Few examples of large-number-of-jet events in LQ sample and their origin

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Note

- Export generated particles and visualize the structure – see accompanying files
- Plot pt in eta-phi bins, identify jets and try to find the origin of the jets
- In the following pages the z axis is total pt of final particles in the bin (bin size is arbitrary)
- Circles are the reconstructed jets (above 50 GeV)
- D6T, 350GeV, CMSSW 3.11.0, gen-level only
- I ran GEN-only jobs to accumulate large statistics fast, so there is no SIM/RECO information available...

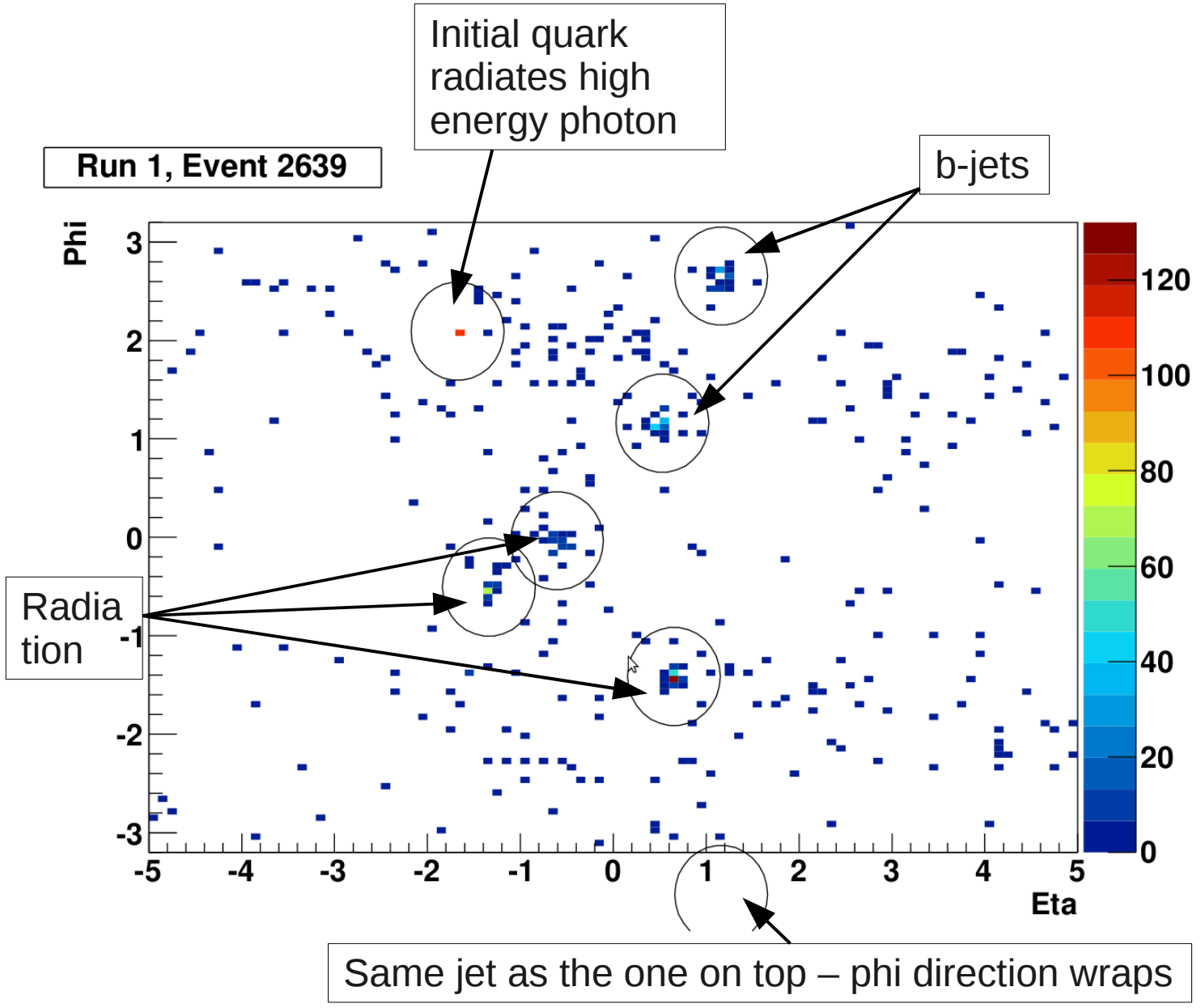
Note

- In the accompanying file, all particles above 25 GeV (energy) is exported.
- Number ignored (small energy) direct children is shown in one of the “Ignored X particles” sub-node.
- If particle PT is greater than 30GeV, the node is a box instead of circle.

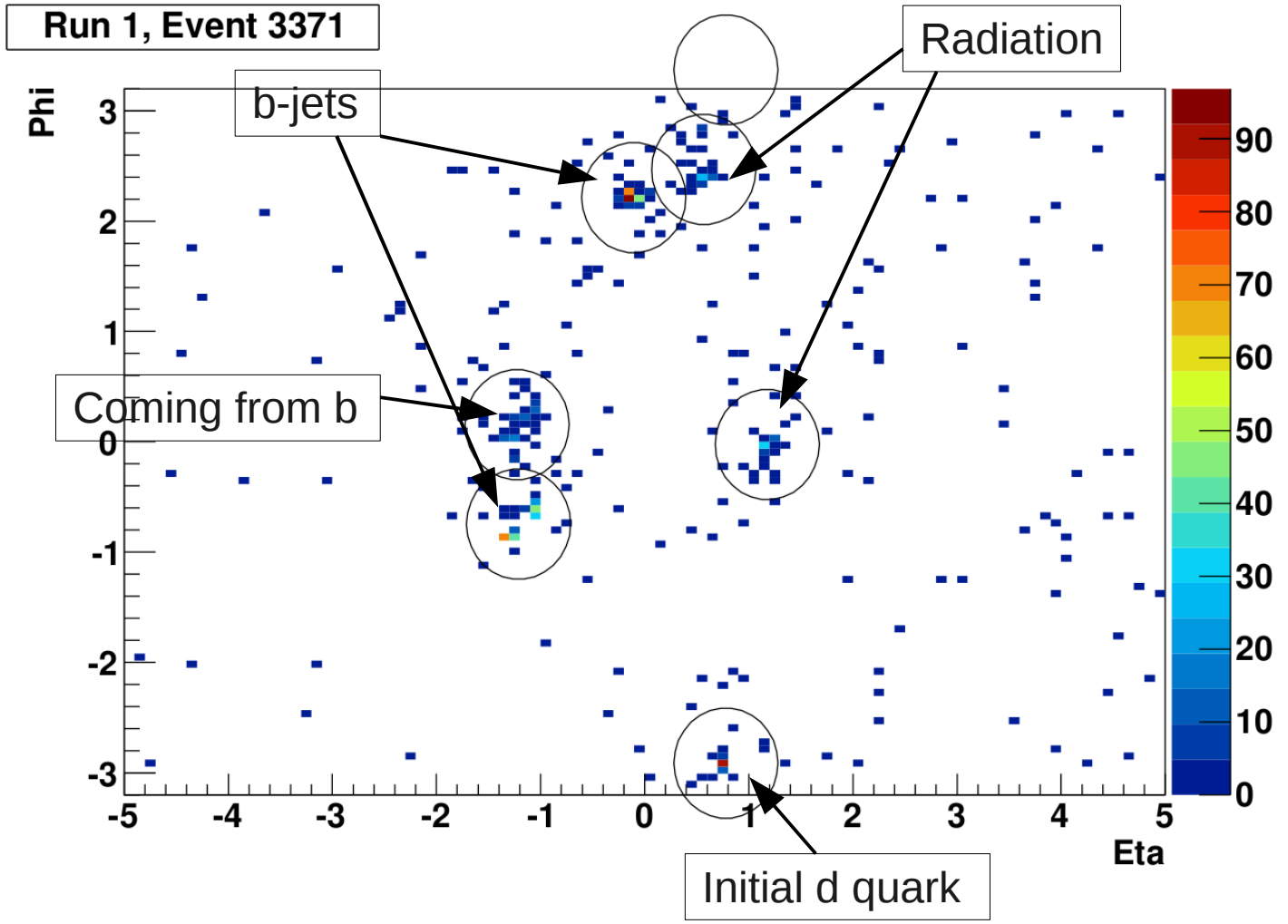
Note

- Terms definition
  - “b-jets”: b from LQ. Follow b-meson and find the direction
  - “Radiation”: gluon radiation. Gluons radiated by quarks early on that's not directly related to the hard interaction
  - “Initial quark”: in case of LQ pair from gg, the quark that radiates the gluon to participate in the hard interaction
  - “Remnant of b”: when b quark/meson (from LQ) radiate a gluon which then becomes a jet that's somewhat away, and got clustered into a second jet

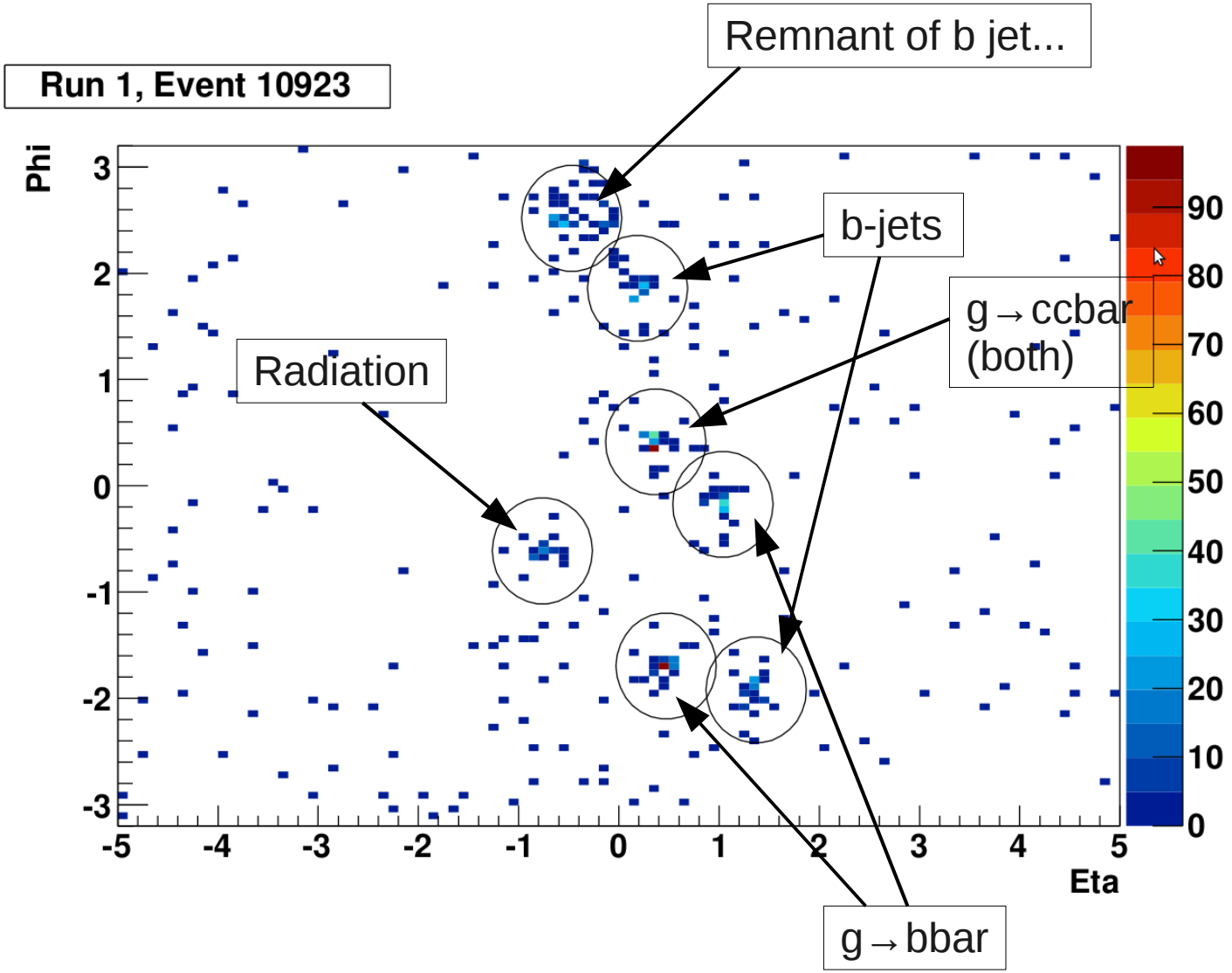
Event 2639, LQ from gg



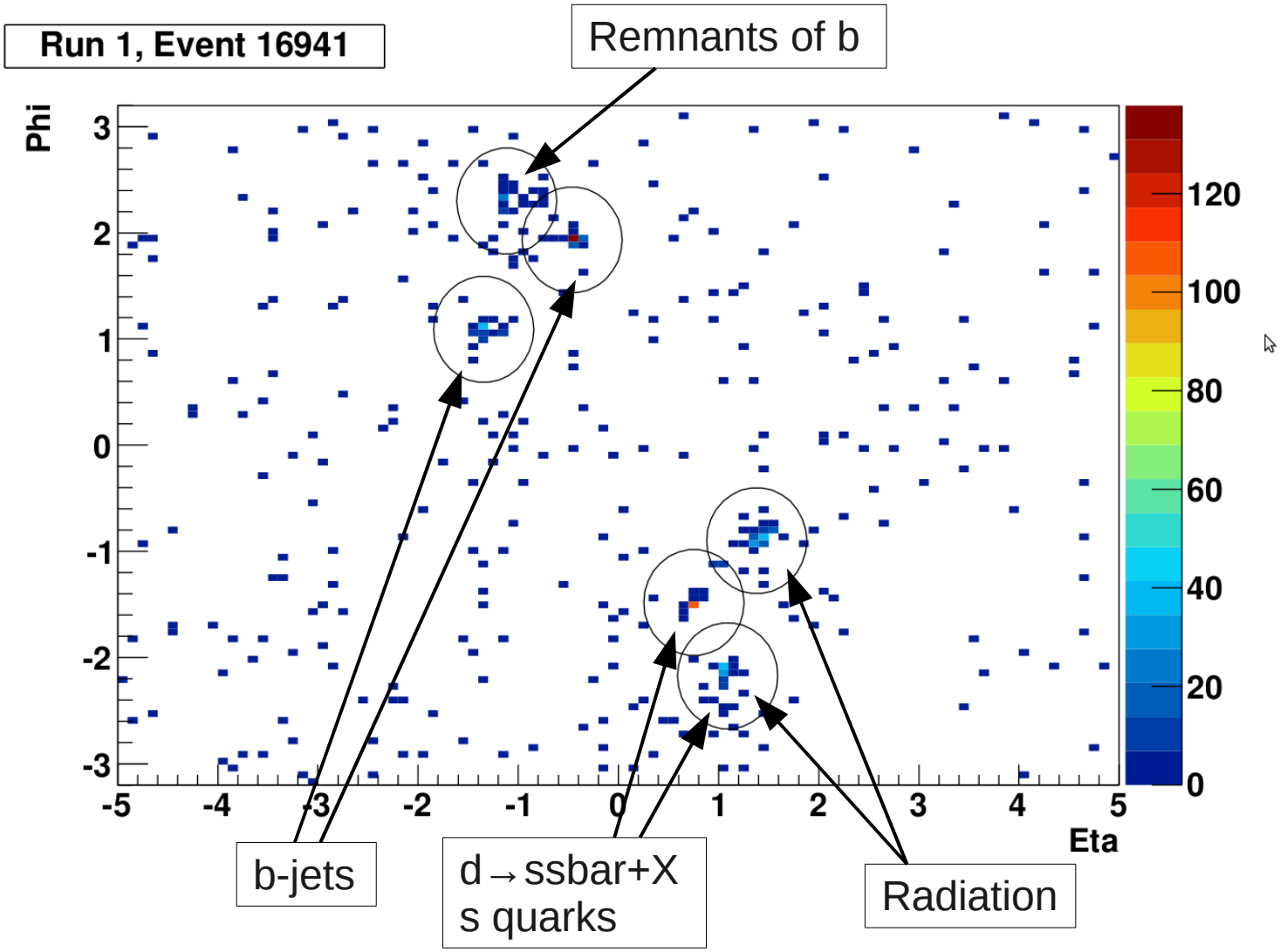
Event 3371, LQ from gg



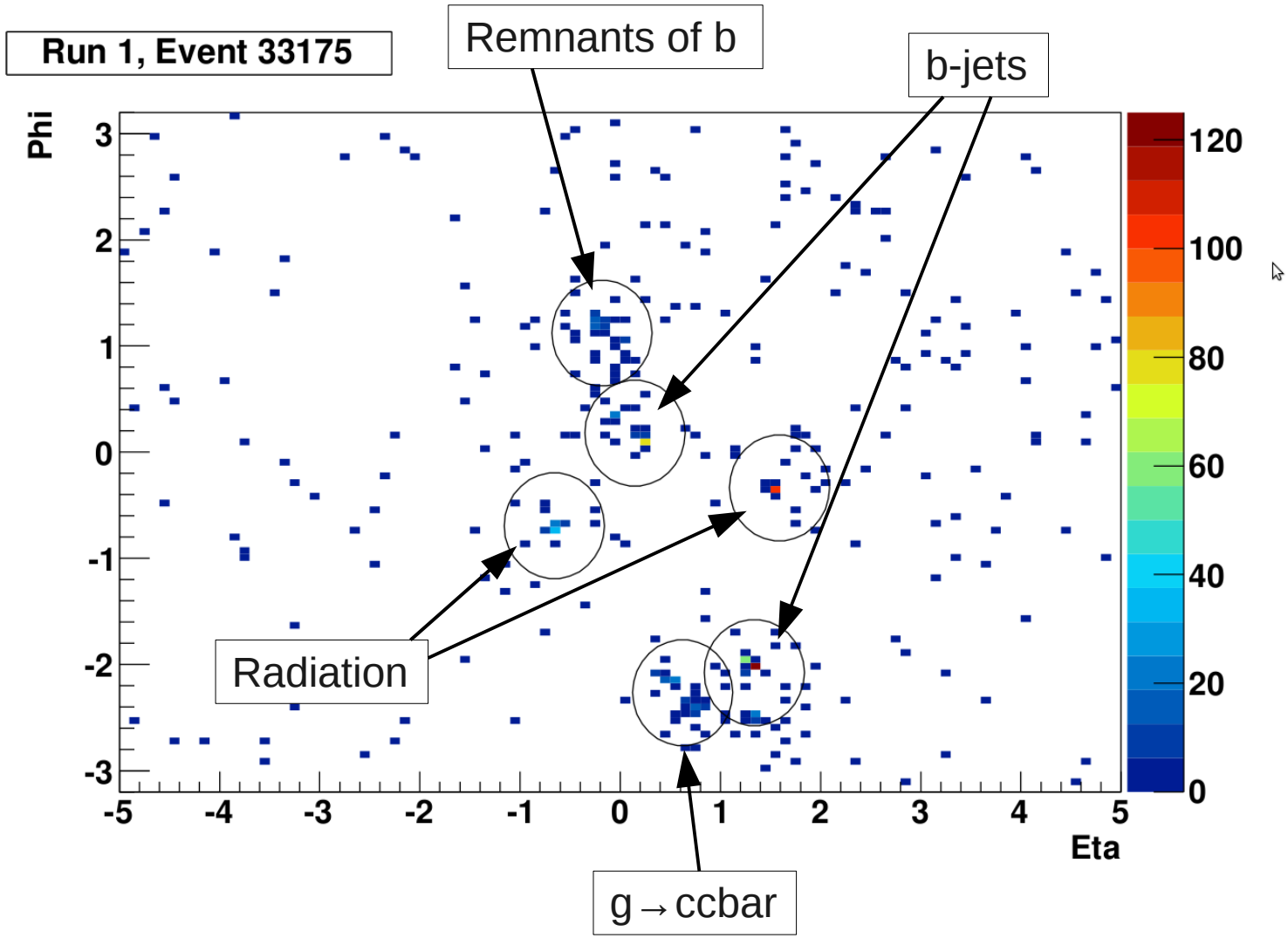
Event 10923, LQ from gg



Event 16941, LQ from gg



Event 33175, LQ from gg



Remarks

- The “remnant of b” jets explains the rise close to zero in the gen-jet-pt/b-quark-pt histogram
- The rest mostly come from gluon radiation (or qqbar production) that's independent of the hard interaction
- Sometimes the initial parton will leave a jet
- Why does TEllipse draw outside of frame?
- I have hundreds of examples if you want more