

PIONEER trigger

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PIONEER Collaboration

Rare Pion Decay Workshop

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Physics triggers

Physics trigger decisions:

triggers	prescale	range	rate	CALO			ATAR digitizer			ATAR high thres	
				TR(ns)	chan	MB/s	ΔT (ns)	chan	MB/s	chan	MB/s
PI	1000	-300,700	0.3	200	1000	120	30	66	2.4	20	0.012
CaloH	1	-300,700	0.1	200	1000	40	30	66	0.8	20	0.004
TRACK	50	-300,700	3.4	200	1000	1360	30	66	27	20	0.014
PROMPT	1	2,32	5	200	1000	2000	30	66	40	20	0.2

- PI: Minimum Bias
- CaloH: Calo energy deposition > threshold
- TRACK: e^+ signal in tracker
- PROMPT: TRACK in small time window

All require timing signal from incoming pion

Other triggers

More triggers will be necessary for:

- commissioning
- characterization
- calibration

Other triggers

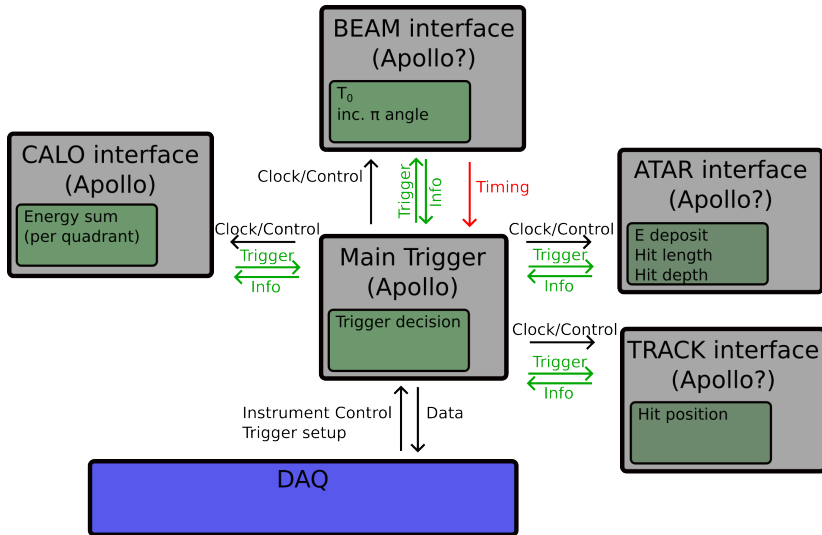
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Examples:

- cosmics
- alignment from beam
- ATAR tracks
- TOF w.r.t. PSI acc RF
- ...

Trigger Hardware Scheme



Hardware plans

- Hardware platform: Apollo board (dev. for LHC trigg.)
- Main trigger Apollo collects trig info, makes decision
- Individual sub detectors collect relevant info in Apollos
- Unified communication scheme between sub detectors and main trigger
- Every sub detector can be source for trigger decisions

Summary

- PIONEER needs high trigger flexibility
- Unified trigger architecture for all sub detectors
- Based on Apollo boards developed specifically for trigger tasks

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Thank you for your attention!