

LCIO RawCalorimeterHit discussion

AHCAL (SPIROC + KLauS) subsystem usage

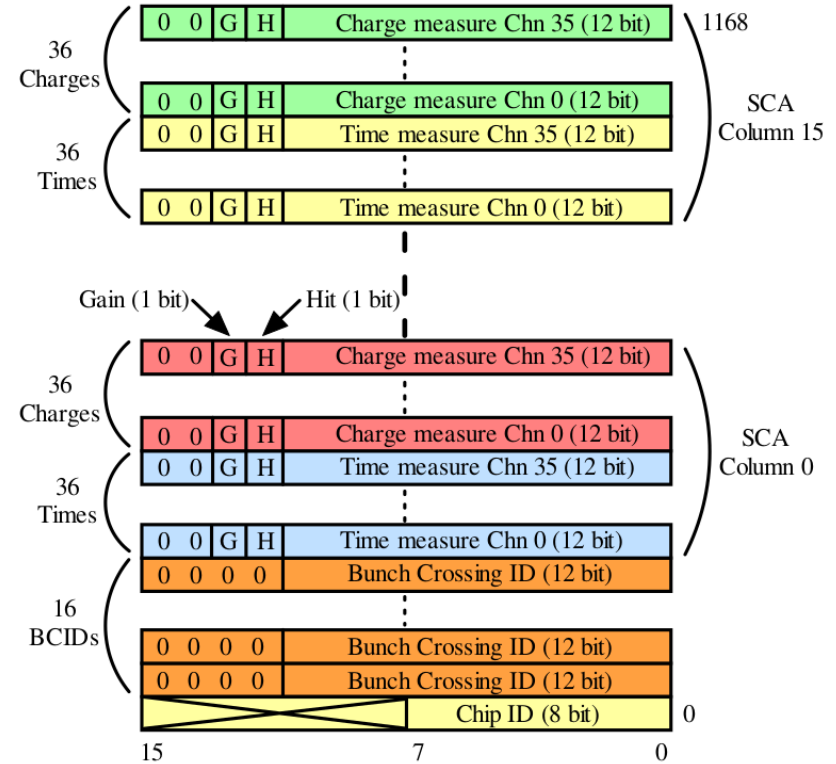
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Stored information – SPIROC

- SPIROC designed for short spill (~1-16 ms) operation with acquisition, conversion and “slow” readout phase
- SPIROC packet:
 - **ChipID** (8bits)
 - List of **BXIDs** (16 bits each, 1~16 memory cells)
 - **36 * ADC** (12 bits +gain bit +hit bit) * memory cells
 - **36 * TDC** (12 bits +gain bit +hit bit) * memory cells
- DIF:
 - **DIF_ID** (16 bits)
 - ASIC readout chain, ASIC Index
- LDA:
 - **Readout Cycle number**
 - **LDA number, Port number**
- LDA separate stream:
 - Timestamps (start, stop, trigger)
 - Trigger number (counting or fetched from TLU)

aggregation



LCIO events

- Different event building (in Eudaq) → different LCIO:
 - Complete readout cycle,
 - same BXID,
 - triggered BXID
- Collections:
 - **EUDAQDataLDATS**
 - Timestamps (25 ns bins): Acq start (64 bits), stop (64 bits), triggers (64bits each)
 - **EUDAQDataScCAL** – array(s) of integers (32 bits)
 - **i:CycleNr** – cycle number
 - **i:BunchXID** – BXID (12 or 16 bits)
 - **i:EvtNr** – memory cell (essential for calibration)
 - **i:ChipID** – defined by slowcontrol for each SPIROC (8bits) + (DIF_ID << 8)
 - **i:Nchannels** – number of channels – used to get the following arrays
 - **i:TDC14bit[NC]**
 - **i:ADC14bits[NC]**
 - TempSensor, SlowControl, LEDinfo, HVAdjInfo, ASICStopData
- **DAQquality** parameter of the collection – indicates a “good” and complete event

Stored information - KLauS

- Two operation mode: “**spilled/pulsed**” and **continuous**
- Up to 700 individual hits buffered stored – single channel only (unlike SPIROC, which fills complete SCA row with 36 channels)
- KLauS (DIF) readout packet:
 - **Chip ID**
 - Up to 700 KLauS hits
- KLauS hit information (6 bytes packets) from one ASIC
 - **Channel ID** – 36 channels
 - **ADC** – 12 bits, converted on the fly
 - **TDC** – digital clock counter from the start. 16++ bits (more for KLauS6)
 - **Gain selection flags**
- Data is readout via I2C – shared readout bus for all asics
- Spilled mode: hits accepted only during acquisition window, ASICs readout at the end
 - → **BXID** is only a reconstructed information from TDC using a fixed offset to SPIROC's BXID0
- Continuous mode: hits read out continuously
 - TDC counter is continuously counting (and overrunning)

Additional LCIO parameters

- **Timestamp** [ns] – unixtime, rounded to nearest second
- **DaqErrorStatus**
- **TimestampBegin, TimestampEnd** – meaning depends on event building
 - Start + stop of readout cycle, or
 - Start + stop of a BXID, or
 - Trigger timestamp
- **TriggerNumber** – when building triggered events