Status of Alignment Technical Triggers

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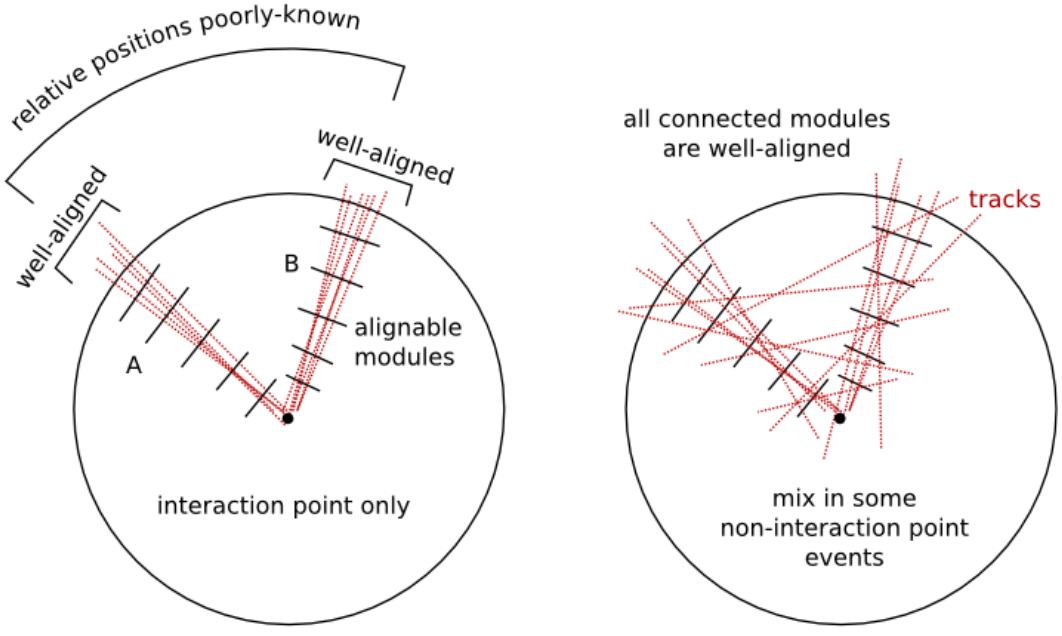
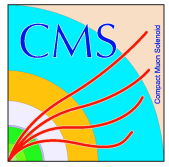
Context

- Non-collisions data like cosmic rays and beam-halo are absolutely essential to alignment: we need tracks with a diverse kinematic distribution



- Alignment technical triggers guarantee that we will get cosmics and beam-halo, even during high-luminosity collisions runs
- However, this year we will have a lot of non-collisions data runs with wide-open triggers

History

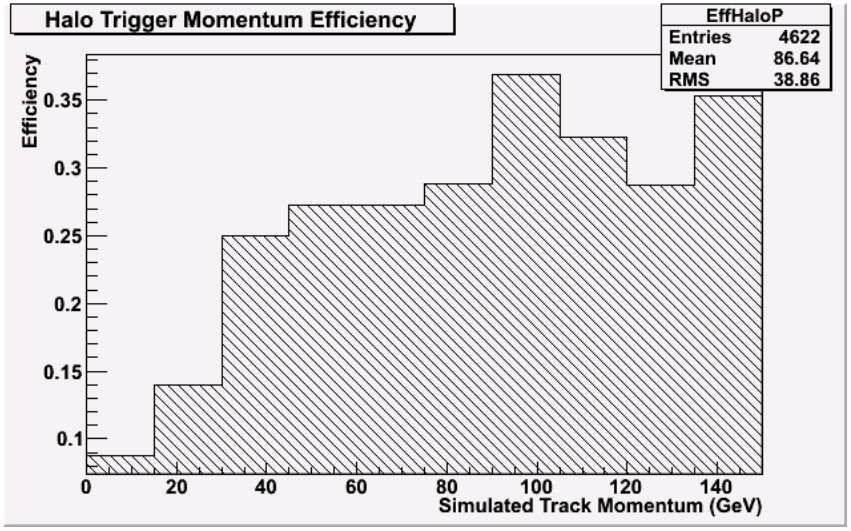


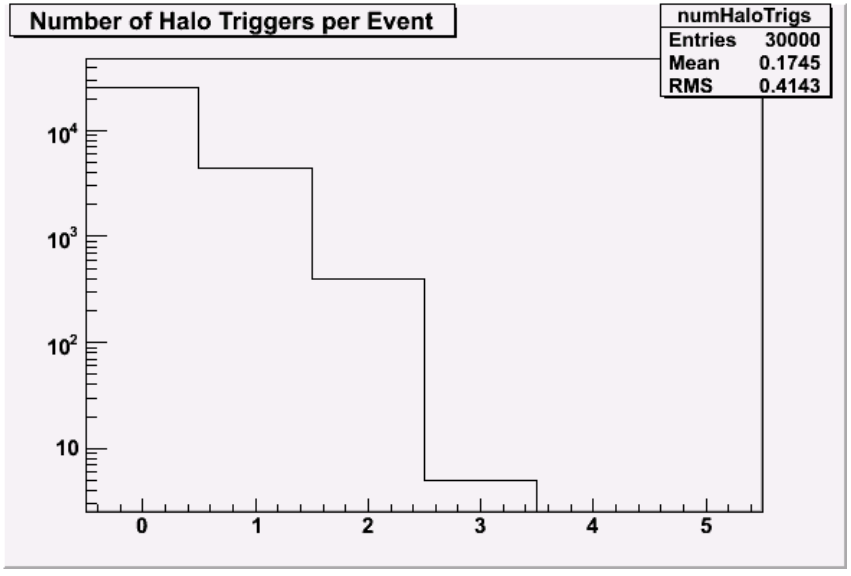
- 2_0_0 release deadline: I couldn't find anyone to implement these HLT paths, so I did it because it didn't look too hard
- Release validation is a long-term commitment— we needed to find people who can dedicate the time
  - CSC beam-halo trigger: Joe Gartner (wrote L1 emulator, doing physics studies with beam-halo events)
  - tracker beam-halo BSC: no one formally assigned, though Andrea Parenti is doing tracker alignment studies with beam-halo
  - tracker cosmic rays: no one formally assigned, though Jean-Roch Vlimant has done some work on the tracker cosmics trigger paths
- Search for manpower has been raised many times in tracker DPG (more detail on subsequent slides)

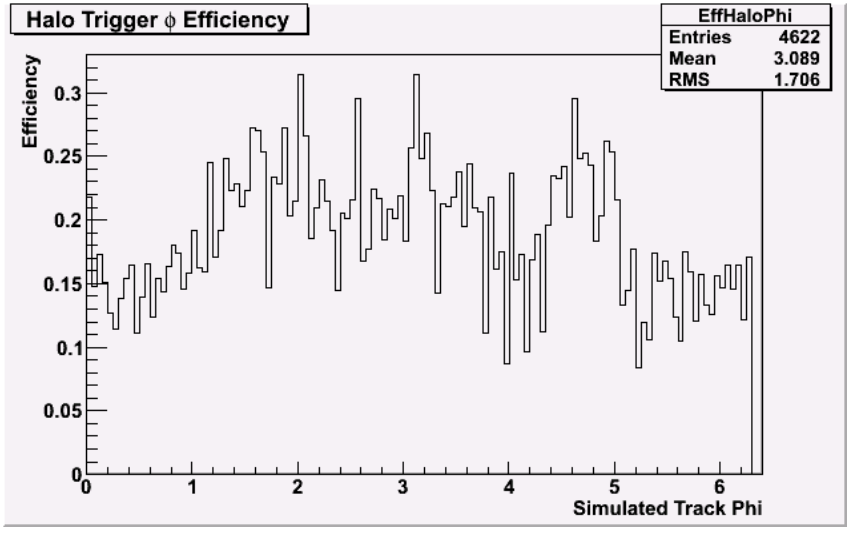
CSC beam-halo triggers

Actively studied in both data and Monte Carlo by Joe Gartner, but not yet formalized into a validation suite

- focused on commissioning real L1 trigger in CRUZET
- informally verified stable releases: 1_8_0, 2_0_7, and **2_0_11** (these plots)
- true validation suite soon







(Context: might be necessary even for dedicated beam-halo runs)

- Andrea Parenti is not formally responsible for the validation suite, but his work is the most related
- Until recently, validation work could not begin because L1 emulator did not exist
- L1 emulator added by Muriel: tested in MinBias, but not successfully in beam-halo sample
- Urgency for someone to take on this task has escalated since it is now possible to generate triggered events in MC and time is getting short for beam-halo data

Tracker cosmic rays

- Jean-Roch Vlimant is not formally responsible for the validation suite, but his work is the most related
- He has developed more advanced HLT paths; these may supercede the original HLT_TrackerCosmics
- L1 RPC technical trigger emulator code exists, but has never been published in a release
- Jean-Roch has been working on instead getting the L1 bit from a DT trigger which requires the track to point into the tracker
- His HLT paths do track-finding, require unpacking of tracker hits, may be too time-expensive to be used in collisions runs unless L1 is very selective

Conclusions

- Triggers for non-collisions events will be *more* necessary at high luminosity when we don't have dedicated non-collisions runs, but it is worthwhile getting them to work now
- CSC beam-halo path is well-covered, but until now focus hasn't been on software validation
- L1 emulator for tracker triggers was in a less advanced state, but that has changed recently
- Tracker cosmic ray triggers may be reorganized soon; HLT_TrackerCosmics might be replaced
- (Also studying Mika Huhtinen's pixel MinBias trigger for tracker. . .)
- Tracker DPG still needs to find people to maintain trigger validation in the long-term
- In no sense have these paths been forgotten about! We know software validation is important, but the people involved are stretched thin by other DPG tasks, some of which is closely related.