Capability Upgrade of the Diamond Transverse Multibunch Feedback
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Device Utilization Summary:

- Number of BUFGMUXs: 7 out of 16 (43%)
- Number of DCMs: 3 out of 8 (37%)
- Number of External DIFFMs: 20 out of 320 (6%)
- Number of LOCed DIFFMs: 20 out of 20 (100%)
- Number of External DIFFSs: 20 out of 320 (6%)
- Number of LOCed DIFFSs: 20 out of 20 (100%)
- Number of External IOBs: 244 out of 644 (37%)
- Number of LOCed IOBs: 244 out of 244 (100%)
- Number of MULT18X18s: 68 out of 136 (50%)
- Number of RAMB16s: 111 out of 136 (81%)
- Number of SLICEs: 7950 out of 13696 (58%)

Tune measurement showing different tunes for adjacent bunches. This shows the potential value of simultaneous tune measurement on several different bunches.

Above we see the detailed architecture of the FPGA implementation for the TMBF. To the left is shown the effect of pre-emphasis on the DAC output on a train of five bunches. To the right we see that closely adjacent bunches can have very different tune measurements, so performing simultaneous measurements on several different bunches can be useful.

Exciting two bunches to clean bunches adjacent to an isolated single bunch: need pre-compensation to reduce crosstalk.

Bunch excitation:

"without pre-emphasis"

"with pre-emphasis"

FPGA resource utilisation report: design now limited by available block RAMs and multipliers (some block RAMs conflict with multipliers!)