SoLiD/PVDIS DAQ

Alexandre Camsonne
DAQ limitations

L1
- GEM multiplexed readout 40 MHz: transfer from APV25 to VME board
  - 141 words to transfer from APV to VME (128 channels + time stamp and header)
  - $141 \times 25 \text{ ns} = 3.6 \text{ us} \rightarrow 270 \text{ KHz limit}$
  - For 3 samples readout: $10.8 \text{ us} \rightarrow 90 \text{ KHz limit}$
- Crate transfer 115 Mb/s: VME 320 limitation
- Network speed: 115 MB/s for 1 ethernet line
- Need to generate trigger in less than pipeline length 4 us

L3
- Disk write speed: 250 MB/s
- Total amount of data

Can be improved at money cost: faster GEM chip, add more crates
**FADC mode and event size**

- **FADC in amplitude time mode:**
  - 1 pulse integral and 1 time on 16 bit word
  - Channel timestamp
  - 2 32 bit word

- **FADC Sample mode**
  - Send n samples
  - n/2 32 bit words + header and trailer
PVDIS trigger
HPS scheme

Start Frame 32 ns

17 bits \(\sum\) 
13 bits word + 3 bits time in frame

17 bits \(\sum\) 
13 bits word + 3 bits time in frame

17 bits \(\sum\) 
13 bits word + 3 bits time in frame

17 bits \(\sum\) 
13 bits word + 3 bits time in frame

Do for all 16 FADC channels

Send 2 channels to CTP in one 32 bit word every 4 ns @ 8 Gbps
Calorimeter sector

R270.0
PVDIS trigger improvement

Expensive version: add SSP