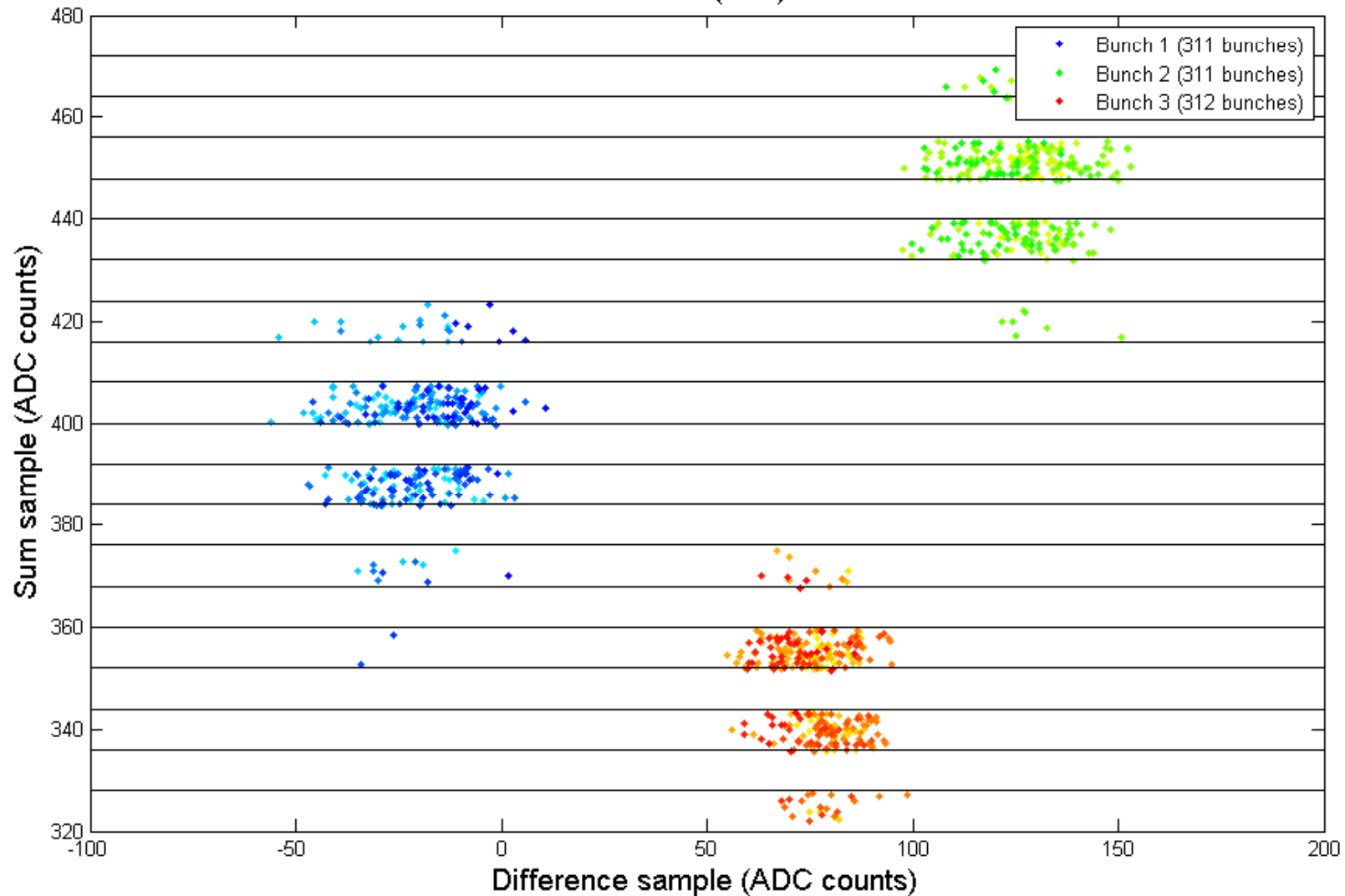# May jitter run, 154ns spacing, feedback off

Difference sample vs. sum sample. Fliers removed bunch by bunch at 3 sigma.
Data points smeared to allow distinction. Lighter shades indicate earlier pulses.
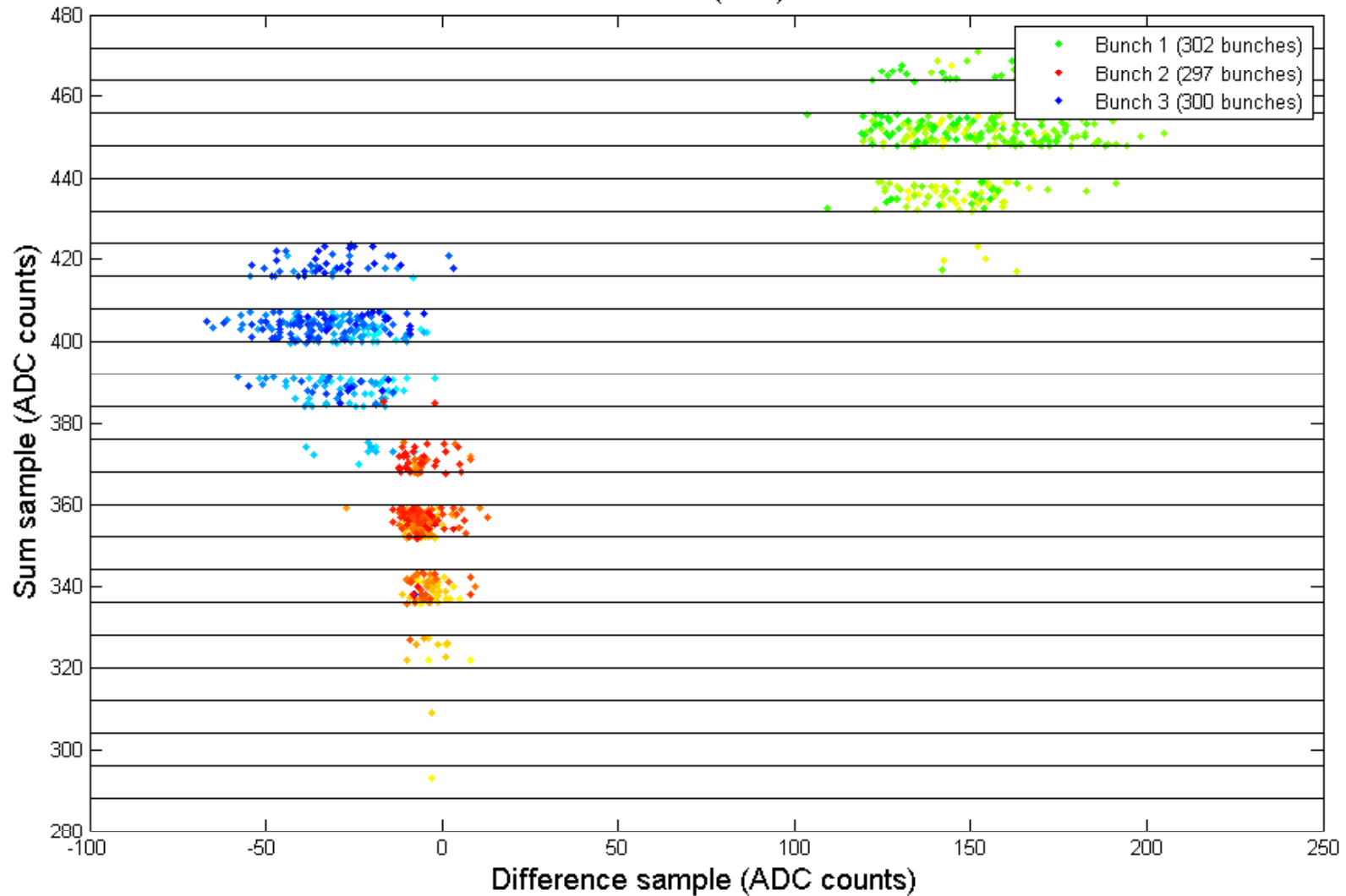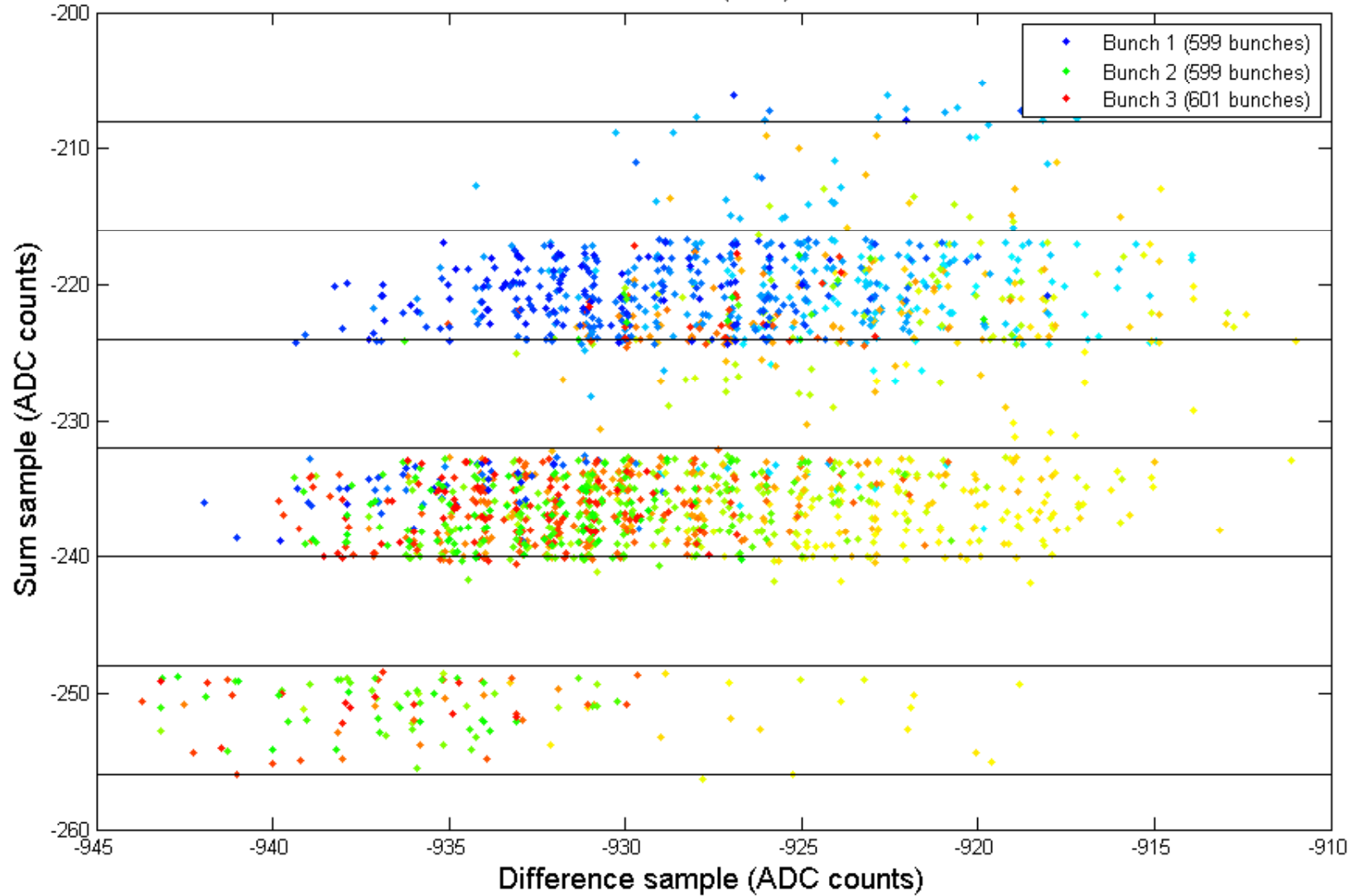Grid shows bit #3 (sum) transitions.

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May jitter run, 154ns spacing, feedback on

Difference sample vs. sum sample. Fliers removed bunch by bunch at 3 sigma.
Data points smeared to allow distinction. Lighter shades indicate earlier pulses.
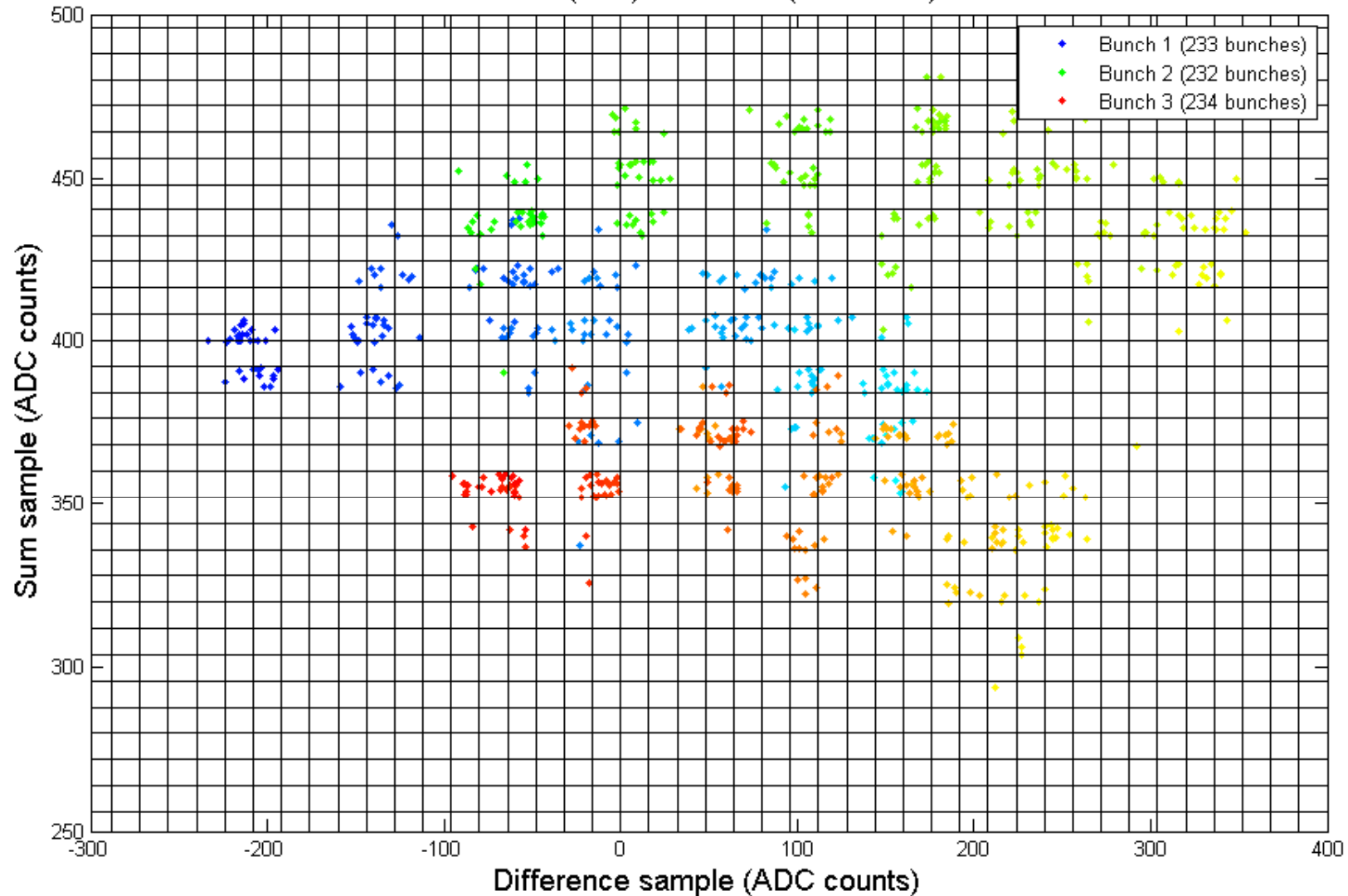Grid shows bit #3 (sum) transitions.

April long sampling run, 154ns spacing

Difference sample vs. sum sample. Fliers removed bunch by bunch at 3 sigma. Data points smeared to allow distinction. Lighter shades indicate earlier pulses. Grid shows bit #3 (sum) transitions.

May Thursday t-shirt run, feedback off

Difference sample vs. sum sample. Fliers removed bunch by bunch at 3 sigma. Data points smeared to allow distinction. Lighter shades indicate earlier pulses. Grid shows bit #3 (sum) and bit #4 (difference) transitions.
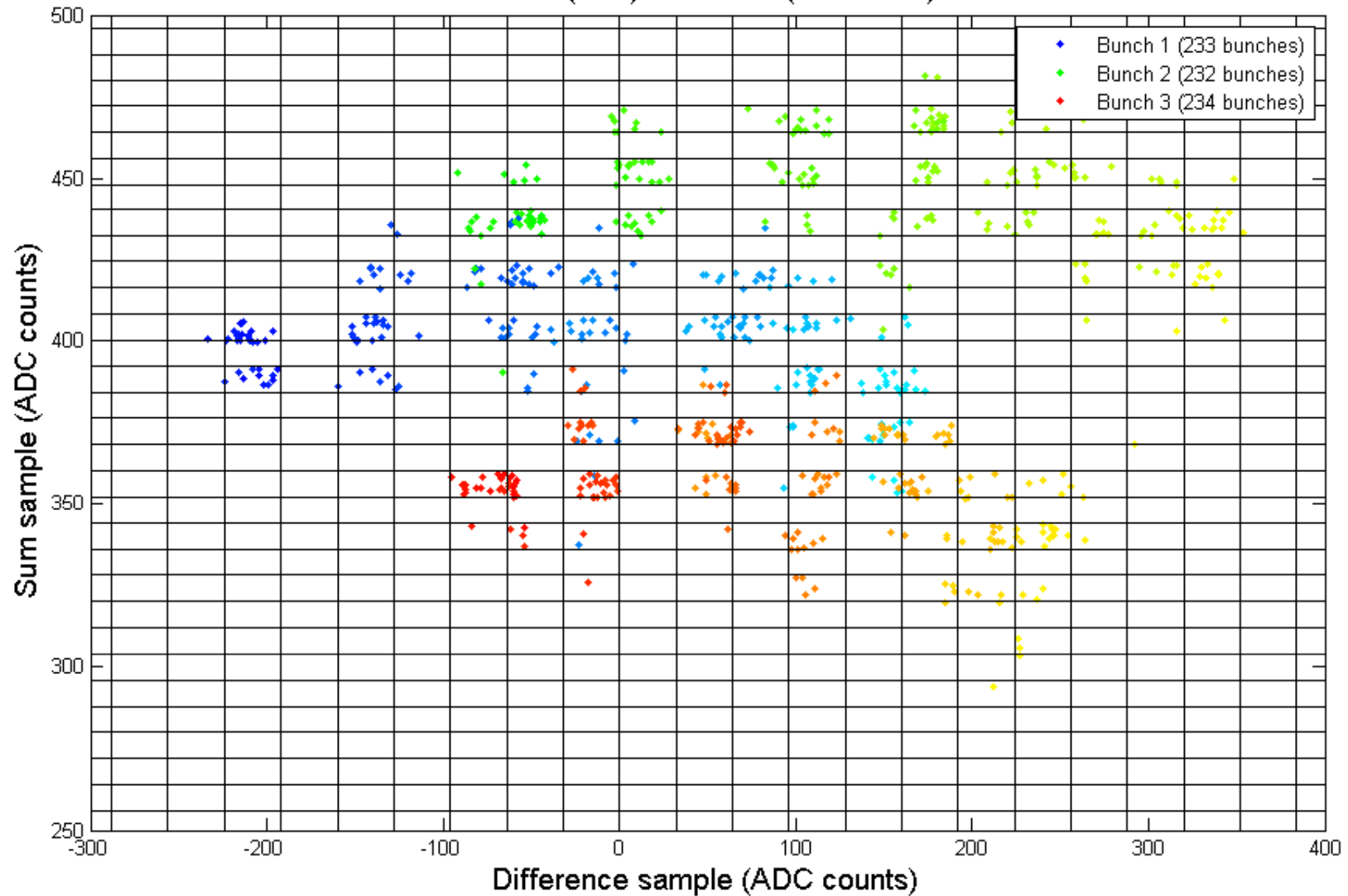
May Thursday t-shirt run, feedback off 2

Difference sample vs. sum sample. Fliers removed bunch by bunch at 3 sigma.
Data points smeared to allow distinction. Lighter shades indicate earlier pulses.
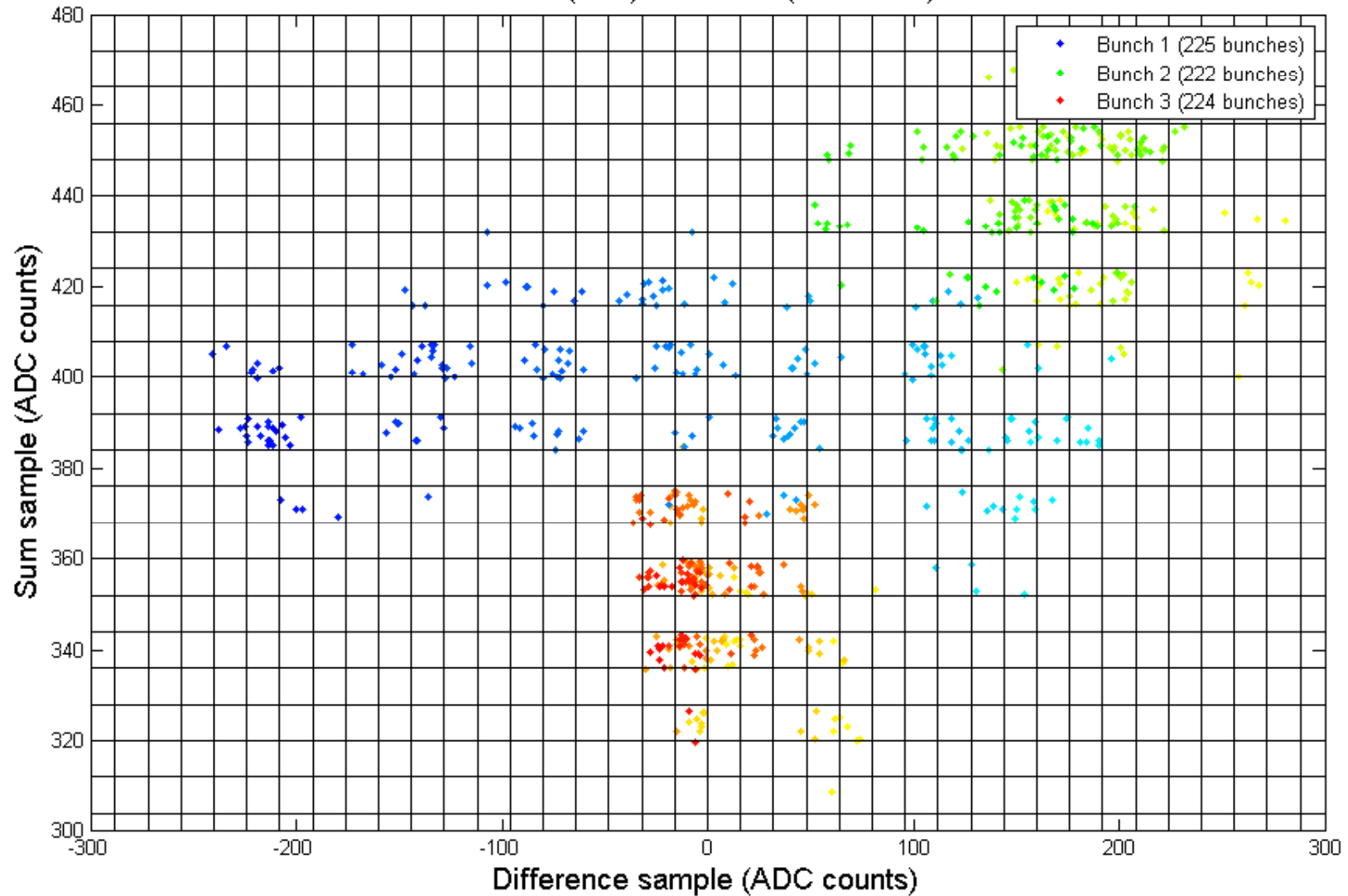Grid shows bit #3 (sum) and bit #5 (difference) transitions.

May Thursday t-shirt run, feedback on

Difference sample vs. sum sample. Fliers removed bunch by bunch at 3 sigma.
Data points smeared to allow distinction. Lighter shades indicate earlier pulses.
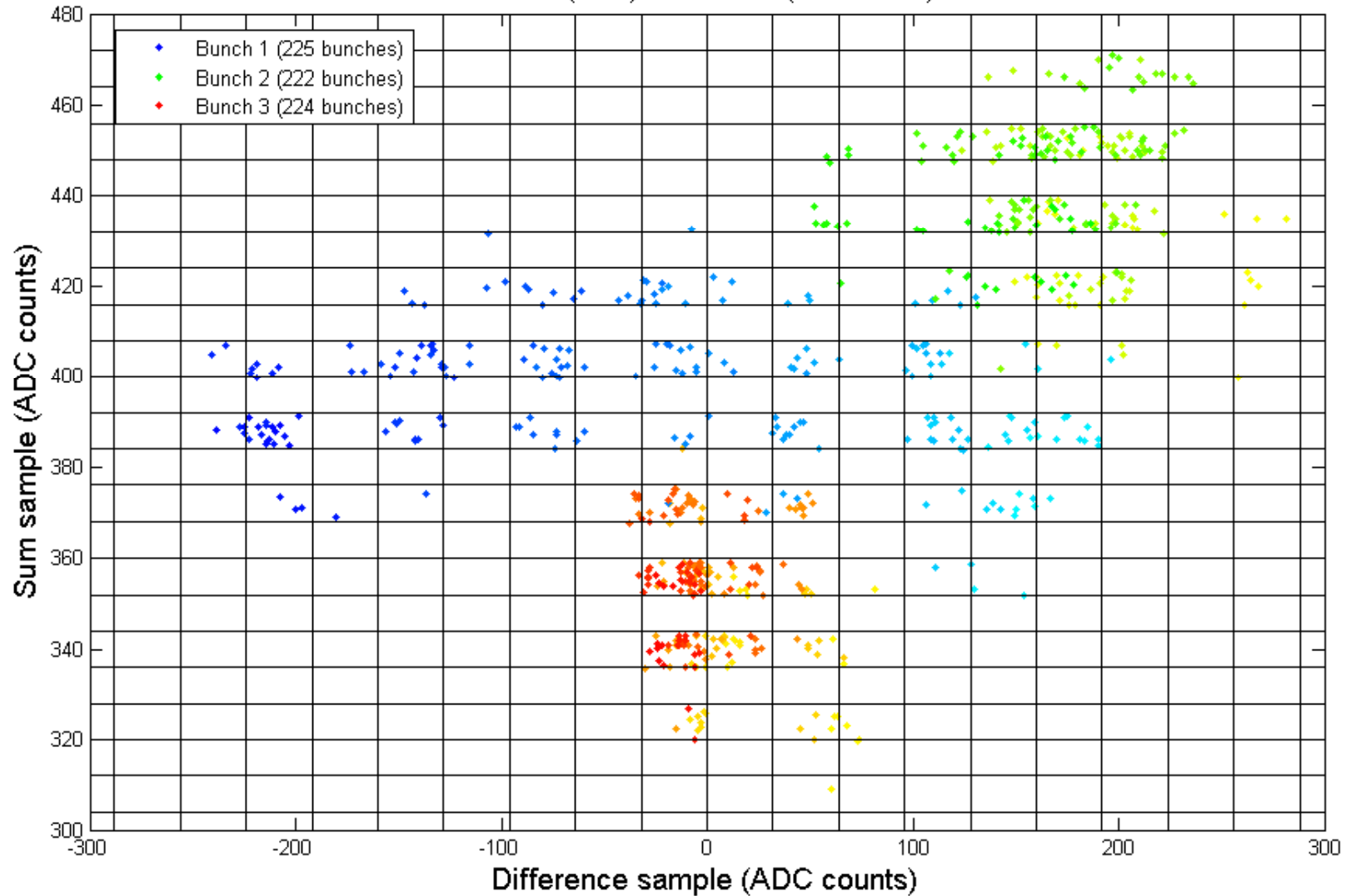Grid shows bit #3 (sum) and bit #4 (difference) transitions.
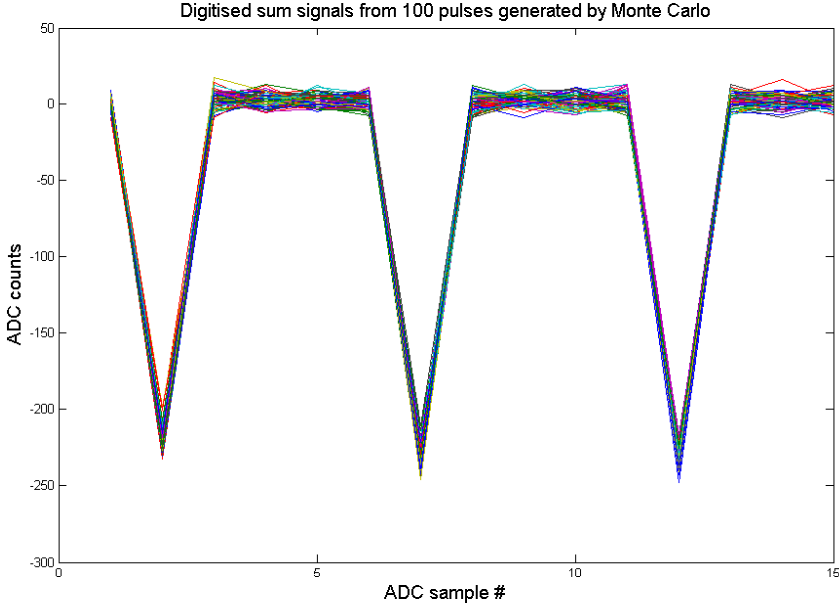
May Thursday t-shirt run, feedback on 2

Difference sample vs. sum sample. Fliers removed bunch by bunch at 3 sigma.
Data points smeared to allow distinction. Lighter shades indicate earlier pulses.
Grid shows bit #3 (sum) and bit #5 (difference) transitions.

Bunch 1 (225 bunches)
Bunch 2 (222 bunches)
Bunch 3 (224 bunches)

Sum sample (ADC counts)

Difference sample (ADC counts)
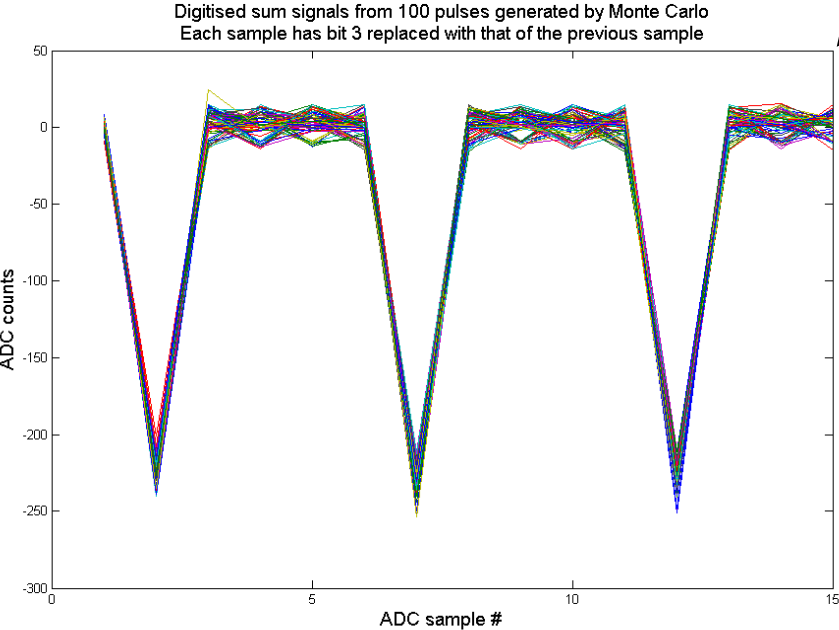
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Simple Monte Carlo simulation

- Generate ILA-style sum and difference samples

- Add Gaussian noise to each sample

- Modify bit 3 of each sum sample

- Run through standard analysis code

- Preliminary results below
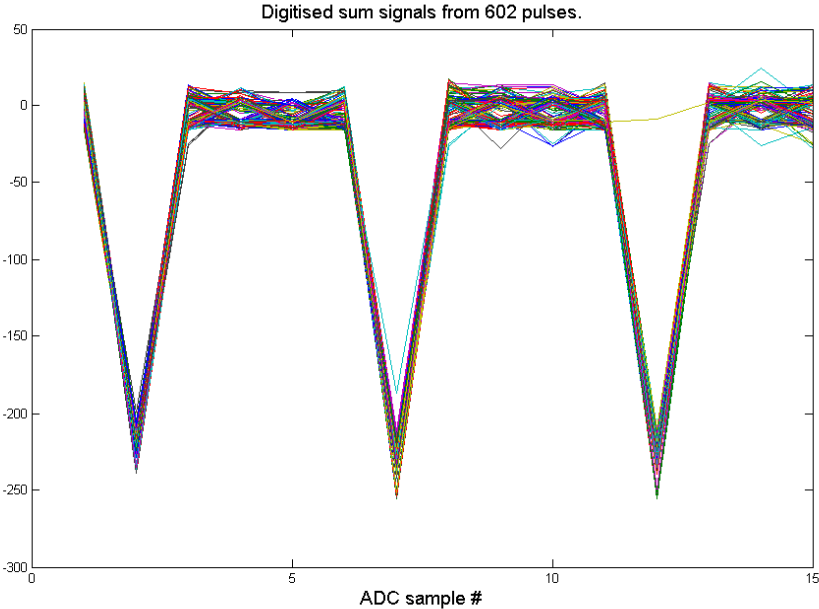
First results from simple Monte Carlo

Simulated sum signals

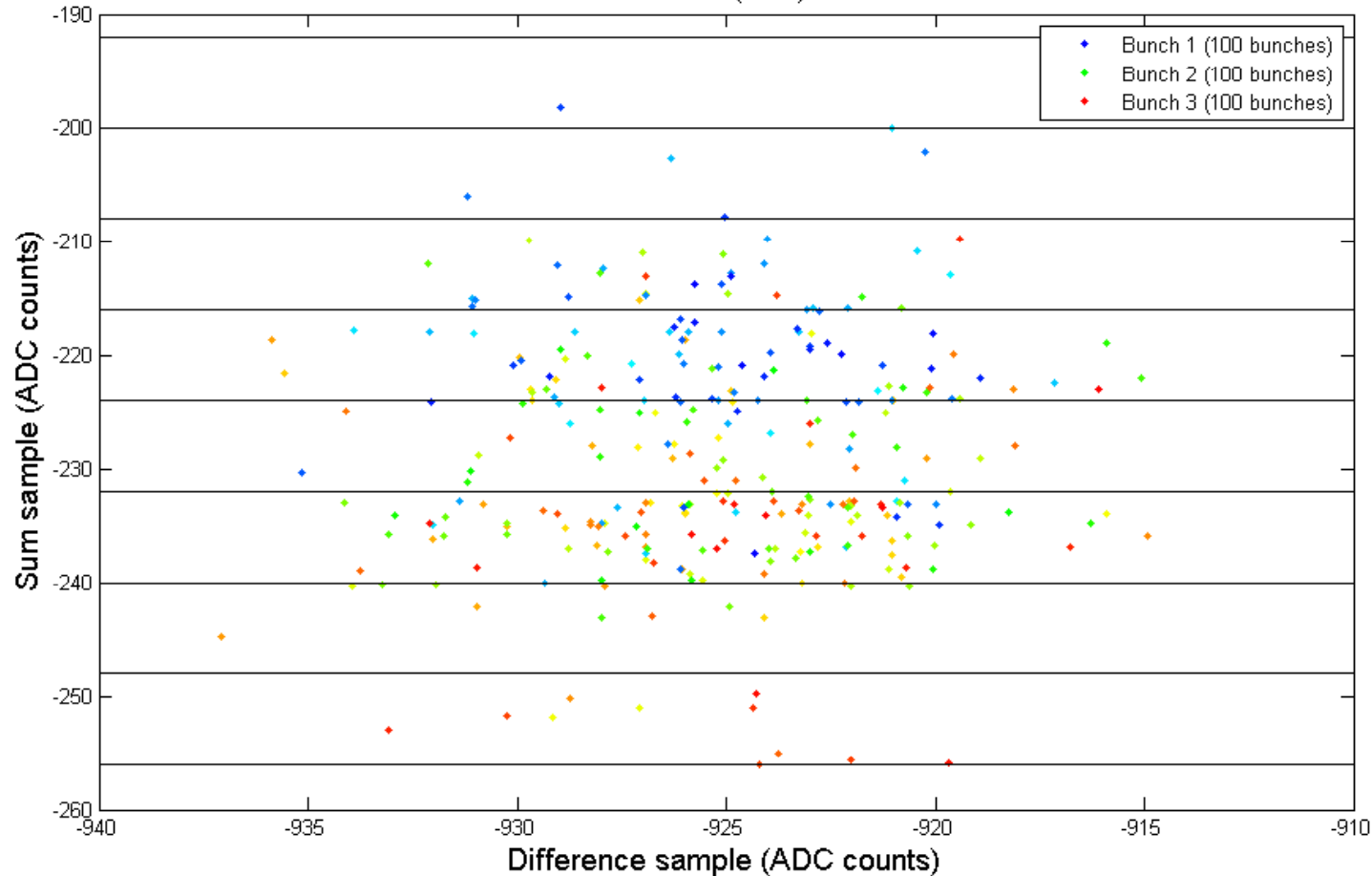**Simulated sum signals with bit 3 taken from previous sample**
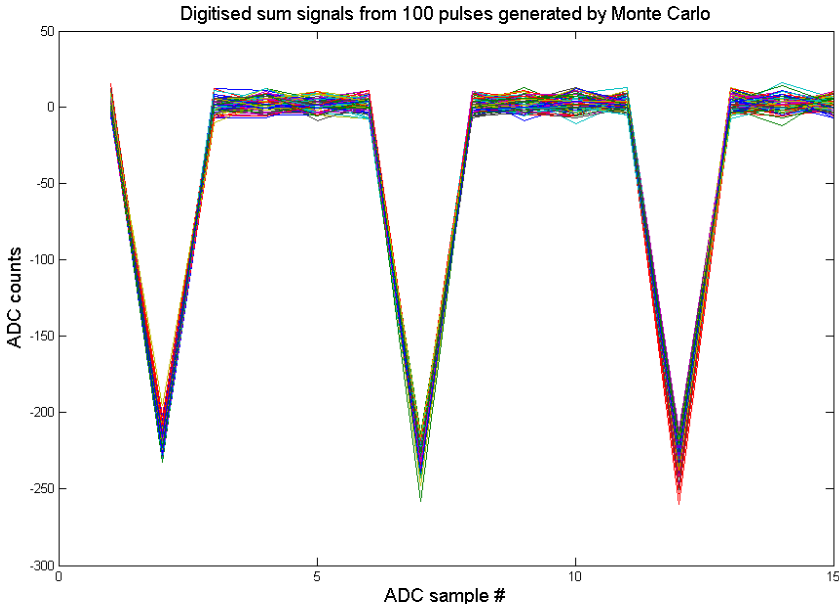
Real sum signals

Scatter plot from previous simulation

Difference sample vs. sum sample as generated by Monte Carlo.
Each sample has bit 3 replaced with that of the previous sample. Fliers removed bunch by bunch at 3 sigma.
Data points smeared to allow distinction. Lighter shades indicate earlier pulses.
Grid shows bit #3 (sum) transitions.

- So far been able to produce partial 'statistical' banding by using previous sample's bit 3, but not complete banding as seen in real data.

First results from simple Monte Carlo

Digitised sum signals from 100 pulses generated by Monte Carlo

Simulated sum signals

Simulated sum signals with bit 3 set to zero

Real sum signals

Digitised sum signals from 100 pulses generated by Monte Carlo
Each sample has bit 3 set to zero

Digitised sum signals from 602 pulses.

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Scatter plot from previous simulation

Difference sample vs. sum sample as generated by Monte Carlo.
Each sample has bit 3 set to zero. Fliers removed bunch by bunch at 3 sigma.
Data points smeared to allow distinction. Lighter shades indicate earlier pulses.
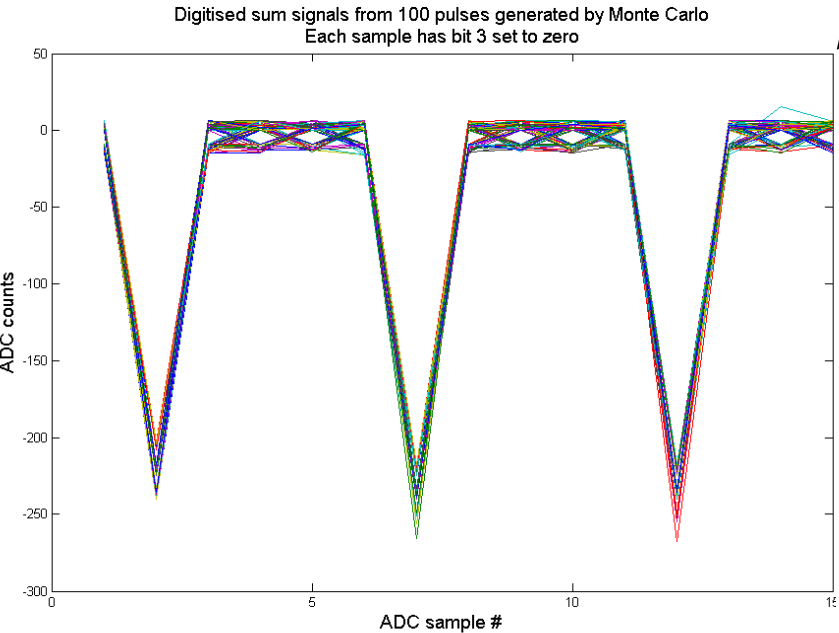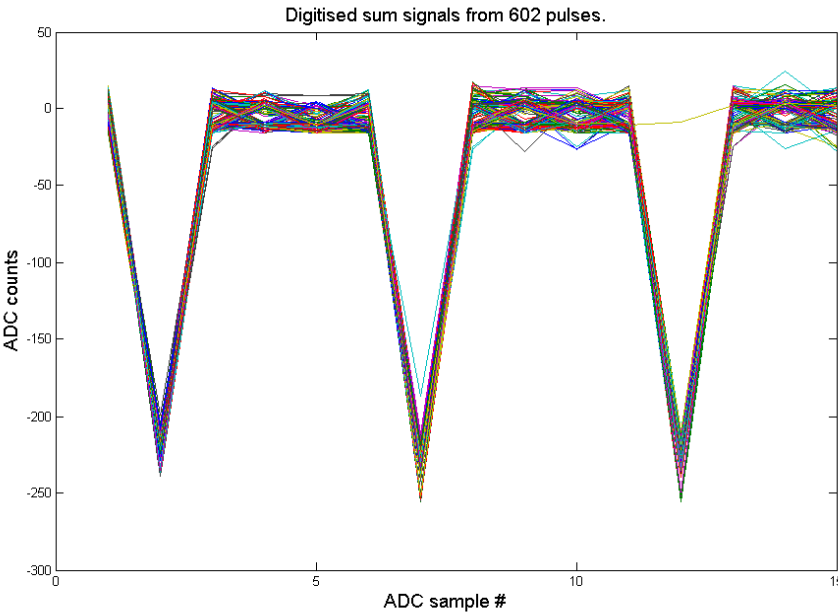Grid shows bit #3 (sum) transitions.