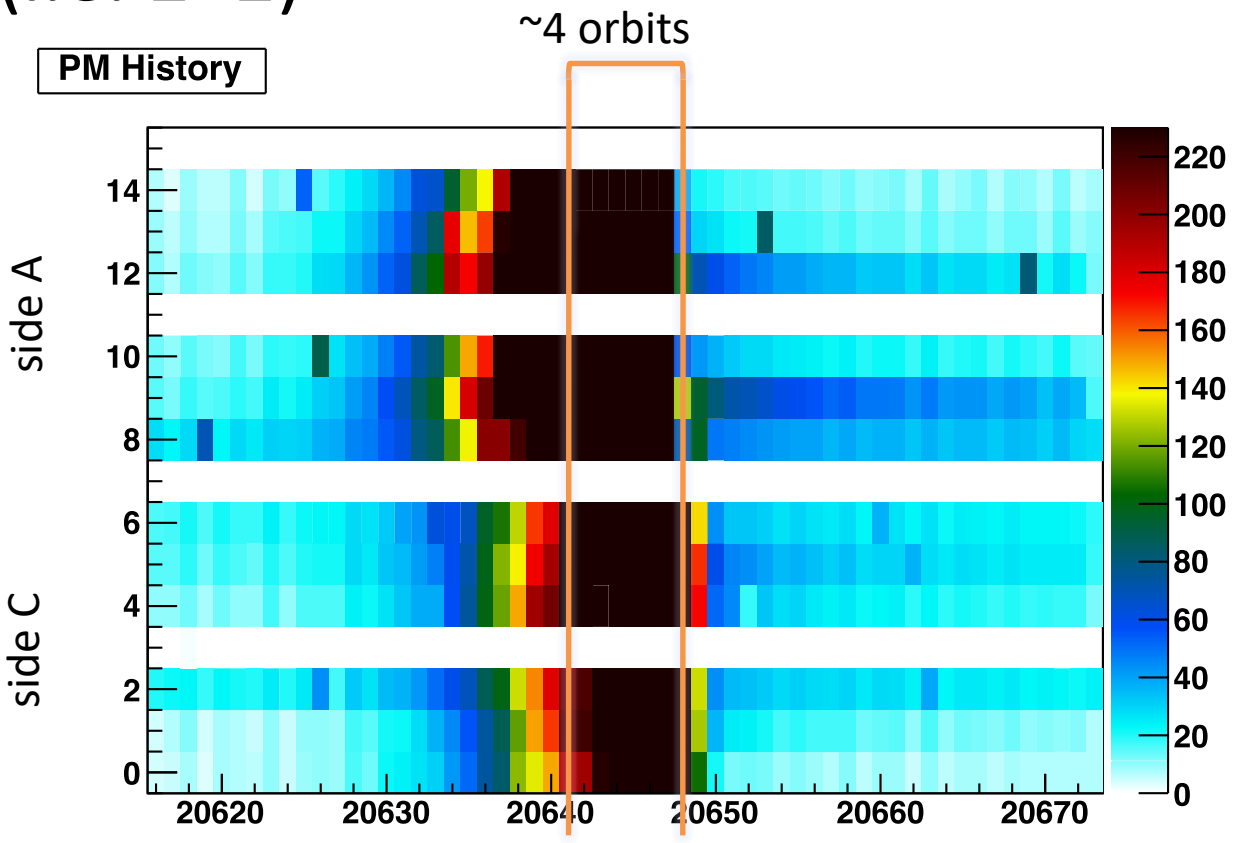
ATLAS July 31st, 2011 BLM Beam Abort Report

Beam Dump

- ATLAS BLM (Beam Loss Monitor)
- BCM (Beam Conditions Monitor)
- Beam was dumped on Sunday (31-07-2011)morning at 6:47 am.
- Spike was seen on all BLM channels and also in the beam 2 rates for BCM.

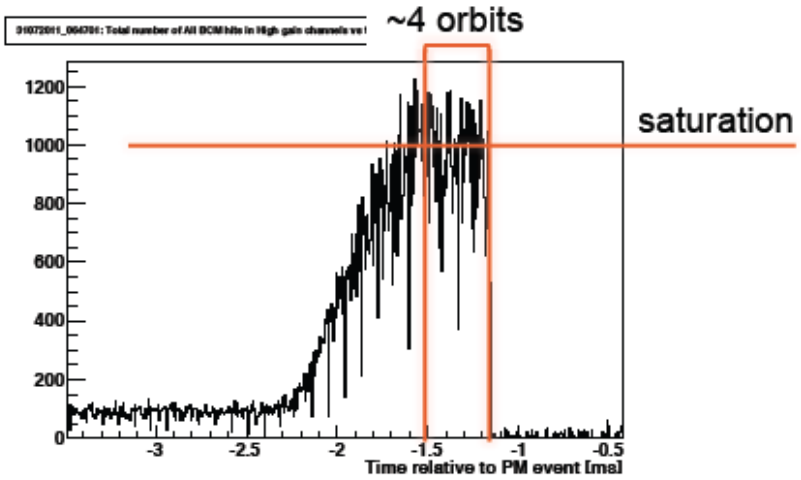
Abort Threshold

- 230 hits on both sides and simultaneous in 2 channels (i.e. 2+2)

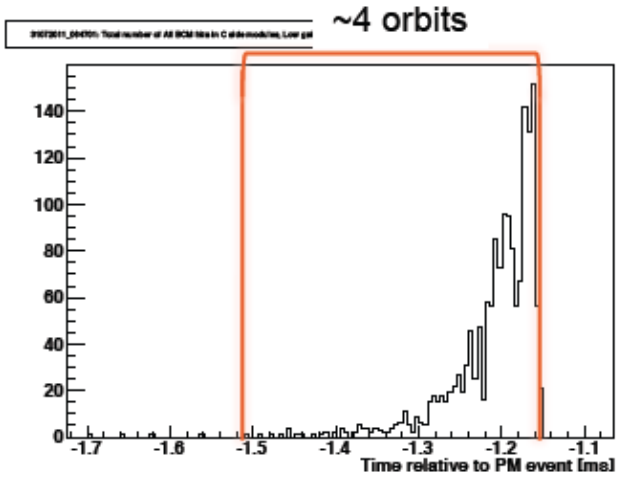


BCM PM Buffer

- High gain channels – saturate at ~1k in 5μs bin

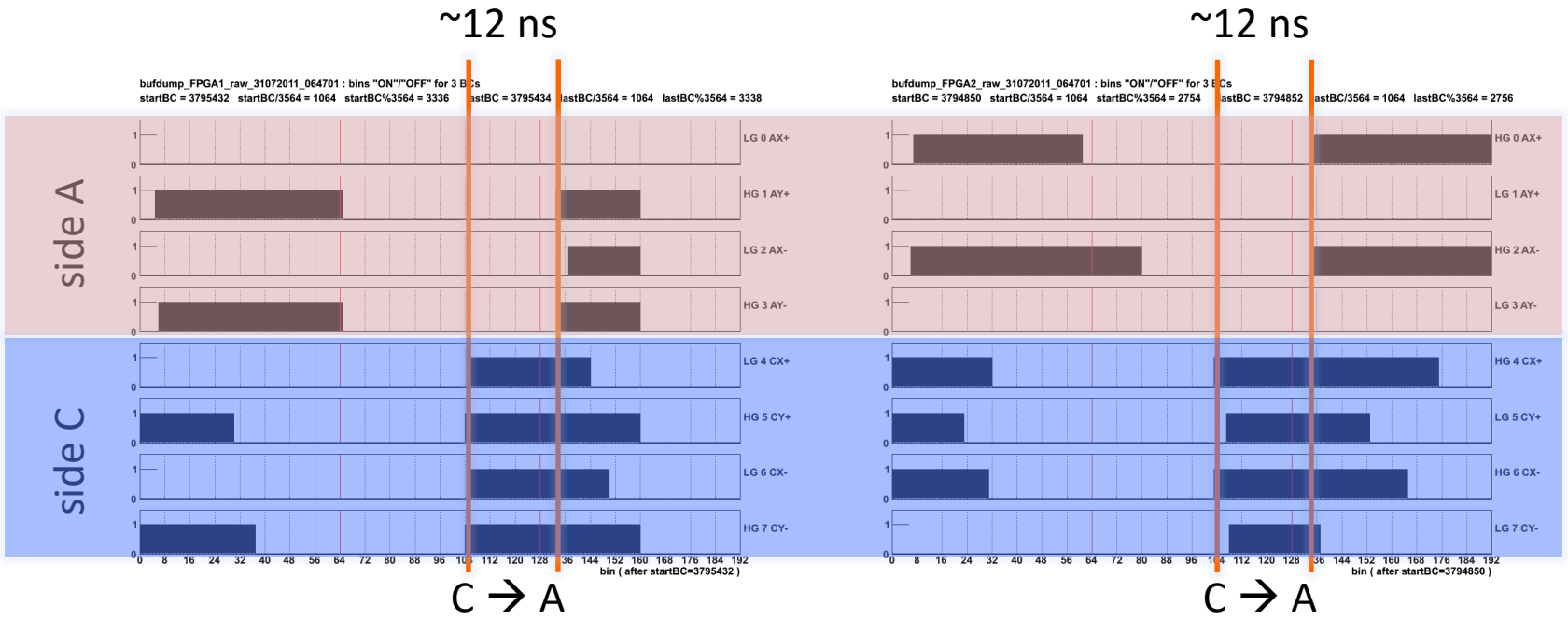


- Low gain channels – far from saturation but substantial signal which looks to be exponentially increasing before beams were extracted (~140/1k).



BCM Timing

- It appears that most events correspond to C->A (beam 2).

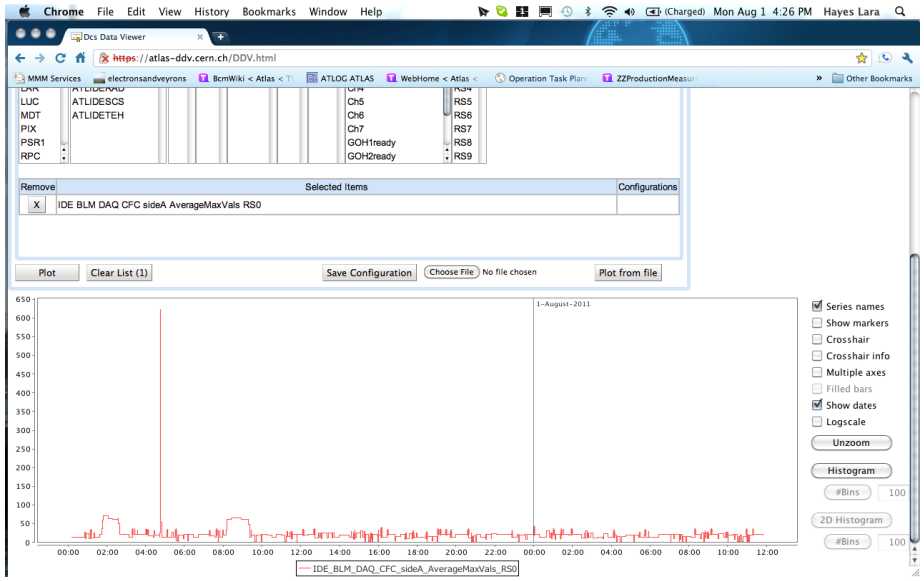


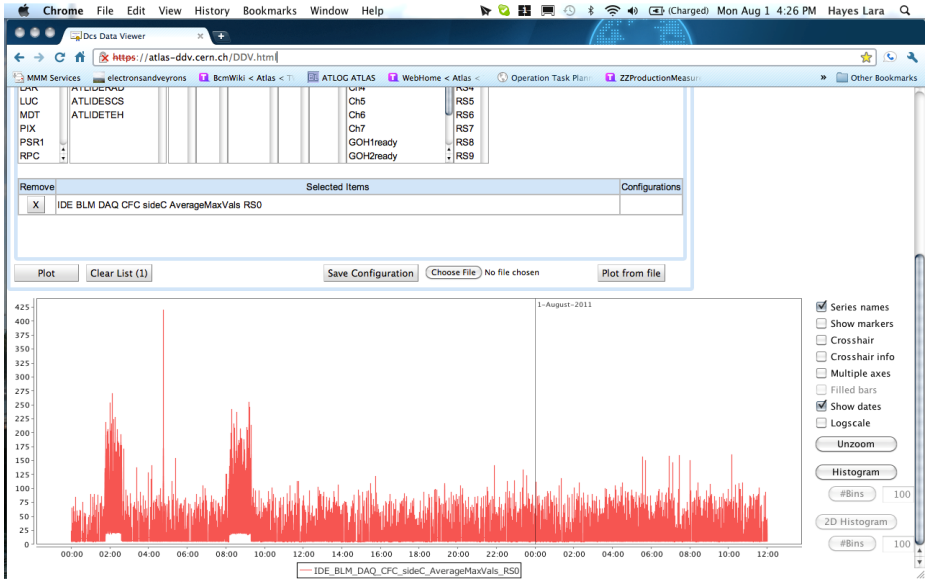
Extra Slides
BLM Threshold

- For loosing IP require that 2/6 channels exceed threshold within 40 μs on A or on C side. BP is lost when A and C side lower IP simultaneously
- 1 MIP in BLM diamond sensor (~1fC charge) in 40 μs causes equivalent current of ~25 pA.
- BLM thresholds set to:
  - ~500 nA (= 230 bits) in 40 μs integration channels.
  - 230 bits → **37 kMIP/cm^2** within 40 μs
  - In addition requiring 2 out of 6 channels to meet this condition within 40 μs either on A or on C side to drop IP.
  - And in addition requiring this on both (A and C) sides simultaneously to drop BP.
- SCT remains on at low voltage during beam adjust.
  - BLM threshold motivated by SCT occupancy damage threshold.
  - doi:10.1016/j.nima.2006.04.086

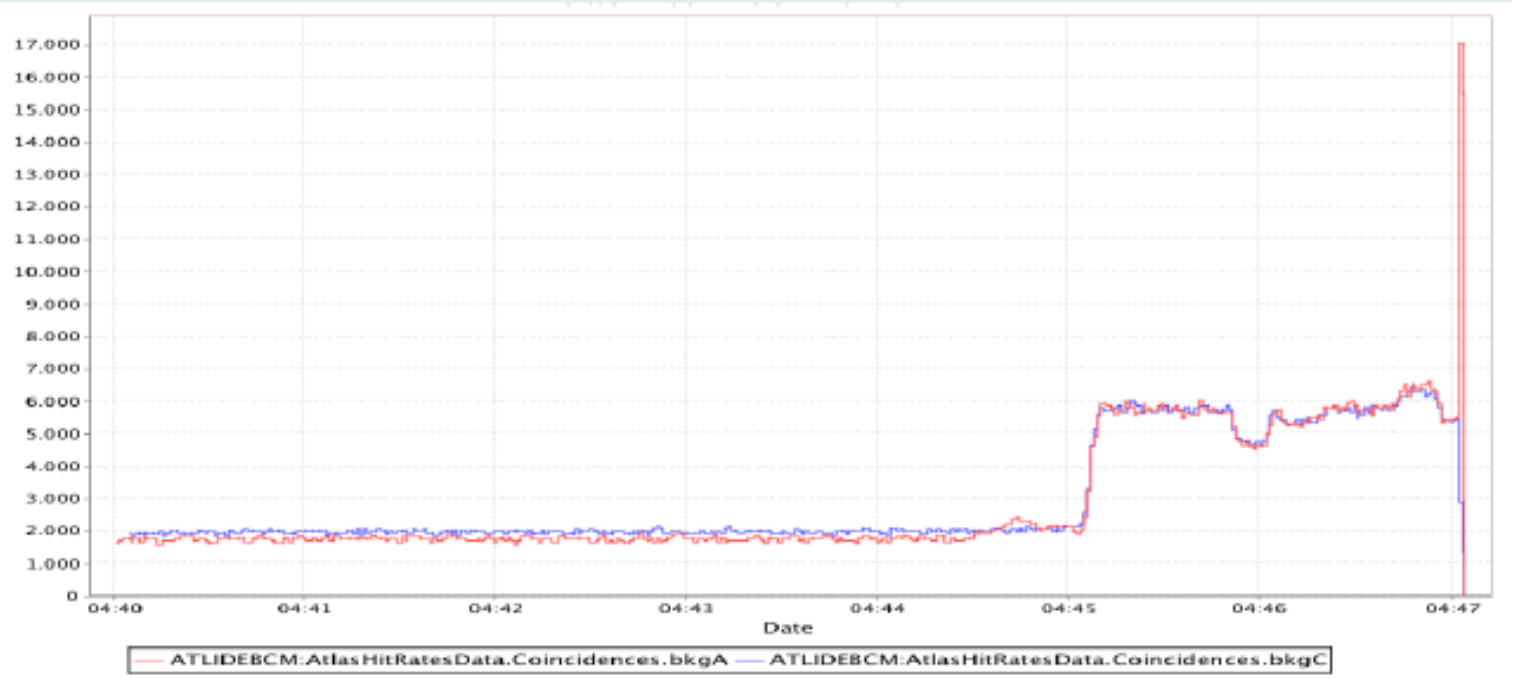
BLM Activity

- Top: Side A BLM activity.
- Bottom: Side C BLM activity.
- Large spikes correspond to activity at the time of abort.
- The spike on both sides exceeds the 230 hits/bin threshold.
- Simultaneous -> Beam Abort





BCM Background Rates



- BCM background rates during the fill that show the adjusting of the beams and ultimately the spike in background activity.