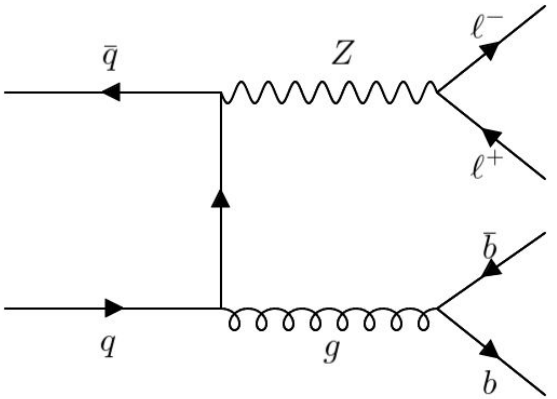
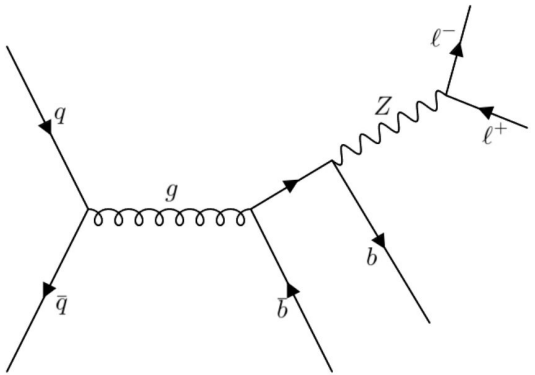
dead cone

savannah’s tea time with friends - 07.10.2024

Process

- Aim to study production of heavy flavour jets produced in association with a Z boson
- Will measure primary Lund Jet Plane (LJP), D_2 & Colour Ring (CR). Expect sensitivity to dead cone effect
- Will study both boosted and resolved topologies comparing light and b-jets





Analysis selections

Full Run 2 Analysis: 139 fb^{-1} of data at c.m.e. 13 TeV

2 x 2 SR: (Resolved + Boosted) x (double-b-tag + double anti-b-tag)

Resolved Topology

- Require 2 same-flavour opposite-sign leptons
  - e or mu: p_T > 27 GeV, |η|<2.5
  - di-lep inv. mass between 76-106 GeV
- 2 (anti) b-tagged R=0.4 PFlow jets with |η| < 2.5
  - 70% b-tag WP

Calculate LJP and on these jets:

⇒ Study light-jet & b-jet in low & medium pT range

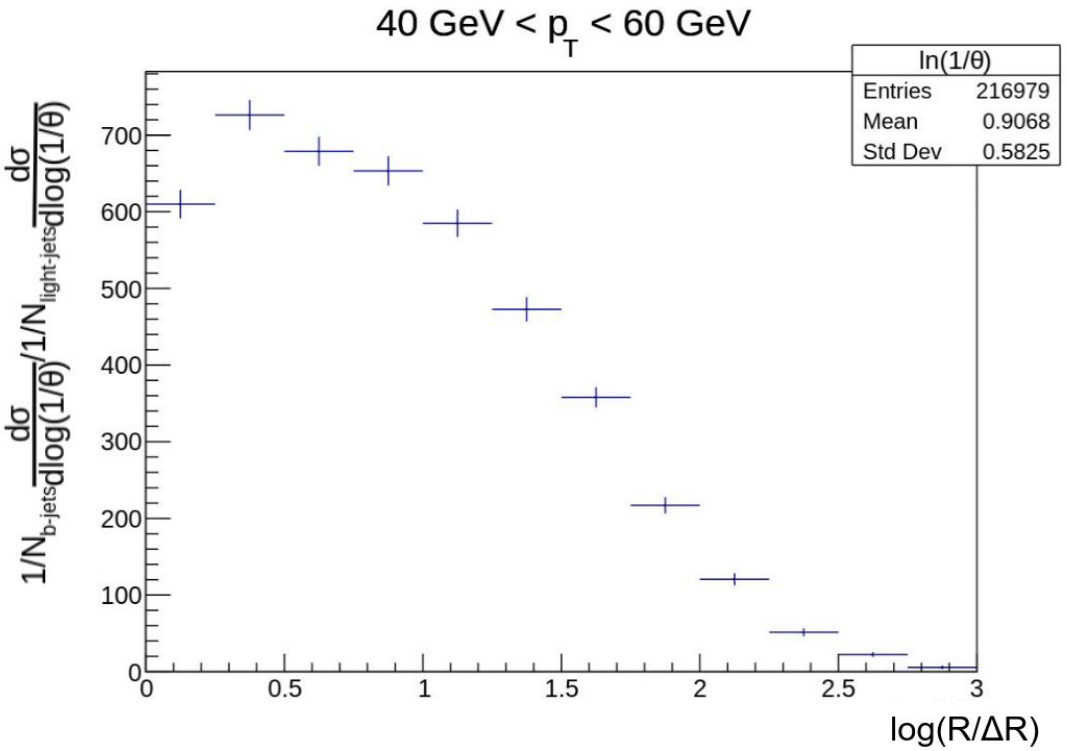
Boosted Topology

- Require 2 same-flavour opposite-sign leptons
  - e or mu: p_T > 27 GeV, |η|<2.5
  - di-lep inv. mass between 76-106 GeV
- ≥1 R = 1.0 LCTopoJet with |η| < 1.5
- 2 (anti) b-tag VR-track jets matched to a fatjet
- (Anti) b-tagging of VR-track jets. Fatjet tagged as (anti) b if two VR-track jets are matched (70% WP)
- Require one other jet matched to fatjet (for CR only)

Calculate LJP and D2 on fatjet, CR on subjets:

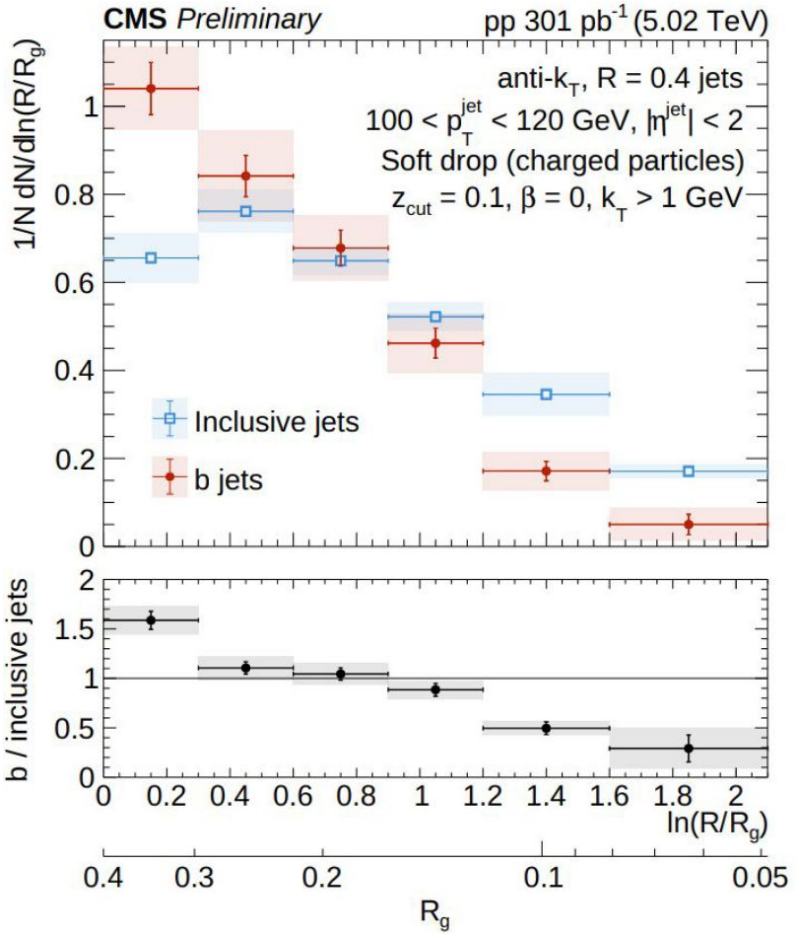
⇒ Study light-jet & b-jet at high pT and g→ bb topologies

dead cone has been seen!

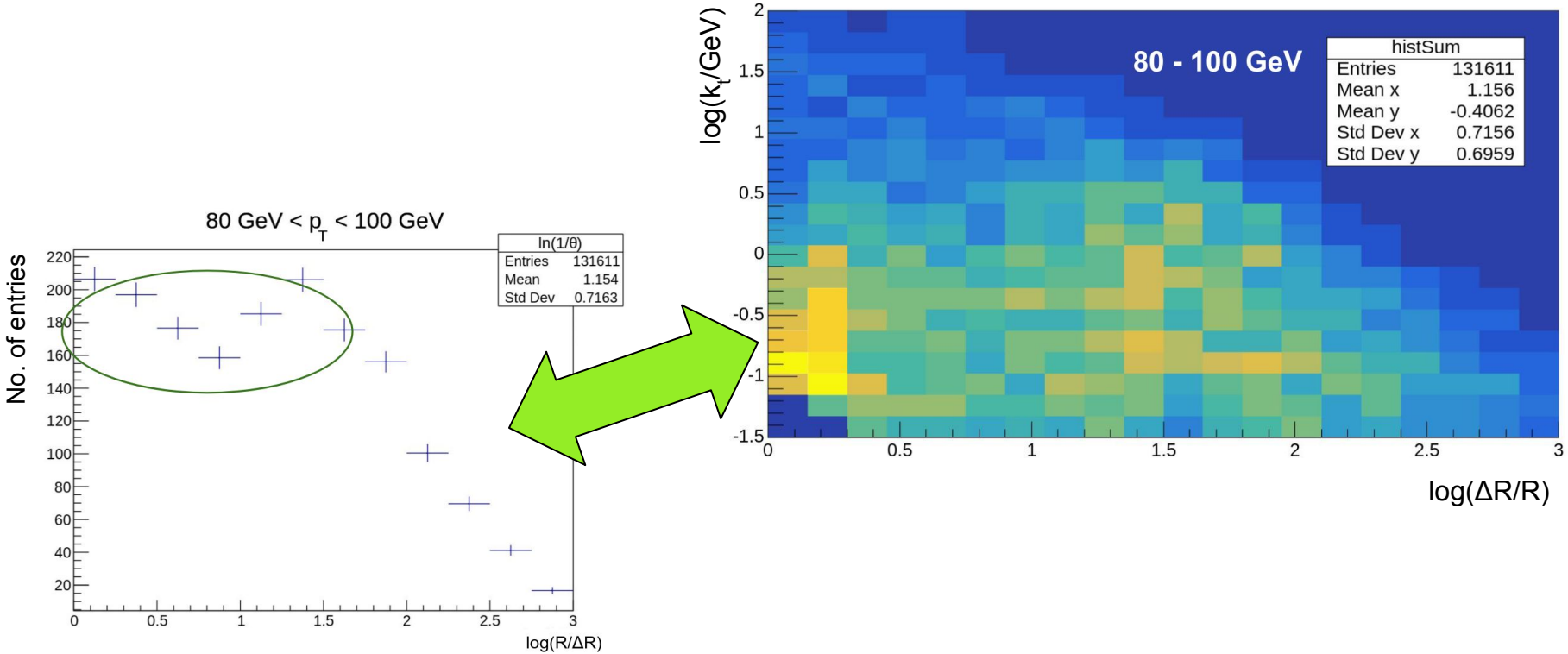


but cms beat us to it :(

Lida Kalipoliti
@BOOST2024

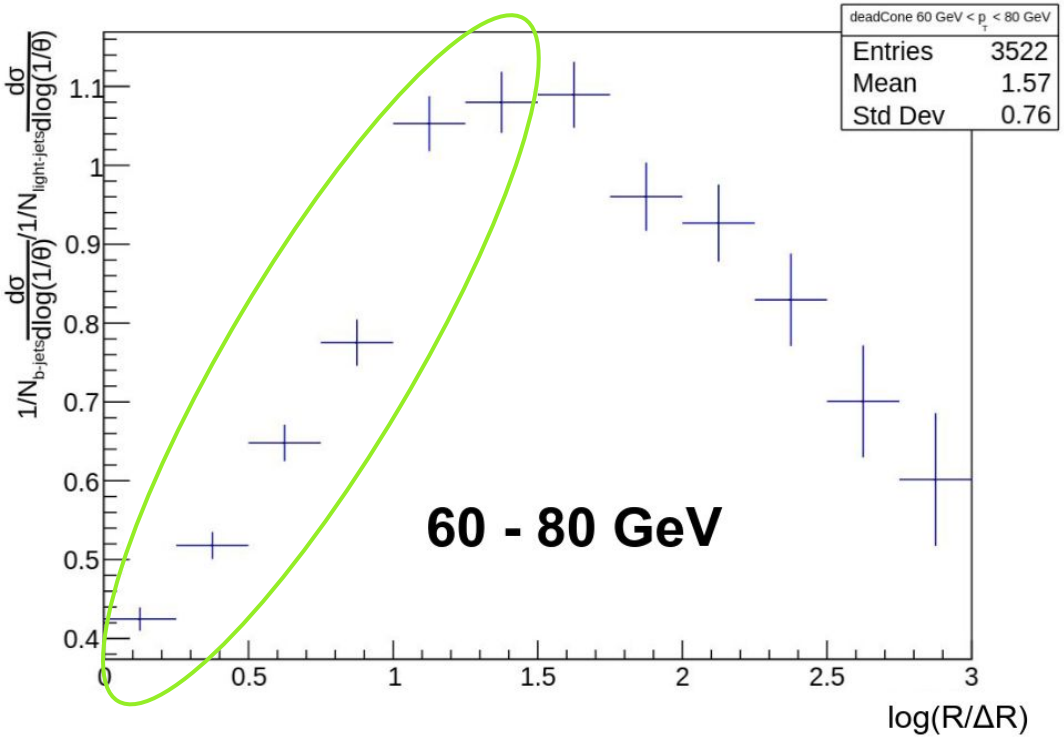


atlas still has some problems…



more problems…

(but probably less worrying)



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