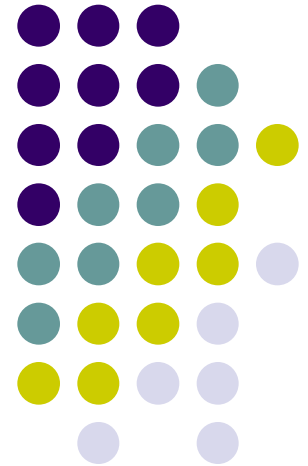


# ATLAS High Level Trigger System

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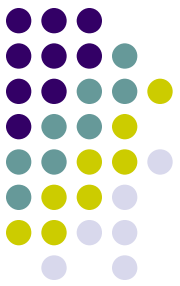
Alexander Palmer  
The University of Texas at Dallas





# Outline

- Trigger System Overview
- Level 1 Trigger
- Regions of Interest
- Level 2 Trigger
- Level 2 Seeding
- Event Filter
- Streaming
- Releases and Validation
- AthenaMT/PT
- Validation Scripts



# Outline

- Trigger System Overview
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- **Level 2 Seeding**
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# Trigger System Overview



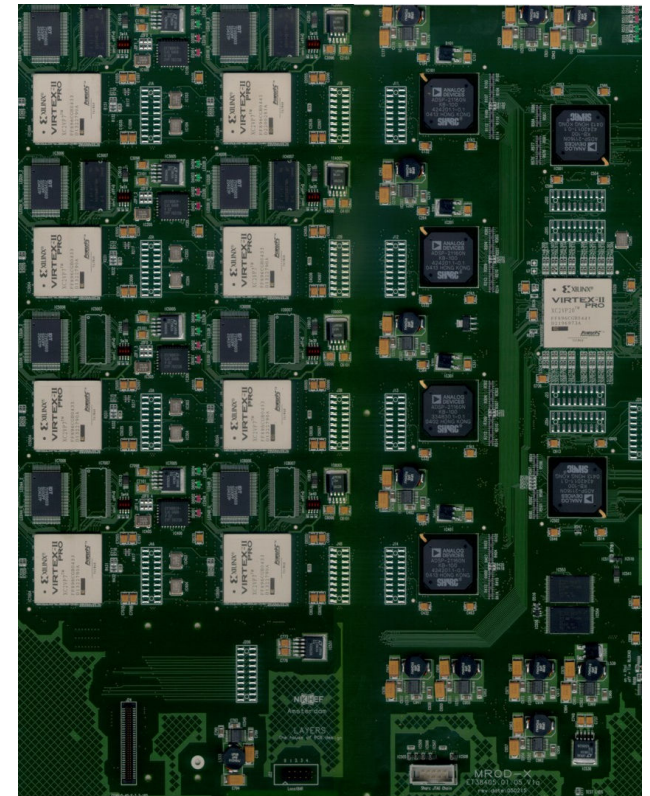
- 40 MHz bunch crossing rate
- Event write out  $\sim 100\text{Hz}$
- High rejection, high sensitivity

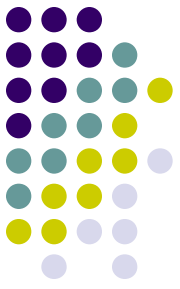




# Level 1 Trigger

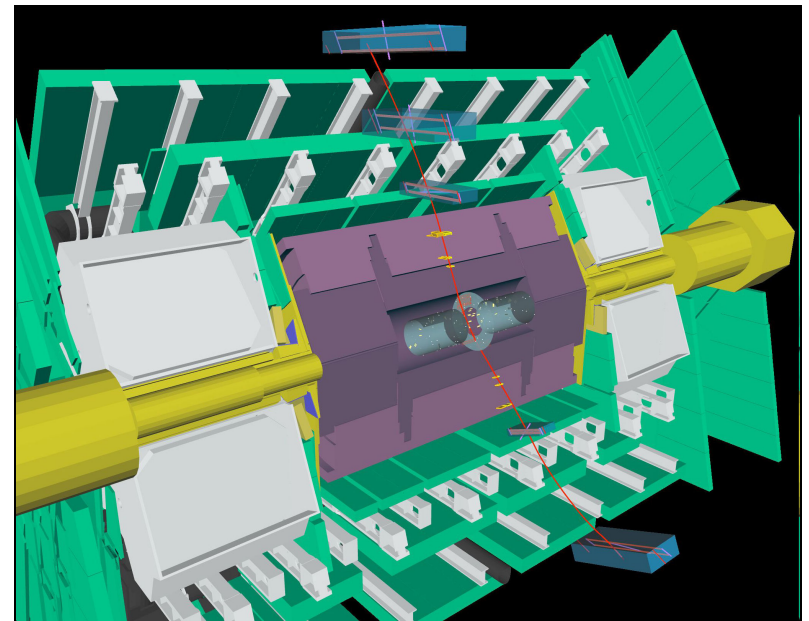
- Hardware-oriented
- 2.5 microsecond latency
- 256 parallel trigger items
- Level 1 Menu/CTPID
- 40 MHz  $\rightarrow$  75 kHz





# Regions of Interest

- ROI Builder
- Region in  $\eta$  and  $\phi$
- Single data structure
- Level 1/Level 2 Boundary





# Level 2 Trigger

- Software-oriented
- 40 ms latency
- 8 bit Trigger Type
- Chains and Sequences
- Prescaling and Passthrough
- 75 kHz  $\rightarrow$   $\sim$ 1 kHz

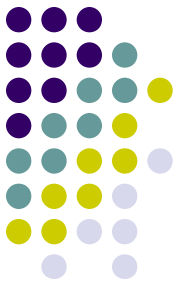


# Level 2 Seeding

- L1 Item and Rol
- Random Chain
- Unseeded Chains
- Trigger Type Seeding







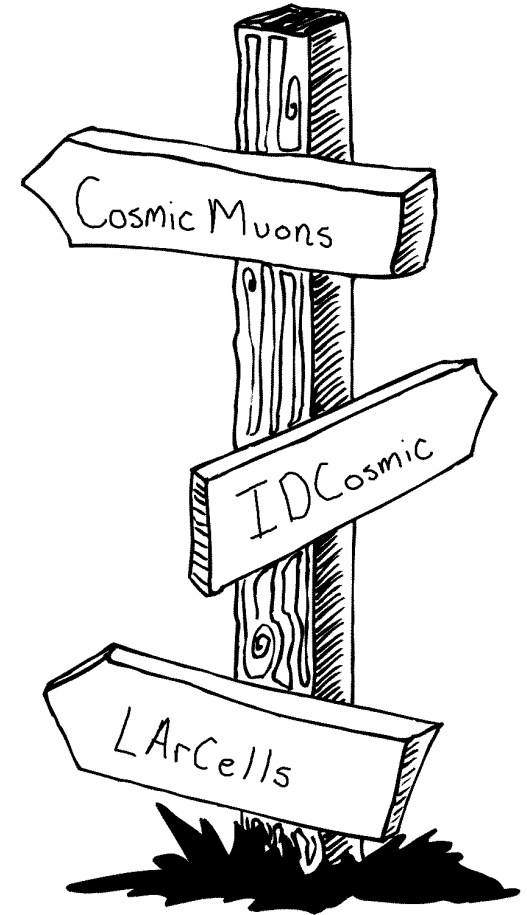
# Event Filter

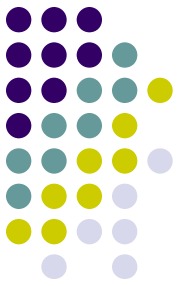
- Software-oriented
- 1 second latency
- Offline Algorithms
- Event Builder
- 1 to 1 with Level 2
- 1 kHz  $\rightarrow$  100 Hz



# Streaming

- Groups of HLTs
- Duplicate events
- Stream Classification in EF





# Releases and Validation

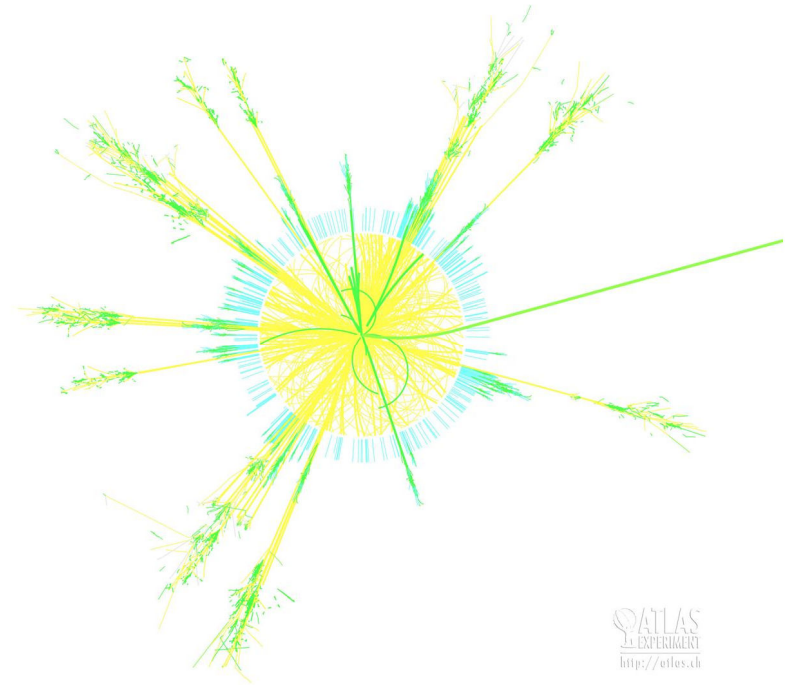
- Reconstruction Algorithms
- Level 1 Menu
- HLT Steering
- Newer = Better?



# AthenaMT/PT



- Athena Framework
- Online Emulation
- MT = Level 2
- PT = Event Filter





# Validation Scripts

- Test Release Setup
- Package Checkout
- AthenaMT/PT
- Streaming Check
- Signature Acceptance Check

CosmicsAllTeTRTxK\_TRTTrkHypo

30 / 98 :

(121416, 335544357)

(121416, 1207959811)

(121416, 83886110)

(121416, 2432696606)

(121416, 2566914067)

(121416, 301989914)

(121416, 922747154)

(121416, 335544588)

(121416, 335544371)

# Acknowledgements



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