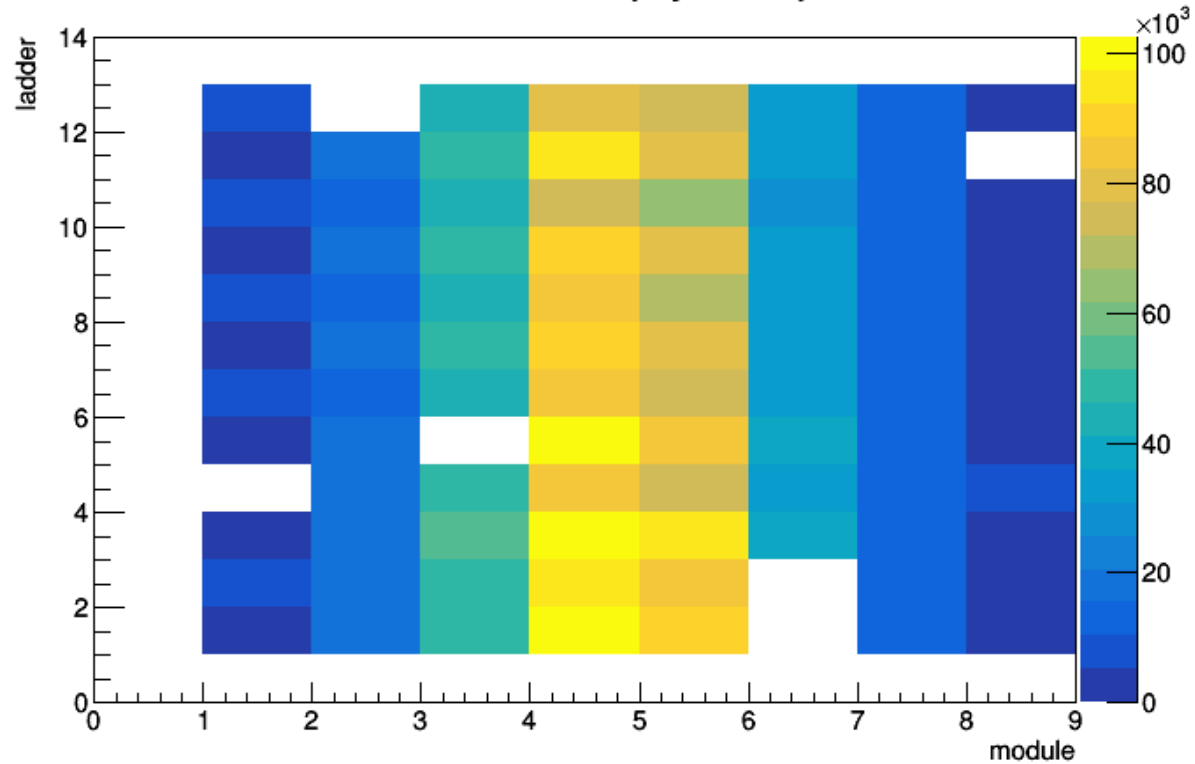
Scenario 3)

5% randomly chosen modules ([list](#))

Using python's random generator

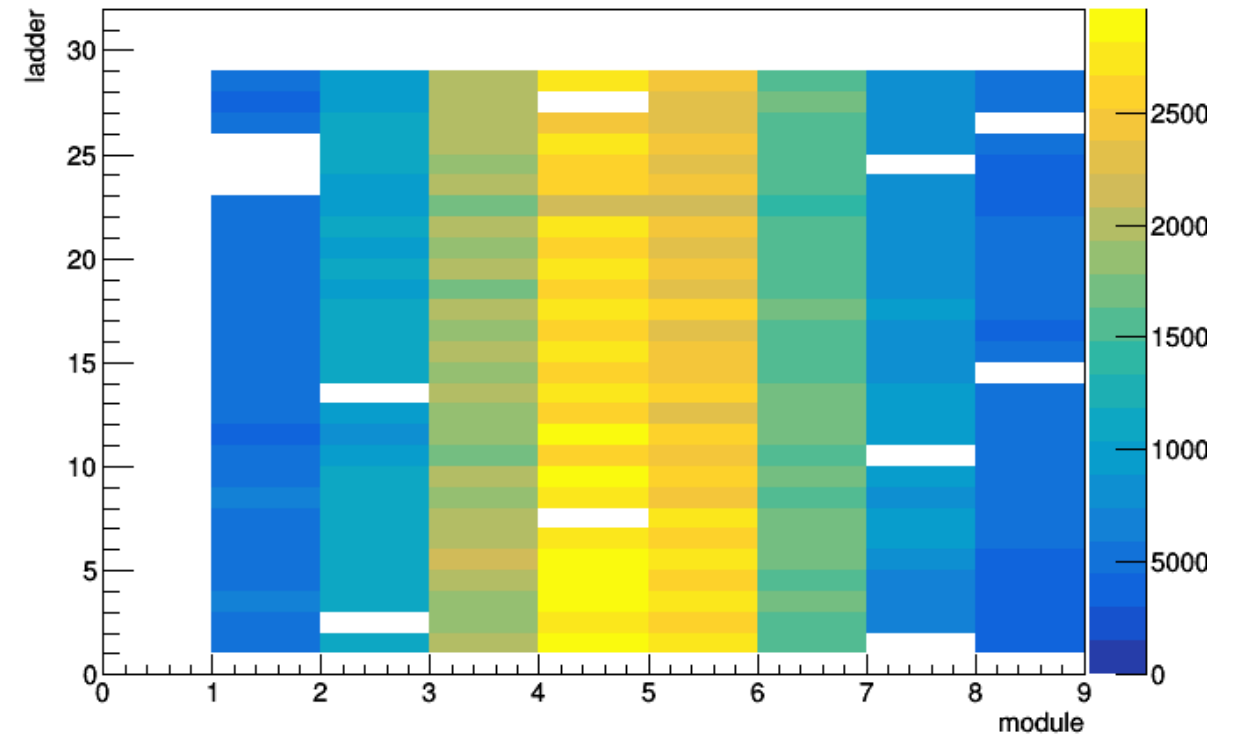
Scenario 3)

ladder:module {layer==1}



Layer 1

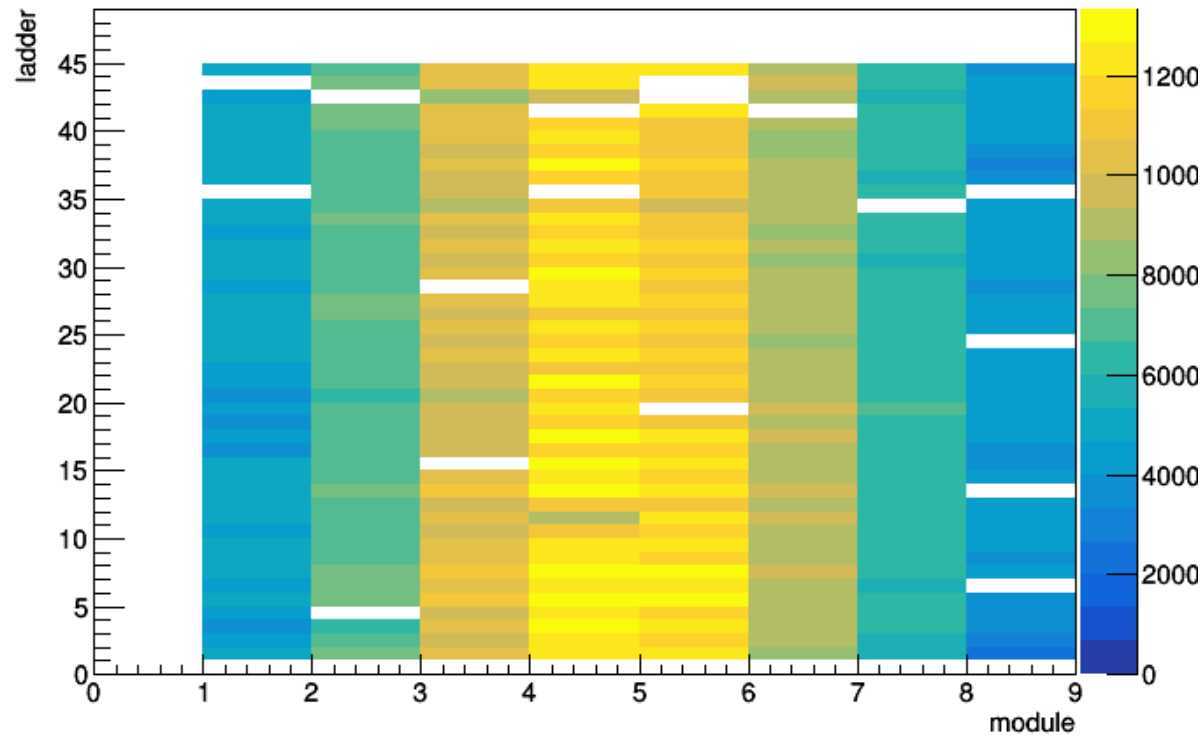
ladder:module {layer==2}



Layer 2

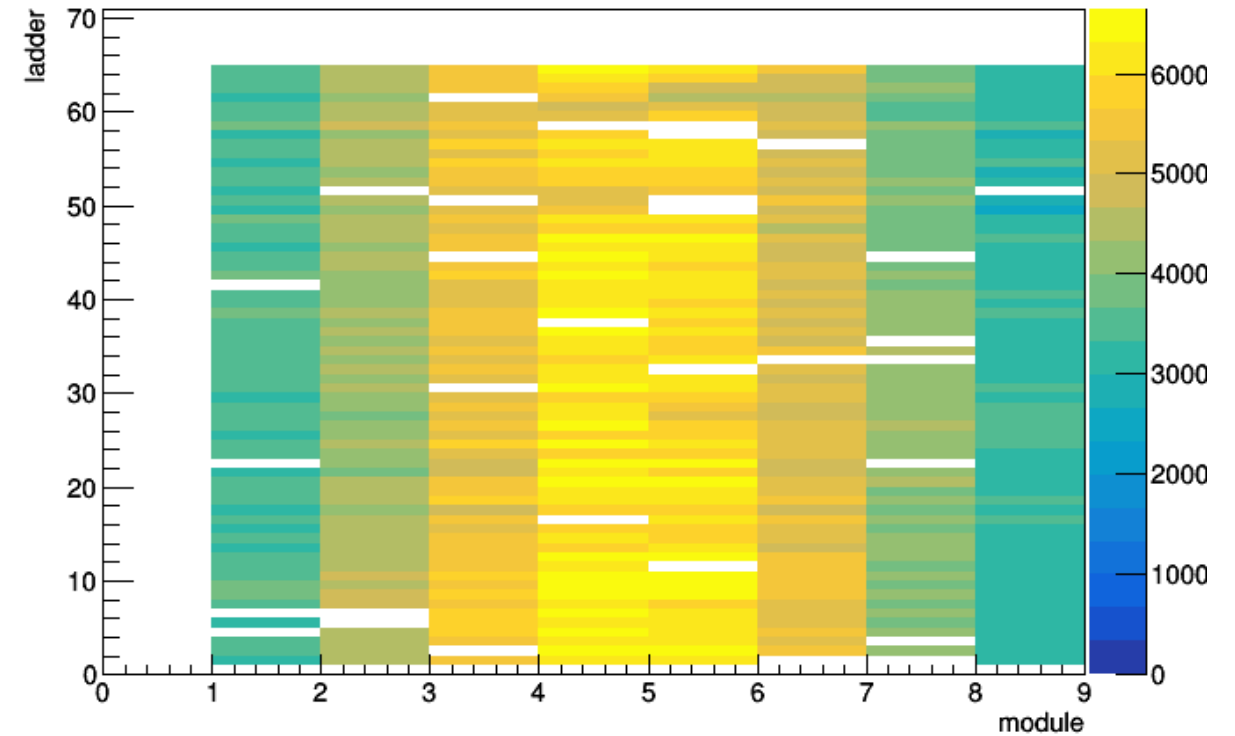
Scenario 3)

ladder:module {layer==3}



Layer 3

ladder:module {layer==4}



Layer 4

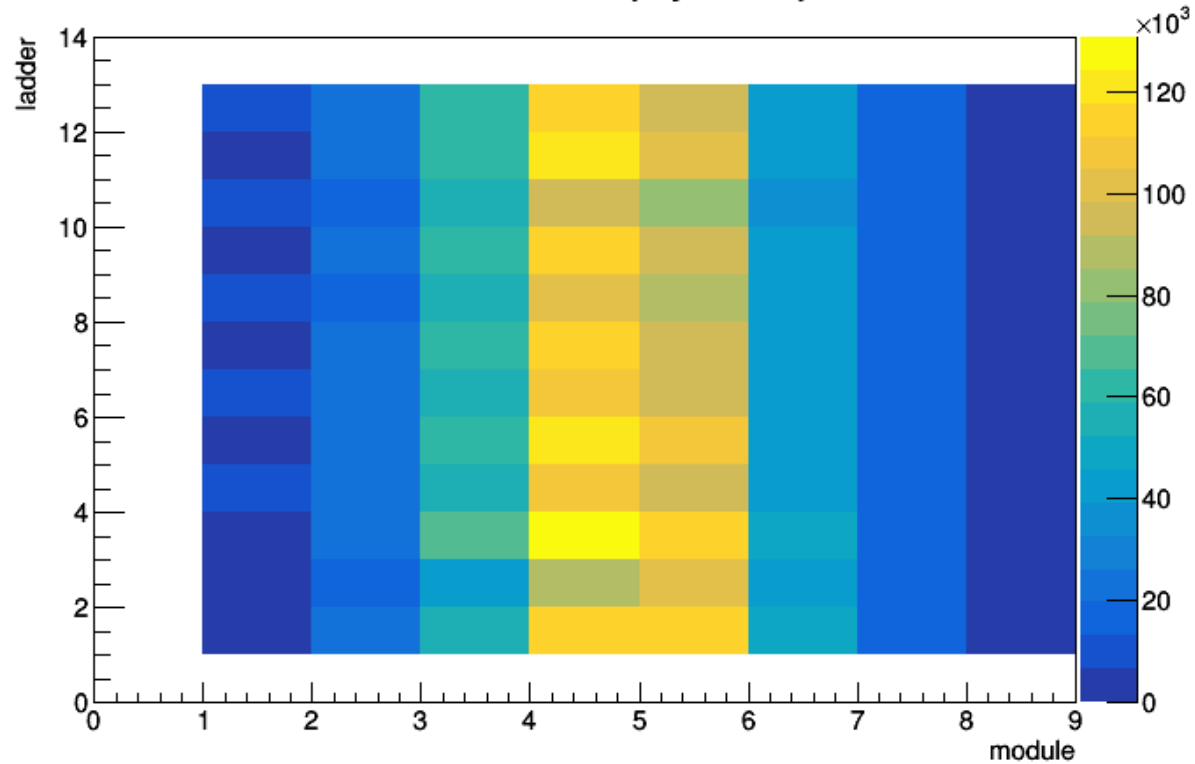
Scenario 4)

Two layers disabled in same sector (Sector 2)

They are located in Layer 2 and Layer 3

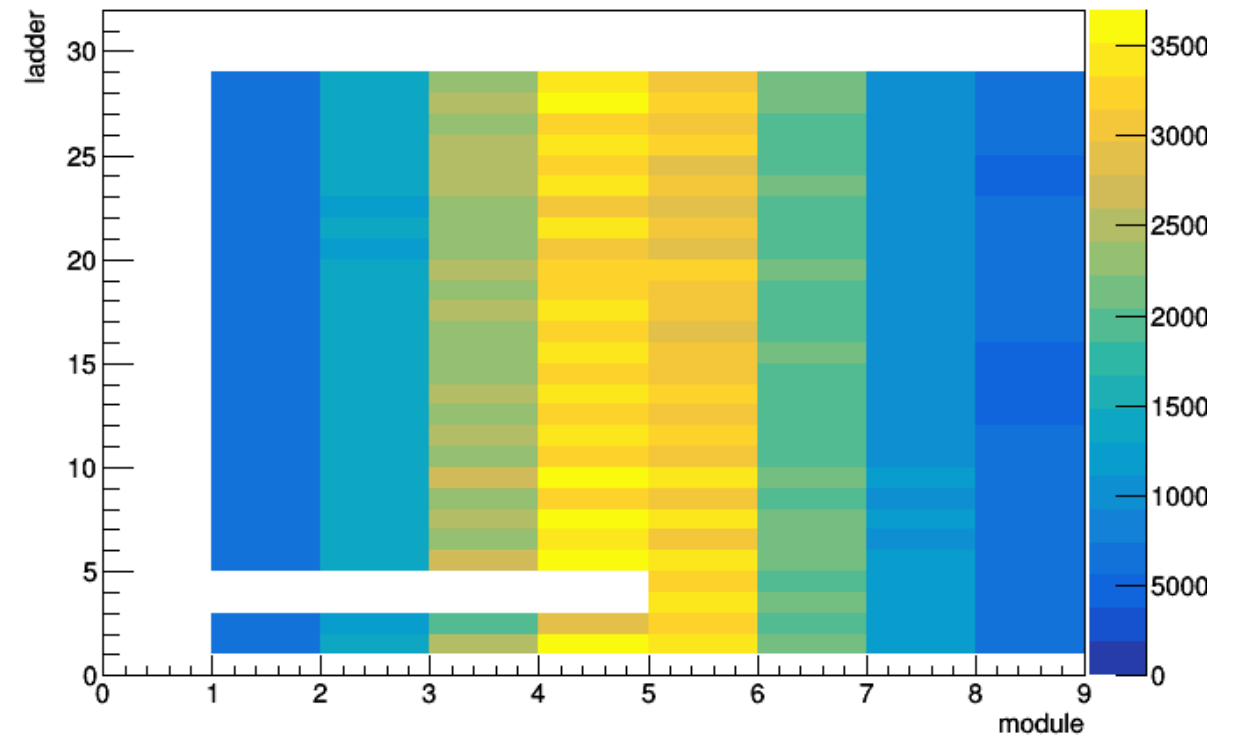
Scenario 4)

ladder:module {layer==1}



Layer 1

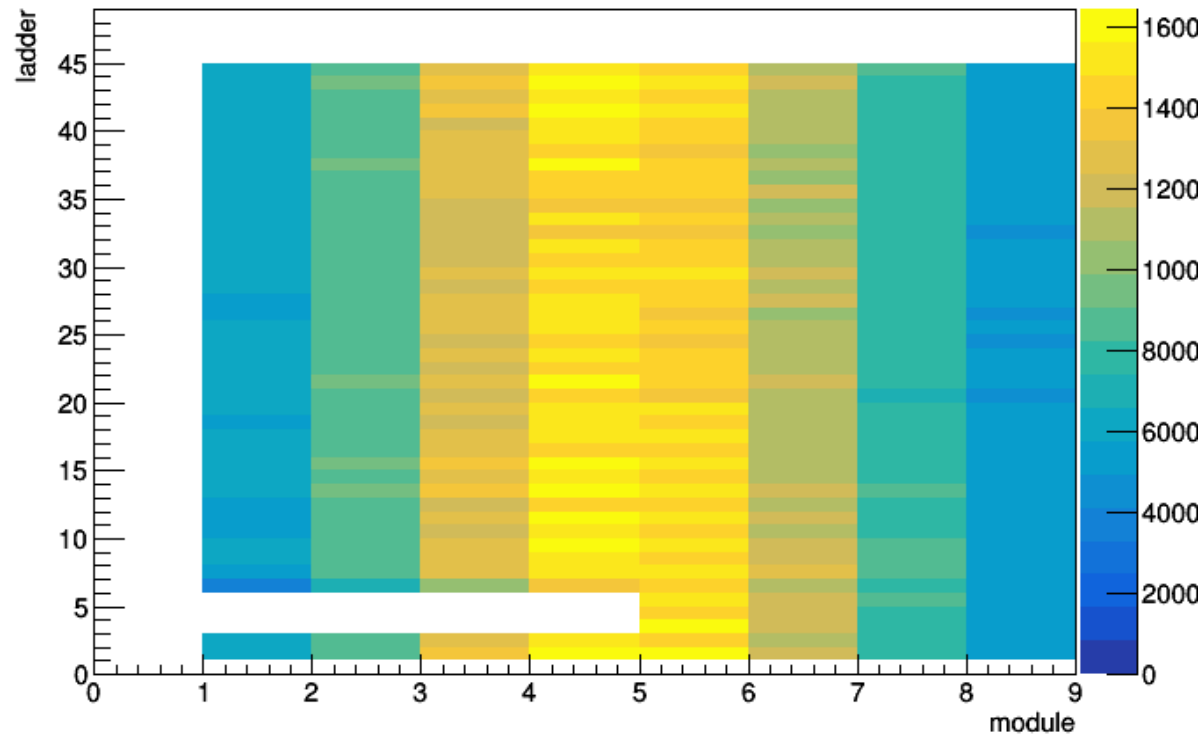
ladder:module {layer==2}



Layer 2

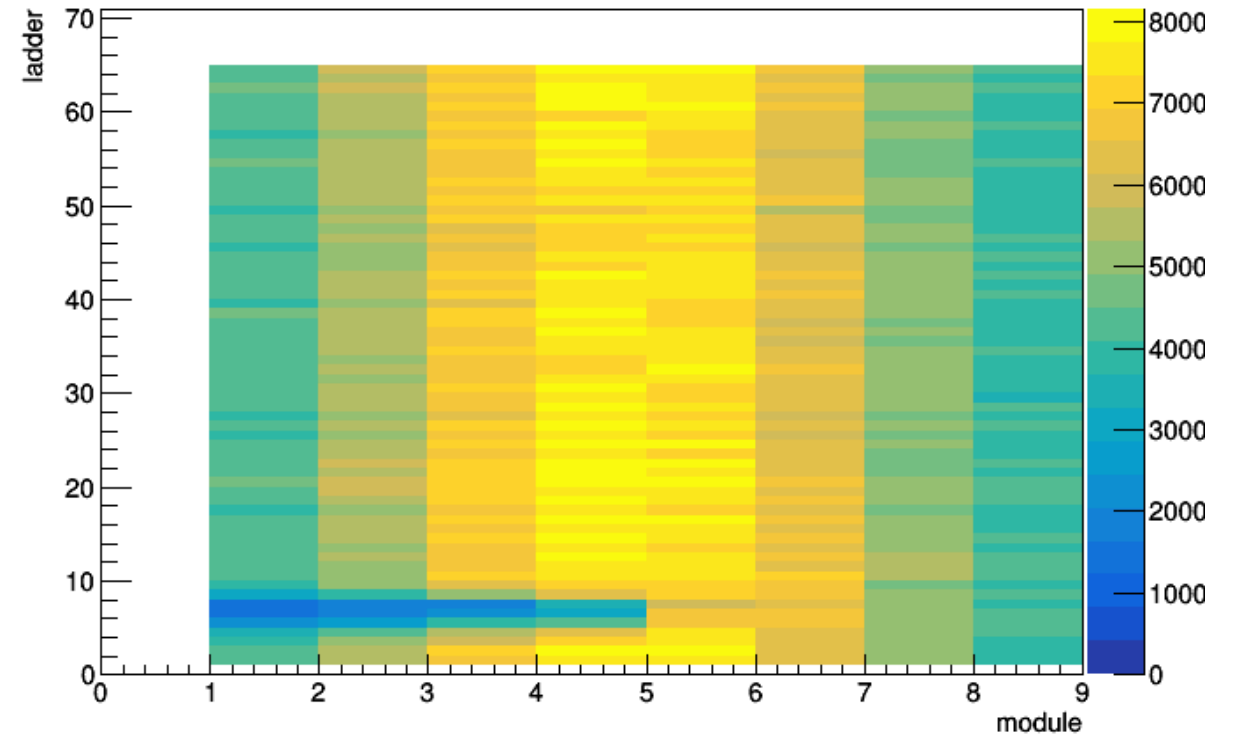
Scenario 4)

ladder:module {layer==3}



Layer 3

ladder:module {layer==4}



Layer 4

Scenario 5) and Scenario 6)

Validation was done by Adam

Comparing cluster numbers

Comparing valid/missing hit ratios

How to reach the payloads?

Quality

```
process.GlobalTag.toGet = cms.VPSet(  
    cms.PSet(  
        record = cms.string("SiPixelQualityFromDbRcd"),  
# either    tag = cms.string("SiPixelQuality_Phase1_Sector2TwoLayerOff")  
# or        tag = cms.string("SiPixelQuality_Phase1_Random5")  
# or        tag = cms.string("SiPixelQuality_Phase1_OneFPixCoolingLoop")  
# or        tag = cms.string("SiPixelQuality_Phase1_OneBPixCoolingLoop")  
    )  
)
```

How to reach the payloads?

```
# DynIneff
process.GlobalTag.toGet = cms.VPSet(
    cms.PSet(
        record = cms.string("SiPixelDynamicInefficiencyRcd"),
# either      tag = cms.string("SiPixelDynamicInefficiency_Phase1_v3")
# or          tag = cms.string("SiPixelDynamicInefficiency_Phase1_v4")
    )
)
```