Study of Reduced L1 Acceptance

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Investigate relative acceptance loss at Level-1 for $|\eta|<2.1$ vs. $|\eta|<2.4$ using MuonAnalysis ntuples in $\$ANA\_MUON$

Apply low luminosity thresholds
- $P_T(1\mu) > 20$ GeV
- $P_T(2\mu) > 4$ GeV

Earlier study: CMS Note 1998/020
- Pretty good agreement with this study
- Thresholds were (20,4) GeV for high lumi, (7, 2+) GeV low lumi
$H \rightarrow 4\mu$ L1 Efficiency

**L1 Trigger Efficiency for H-$\rightarrow$4mu**

- **Efficiency**
  - 0.5
  - 0.6
  - 0.7
  - 0.8
  - 0.9
  - 1
  - 1.1

- **Eta coverage**
  - 1
  - 1.2
  - 1.4
  - 1.6
  - 1.8
  - 2
  - 2.2
  - 2.4

- **Single or Double Trigger**
  - Single Trigger Pt > 20
  - Double Trigger Pt > 4

- **M = 150 GeV**
- **3000 events**

- **$|\eta| < 2.1$**
- **0.1% loss**
$H \rightarrow 4\mu$ Acceptance (Generated)

$M = 150$ GeV
3000 events

$|\eta| < 2.1$: 18% loss incurred if no offline recon of high $\eta$ muons

Relative Acceptance for H-$\rightarrow$4mu

Acceptance

<table>
<thead>
<tr>
<th>Eta coverage</th>
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</thead>
<tbody>
<tr>
<td>1 muon</td>
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<tr>
<td>2 muons</td>
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<tr>
<td>3 muons</td>
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<td>4 muons</td>
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$H \rightarrow 2\mu$ Relative L1 Efficiency

**eta coverage**

```
1  1.2  1.4  1.6  1.8  2  2.2  2.4
0  0.2  0.4  0.6  0.8 1
```

**Efficiency vs Eta Coverage**

- **Single or Double Trigger**
- **Single Trigger Pt > 20**
- **Double Trigger Pt > 4**

$|\eta| < 2.1$

3% loss

$m = 140$ GeV

1545 events
$H \rightarrow 2\mu$ Acceptance (Generated)

Relative Acceptance for $H\rightarrow2\mu$

$M = 140$ GeV
1545 events

$|\eta| < 2.1$: 11% loss incurred if no offline recon of high $\eta$ muons
Relative L1 Trigger Efficiency for top->1μ

Efficiency

| η | < 2.1
5% loss
W → 1μ Relative L1 Efficiency

Relative L1 Trigger Efficiency for W→1μ

|η| < 2.1
13% loss
\gamma^* / Z \rightarrow 1\mu \text{ Relative L1 Efficiency}

Relative L1 Trigger Efficiency for Gamma/Z->1\mu

| \eta | < 2.1

14% loss