New search results for low-mass dijet resonances using trigger-level jets


**CMS** [1], [3] and **LHCb** [2]: trigger reconstructs lots of event, use for analysis!**

**collect data**

New stream in 2016: record HLT jets (0.3% of full event size)

**calibrate the jets**

- **ATLAS**[4]
  - $m_{\ell\ell}$ [GeV]
  - L1 E_{r}\text{pr} 
  - Analysis $m_{ll}$
  - Data

<table>
<thead>
<tr>
<th></th>
<th>75</th>
<th>185</th>
<th>400 (y*&lt;0.3)</th>
<th>3.6 fb^{-1}</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>220</td>
<td>531 (y*&lt;0.6)</td>
<td>29.3 fb^{-1}</td>
<td></td>
</tr>
</tbody>
</table>

**check it worked!**

- Trigger L1 rate at end of fill (below $10^{3}$ cm^{-2} s^{-1}) to run extra TLA trigger (J50) - will allow sensitivity to even lower masses

**look for bump**

- Bayesian method to set limits: refit, including signal shape with floating normalisation

**set limits**

**wider context**

- ATLAS: Set limits down to 450 GeV in m($\ell\ell$)
- Similar sensitivity to "normal" dijet result around 1500 GeV
- Other methods of accessing low masses use ISR: cross-section penalty
- statistically limited: $\gamma$ limit ~ data [14]

**background estimate: fit**

- Excellent agreement with offline dijet mass after calibration
- 3x10^{3} events in first bin: fit sub-ranges with sliding window

**small increase in systematic uncertainty**

**future**

- Make use of L1 rate at end of fill (below $10^{3}$ cm^{-2} s^{-1}) to run extra TLA trigger (J50) - will allow sensitivity to even lower masses

**event, use for analysis!**

- Trigger L1 rate at end of fill (below $10^{3}$ cm^{-2} s^{-1}) to run extra TLA trigger (J50) - will allow sensitivity to even lower masses

**on behalf of the ATLAS Collaboration**