DCC and Trigger Readout of SDC Straw Tube Tracker

- Introduction
- Overview of Proposed DCC
- Functionality of Tracking Trigger & Readout
- Proposed Layout of Trigger Readout

Introduction

Conceptual baseline design for DCC system now exists

- ASD's reside on separate cards
- Signals from each module routed to μcrate
- Data link from each μcrate to Crate Interface Card (CIC)
- 8 μcrates / CIC and 12 CIC's / SDC DAQ Crate
- 2 DAQ Interfaces / DAQ Crate

Trigger data readout has remained open question

- Considered using DCC as datapath
  - incompatible with L1 trigger data readout
  - difficult to integrate into data-driven design
- Assumed independent data paths for L1 & L2 through CIC

$\boxed{\text{L1 and L2 Tracking Triggers}}$

Assumed each axial module instrumented with Mean Timers

- Will give at least two Pt thresholds
- 60 MHz, synchronous with beam crossings
- Spatial resolution of ~ 1 wire diameter

For L1, only require coarse information:

- Baseline requires ~ 64 azimuthal segments
- Acheived by sending "OR" of Pt bits over whole module
- Gives $\Delta\phi \sim 2\pi/200$ for outer layer

For L2, require most resolution:

- Location of segment to with a wire
- ~ 27 possible locations
- Sent out at L1 trigger rate

Implementation of Trigger Readout

Send trigger signals from each μcrate board to interface card

- ~ 27 signals to chip on interface board
- latch trigger data at each crossing
- form "OR" and generate 2 bits of L1 data
- Store bits for L1 decision
- Transmit all data for L2 trigger

Requires:

- Dedicated 120 Mbit channel from ~ 700 modules
- 10 Mbit/s data path (Cu?) for L2 data

Data sent to CIC where it is multiplexed

- $\Rightarrow$ 96 1 Gbit/s fibre-optic L1 inputs
- $\Rightarrow$ 96 80 Mbit/s L2 inputs