



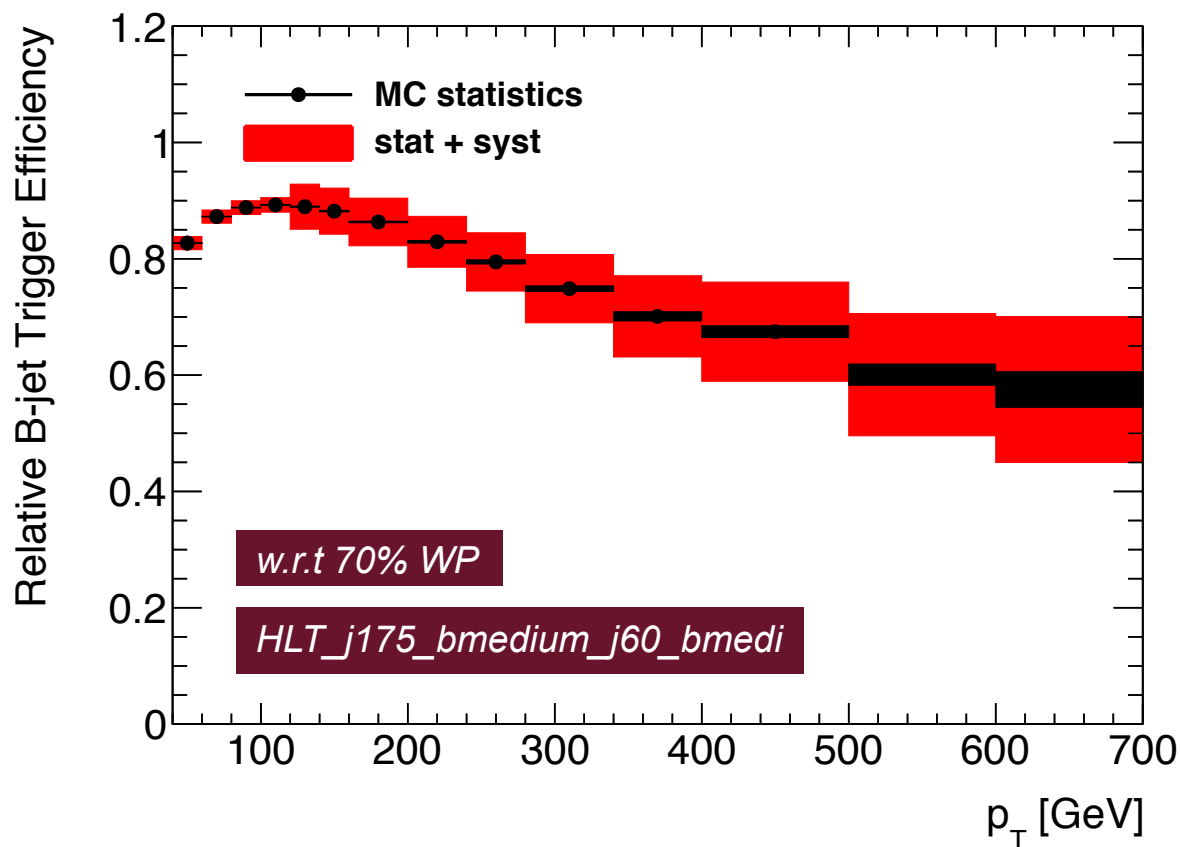
b-Trigger Efficiencies in 2016 Vertex Studies

Laurie McClymont

b-Trigger Meeting
14 September 2016



$$\text{b-Jet Trig Eff. wrt offline} = \frac{\# \text{ b-Jets pass offline and online b-tagging}}{\# \text{ b-Jets offline b-tagging}}$$

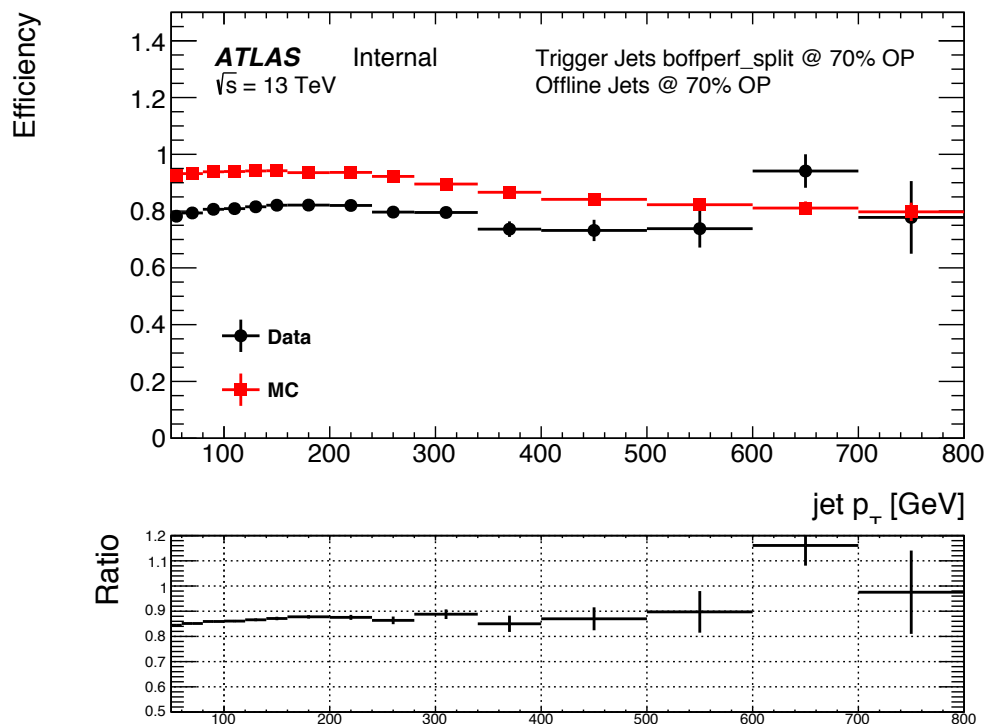


Used by b-tagged dijet in 2015



- **High purity b-jet sample: Di-lepton tt selection**

- **Single lepton bperf trigger:** `HLT_(mu26_Imedium/e26_tight_iloose/e26_lhtight_iloose)_2j35_bperf`
 - Calculate online b-tagging algorithms on all jets with $p_T > 35$ GeV
- **1 medium electron & 1 medium muon** ($p_T > 30$ GeV)
- **2 b-tagged jets**, MV2c10 ($p_T > 50$ GeV, $|\eta| < 2.5$)

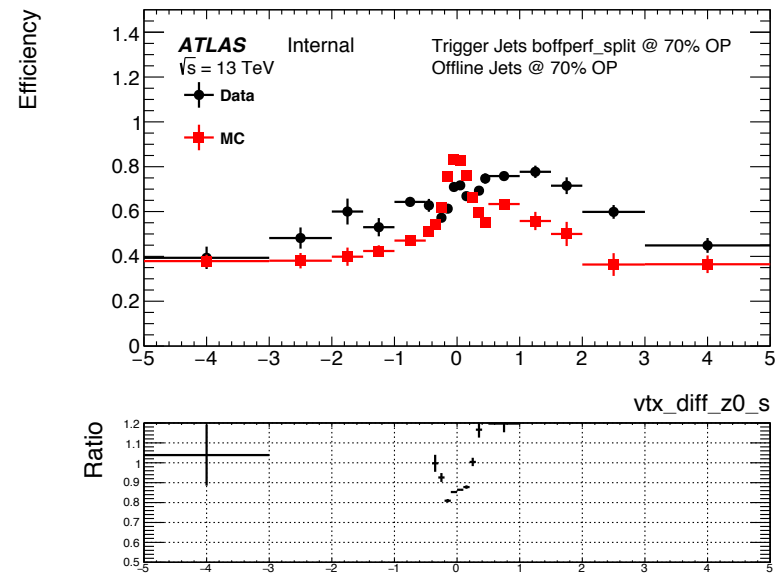
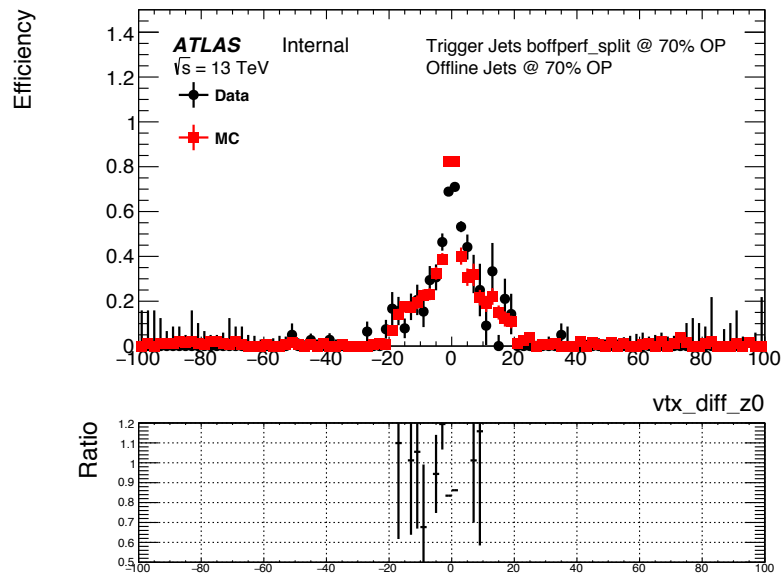
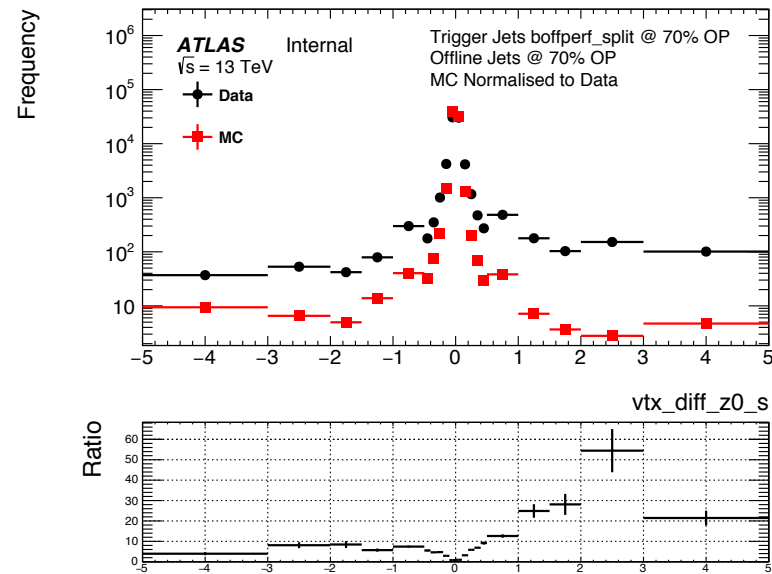
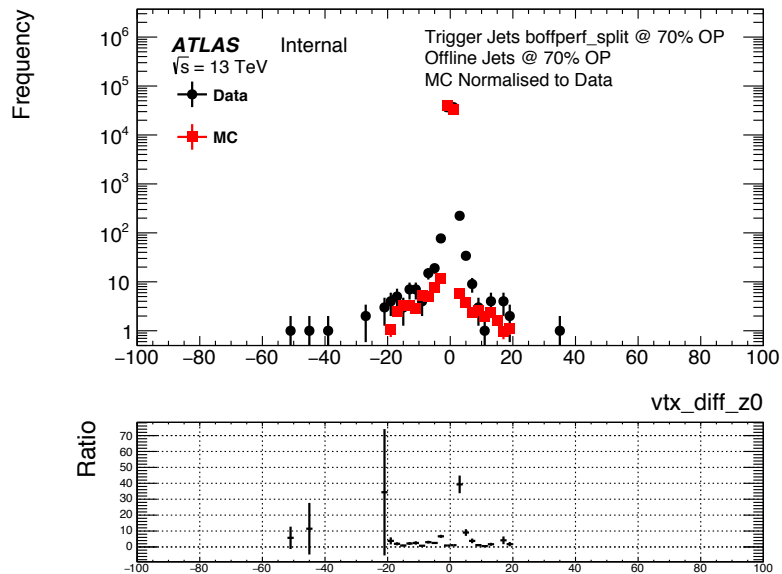


- **Data/MC diff could vertex inefficiencies coming from non-ideal beamspot**
 - Study this by enforcing that we have the same vertex offline and online

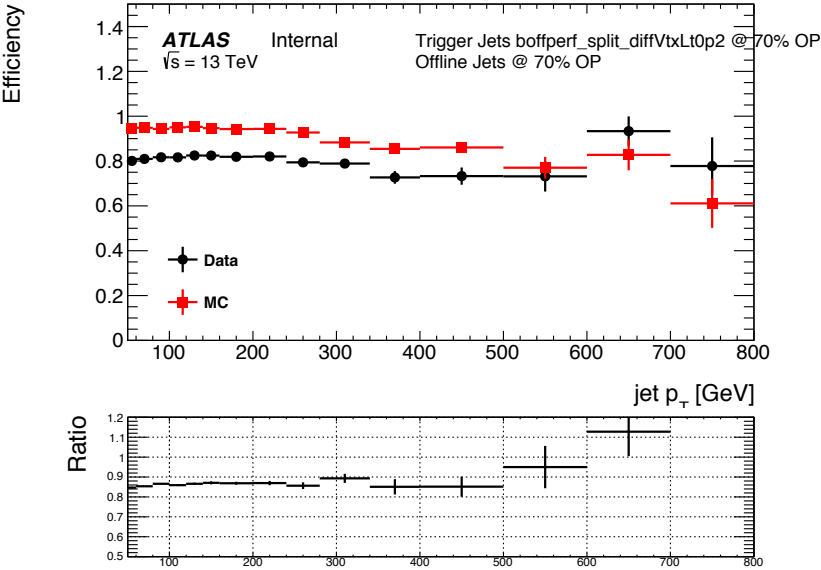


4 Study Vertex Difference

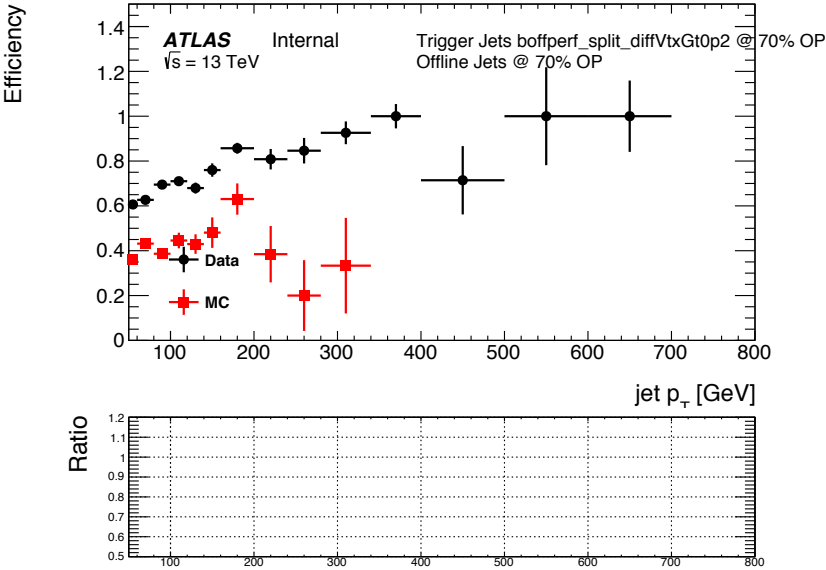
- vtx_diff_z0 = online z0 - offline z0 - unit = mm



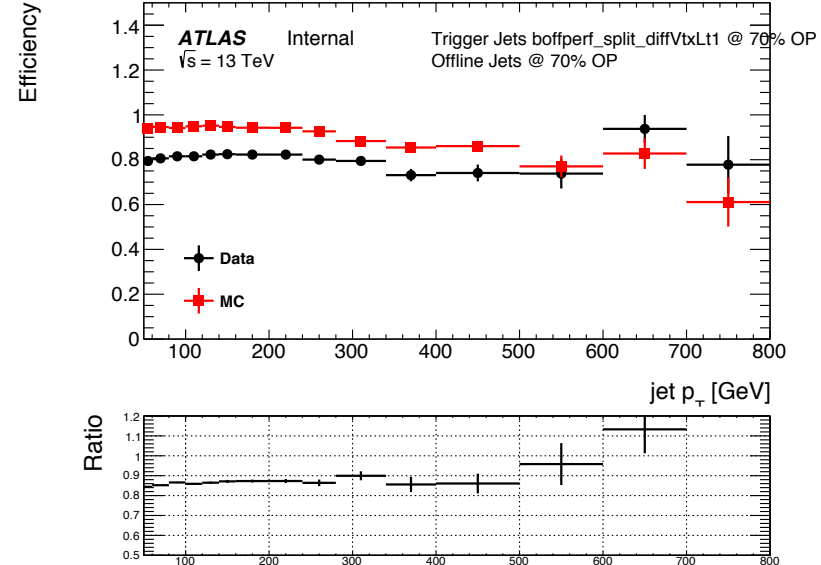
Match offline and offline vertex $|\text{vtx_diff_z0}| < 0.2\text{mm}$



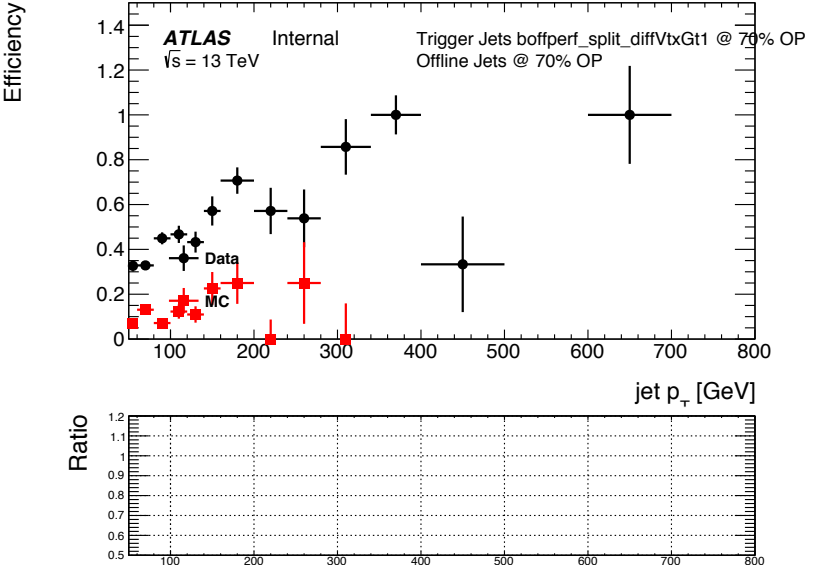
Anti-Match offline and offline vertex $|\text{vtx_diff_z0}| > 0.2\text{mm}$



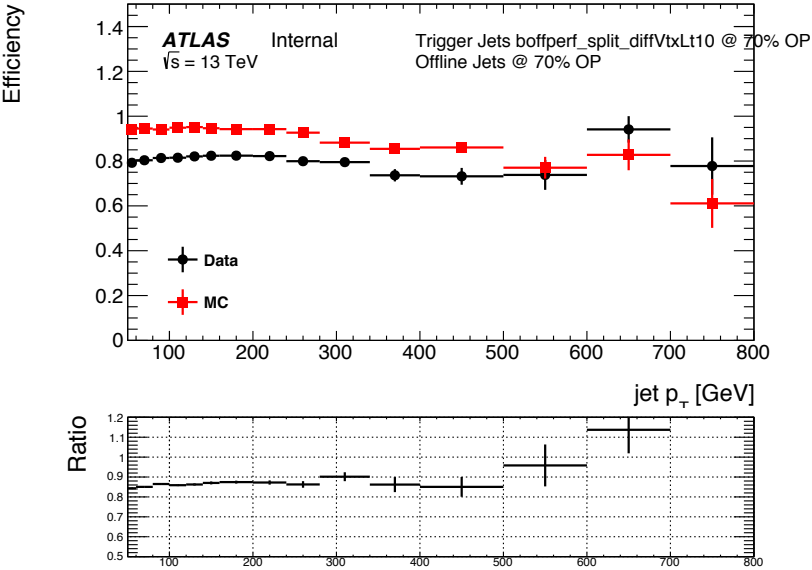
$|\text{vtx_diff_z0}| < 1\text{ mm}$



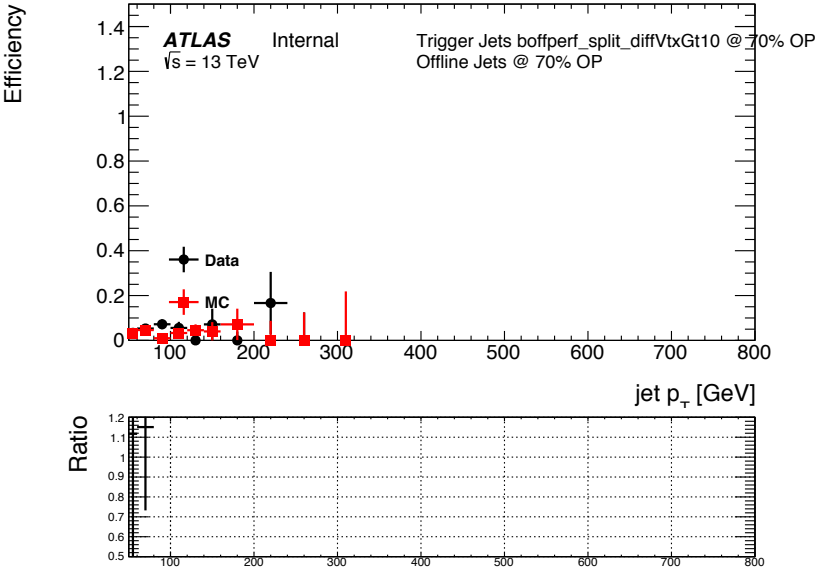
$|\text{vtx_diff_z0}| > 1\text{ mm}$



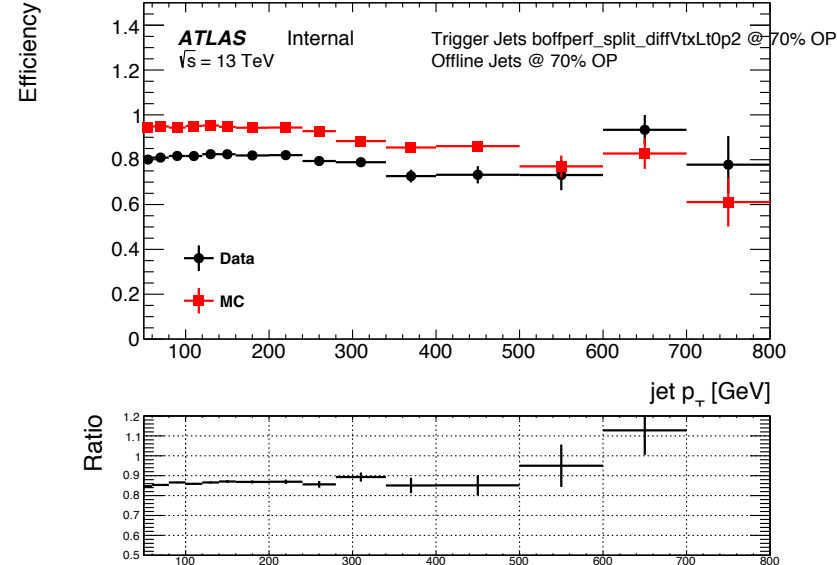
Match offline and offline vertex $|\text{vtx_diff_z0}| < 10 \text{ mm}$



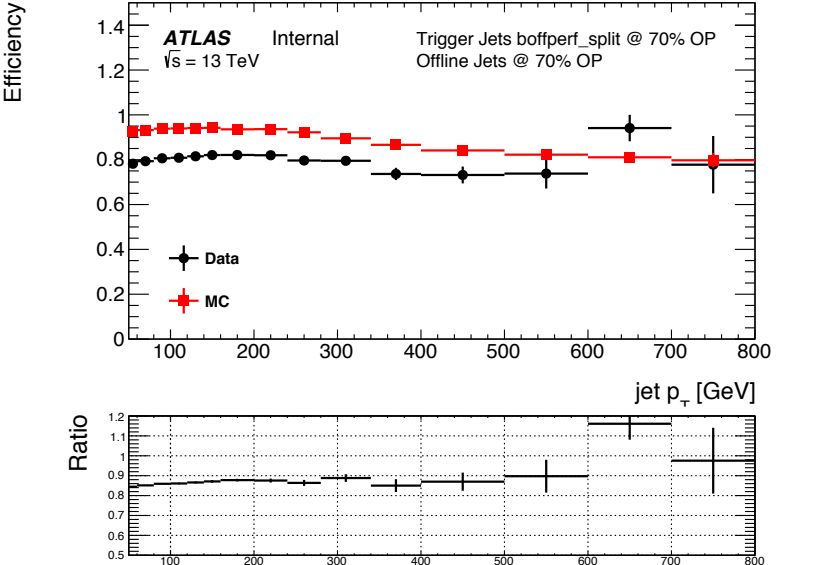
Anti-Match offline and offline vertex $|\text{vtx_diff_z0}| > 10 \text{ mm}$



$|\text{vtx_diff_z0}| < 0.2 \text{ mm}$



No Cut





- Forcing offline vertex == online vertex (0.2mm) sees little change to data/MC agreement
- But, data eff dist vtx_diff_z0 is indicative that vertexing could be a contributor to data/MC discrepancies
- Somethings to move forward with
 - 1) dx and dy
 - 2) Check eta (check for kinematic bias)
 - 3) # of events in MC/data for $>$ and $<$ 0.2, 1, 10mm



UCL

Backup!