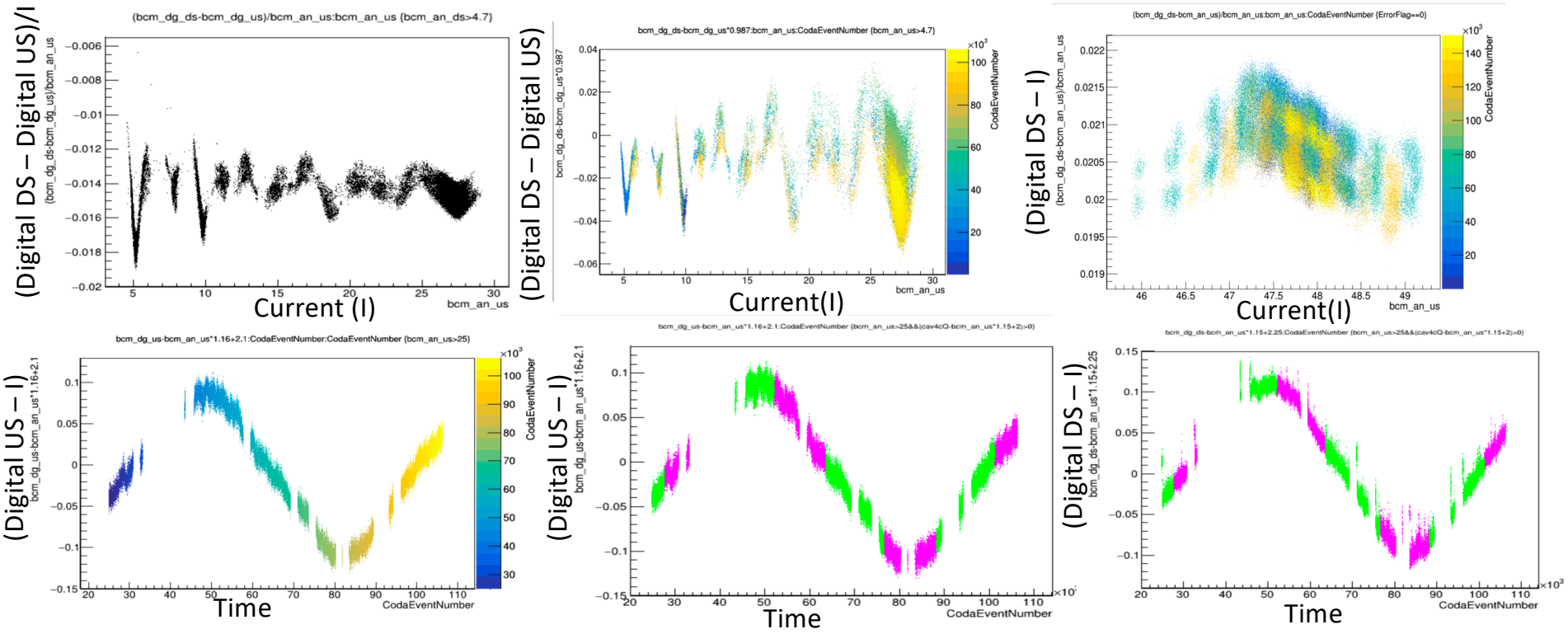
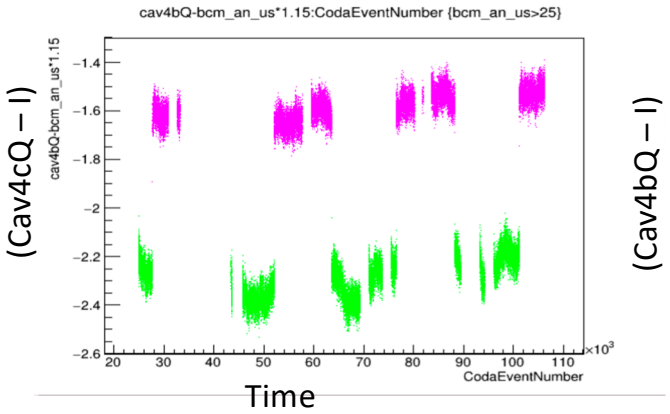
What's wrong with BCM digitals

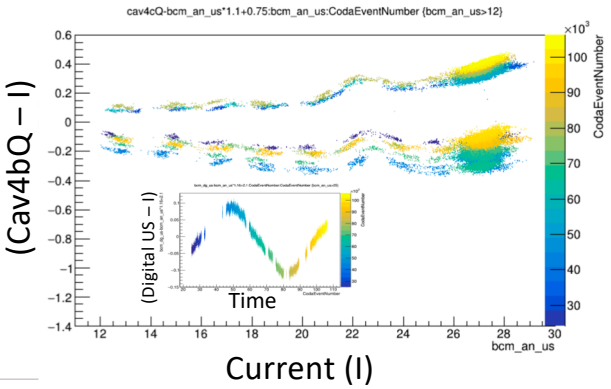
- Oscillatory response in Signal vs Current at the 0.04uA,0.1-1% level(bit resolution?)
- Temporal Oscillation in the gain ~1hr time scale (seen by both dgus&dgds, 0.1uA/40uA=0.25% amplitude (could be RF slip)

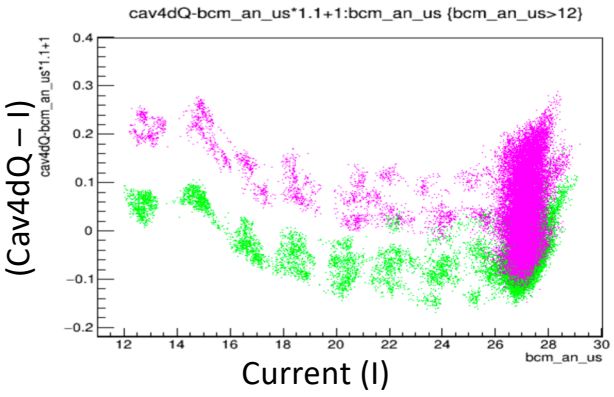


What's wrong with cavity digitals

- Jumps (2%) in signal on several minute time scale(which appear to occur at regular time intervals for all 3 cavities b,c,d and may relate to the ~1hr temporal oscillation in gain observed in the digital bcms)
- Possible oscillatory response in Signal vs Current (a bit wobbly 0.1uA, 0.5%)
- Possible Temporal Oscillation in the gain on the ~1hr time scale 0.1-0.2uA, 0.5-2%(see stripes in Signal vs Current for different beam trips at different times)







Propose 2 tests

- 1. Response curve measurement
  - Function generator makes 1497MHz with Amplitude that varies as a triangle/sawtooth envelope, scanning from 5uA->100uA equivalent, recording with parity DAQ. bcm_dg_ds vs CodaEventNumber will reveal the Signal vs Current curve for the receiver. See if observe oscillations.
  - Challenges: receivers are in the labyrinth, need Hall A in restricted access to do it and need to borrow nice function gen from Musson and carry it down there.
- 2. RF slip measurement
  - Take 499MHz ref -> tripler -> digital bcm receiver input (with 10MHz ref plugged in). Check Amplitude of input signal is on the order of 10-100uA.
  - Take parity daq data for a couple hours. See if observe slow temporal oscillation observed in the data.
  - Challenges: 499MHz ref isn't in HallA CH or in HallA labyrinth. It's in the HallB CH. HallB has some digital receivers that might be patched to the HallA CH. But difficult in any case.
- *Alternatives since RF slip measurement is hard:*
  - *RF slip sensitivity*
    - *Generate 1497.00001MHz (or 1497.001MHz or 1497.01MHz) signal from the 10MHz ref. Plug into digital bcm receiver*
    - *Check Amplitude of signal is on the order of 10-100uA.*
    - *Change the frequency around a bit, record with parity daq and use greenmonster to write in frequ changes using scandata1. Then examine for oscillations in signal output for imperfect frequency, the period and the amplitude of the output oscillation. Look for changes which depend on frequency. This will tell you the sensitivity of the receiver to frequ changes and it's behavior.*
    - *Challenges: receivers are in the labyrinth, need Hall A in restricted access to do it and need to borrow nice function gen from Musson and carry it down there.*
  - *Gain temporal oscillation hunt*
    - *Generate 1497MHz signal from the 10MHz ref so we know it's stable. Plug into digital bcm receiver*
    - *Check Amplitude of signal is on the order of 10-100uA.*
    - *See if observe oscillations on the same time scale (1hr)/size(0.25%) as seen in the run. If so, the culprit is not just RF slip, but lives within the receiver itself.*
    - *Challenges: receivers are in the labyrinth, need Hall A in restricted access to do it and need to borrow nice function gen from Musson and carry it down there.*