

LArIAT DAQ Recent Updates



- Released v01_01_08 or v01_01_08_off (for offline use)
- Added XML configuration file to beginning of data stream

```
struct LariatConfig
{
    uint32_t fragmentSize;
    uint32_t fragmentType;
    char    * xml;
};
```

- Full copy of all config files, verbatim in `char *xml` buffer
- Every spill file, only small increase in size; ensures we never lose the information[s]

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- Added SpillTrailer at the end of the data stream

```
struct SpillTrailer
{
    uint32_t fragmentSize;
    uint32_t fragmentType;
    uint32_t runNumber;
    uint32_t spillNumber;
    uint32_t timeStamp;
    double   spillSnapshot; // In milliseconds, time of MidSpill snapshot
    double   spillOffset;   // In seconds, normally 2.000 (msec least count)
    // To get time of $21, spillTime=spillSnap-( spillOffset * 1000.0) in milliseconds
    int spillV1740; // Count of 1740 triggers during spill
    int spillV1751; // Count of 1751 triggers during spill
    int countV1740; // 1740 cumulative during run
    int countV1751; // 1751 cumulative during run
};
```

- spillSnapshot may be used as “primary key” for IFbeam db queries
- Example URL, fetches recent \$21 events:

<http://ifb-data.fnal.gov:8100/ifbeam/data/data?e=e,21&v=G:E21SNC&tz=&t0=-1m&t1=now&f=xml>

- NB: XML support may be unstable, may change to CSV

LArIAT DAQ Status Update



- Wire Chamber Timing Drift – simple math check:
- Primary internal clock: 53.104 MHz \Rightarrow 18.83 ns period
- Estimate \sim 25 ppm jitter (Sten Hansen) \Rightarrow 0.47 ps period jitter
- Over one second we have 53.104 million clock ticks
 \Rightarrow \sim 25 μ s possible drift over one second
- Observed \sim 28.8 μ s drift per second (see next slide from Johnny)
 - \therefore We live with it
- With a PLL to the Accelerator clock, uncertainty and drift may improve
 - Caveat the RF frequency changes during ramp, and lock is lost
- Warning from Sten: The trigger timing is “quantized” at 10 nsec
 - Would this cause us problems? May not cause drift, but would effect accuracy of coarse time
 - Yes, we don’t know exact arrival time of trigger
 - Mistake in firmware could be fixed if desired, to 1 tick (1.18 ns)
 - We have to ask if we want this fixed

Spill Drift Over One run – ~30 minutes (Johnny)

