

# B hadron angular correlations in $pp \longrightarrow Z \bar{b} b X$

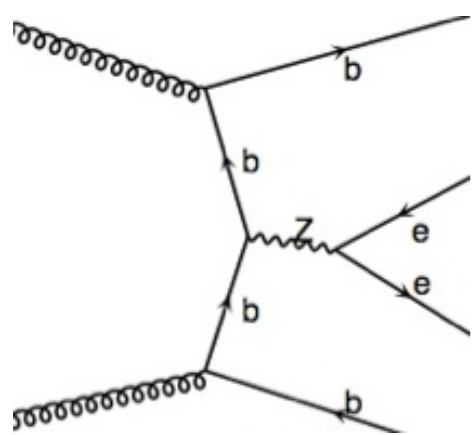
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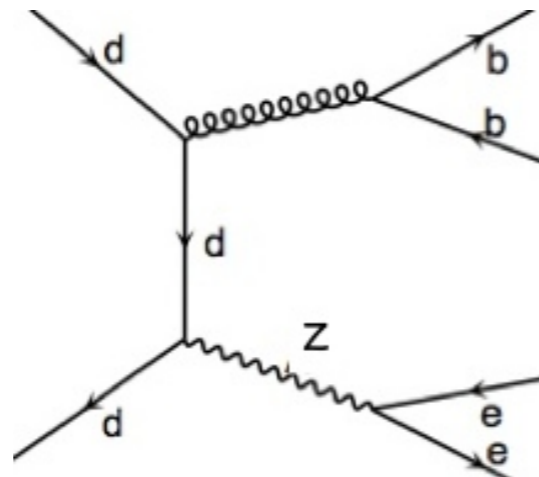
**angle between the 2 B hadrons produced with a Z boson**

$$\Delta R(B, B) = \sqrt{\Delta\eta^2 + \Delta\phi^2}$$



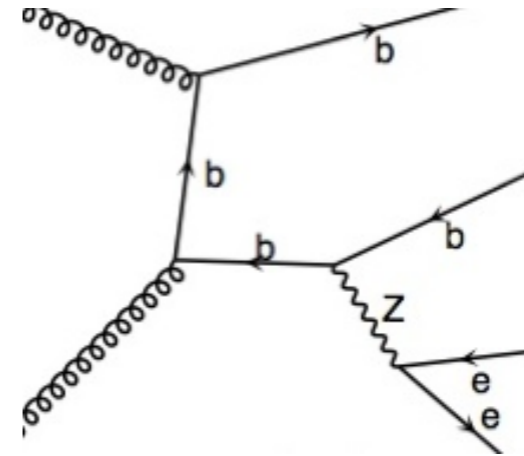
**b quark fusion**  
mostly back-to-back

+



**gluon splitting**  
mostly collinear

+



**Z radiation**

+

**Multi Parton Interactions**

- test of understanding of QCD processes
- background of many Higgs and BSM searches

## leptons

Z reconstruction in muon and electron decays

## B hadrons

(identification with Inclusive Vertex Finder)



### $\Delta R(B,B)$ differential cross-section

$$\frac{(N_i^{\text{data}} - N_i^{\text{ttbar}}) \cdot P_i}{\epsilon_i^B \cdot \epsilon_i^l \cdot A^l}$$



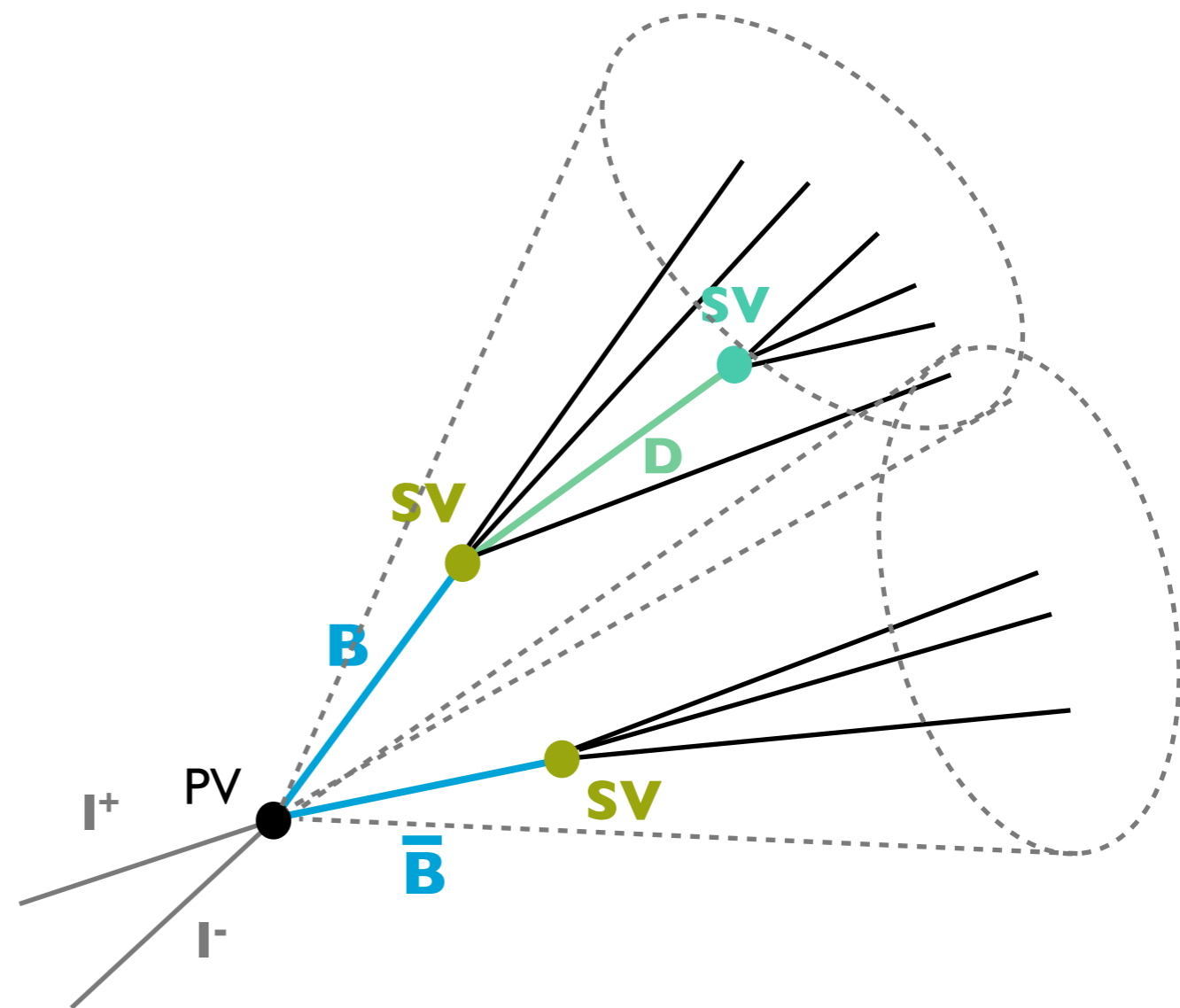
**control of backgrounds**  
(top quark events)

## Inclusive Vertex Finder

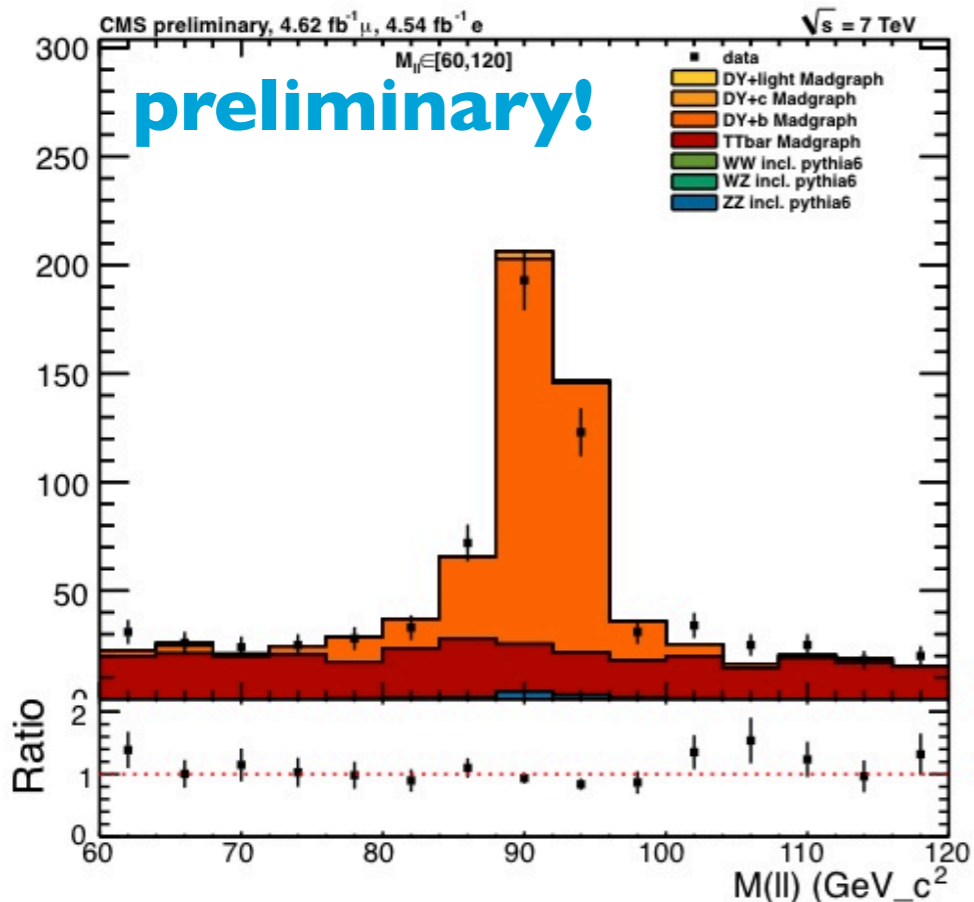
as b-identification algorithm

NO JETS!

1. select displaced track as seed
2. cluster additional tracks to build a secondary vertex
3. identify and merge SV produced from sequential  $B \rightarrow D$  decays (flight direction, invariant mass...)



- sensitivity to configurations with very collinear B pairs
- high resolution in reconstructing the angle  $\Delta R \sim 0.02$

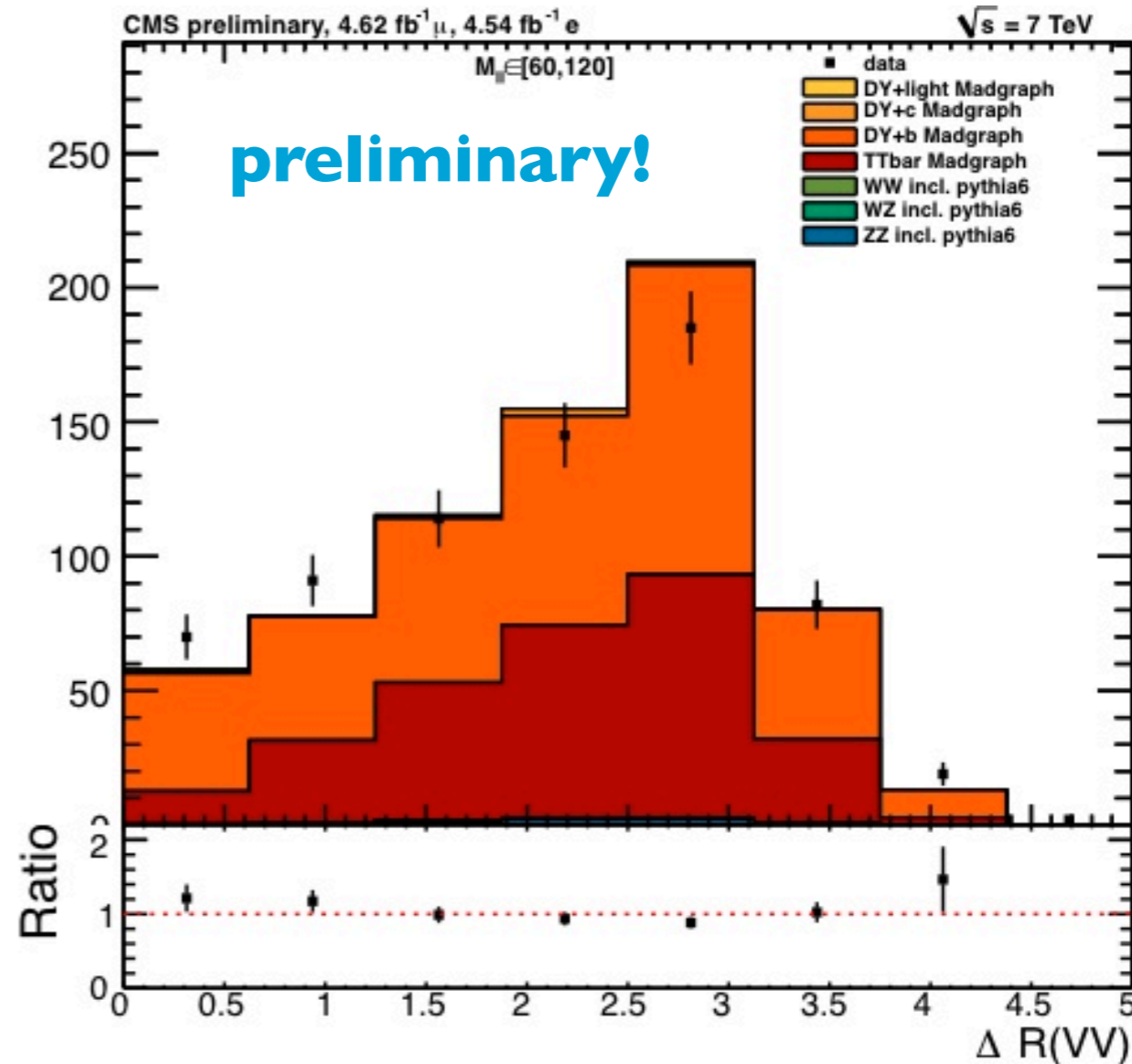


## Z reconstruction

muons and electrons combined  
 events with 2 B hadrons

full 2011 LHC collisions dataset  
**4.5 fb<sup>-1</sup>**

## $\Delta R(B, B)$



## corrections to hadron level:

### leptons

- reconstruction and selection efficiency
- acceptance

### B identification

- B-identification efficiency
- charm contamination (high purity working point)

### backgrounds

- top background rejection (50% after all selections)

good resolution:  
no need to unfold

+  
**estimation of  
contribution from  
Multi Parton  
Interactions**