**Introduction**

The Mu2e experiment measures the conversion rate of muons into electrons and the Muon g-2 experiment measures the muon magnetic moment. Both experiments require 53 MHz batches of 8 GeV protons to be re-bunched into 150 ns, 2.5 MHz pulses for extraction to the g-2 target for Muon g-2 and to a delivery ring with a single RF cavity running at 2.36 MHz for Mu2e.

**Nova/Mu2e Timeline**

- 53 MHz RF linearly ramped down over 5 ms interval
- 2.5 MHz RF ramped adiabatically from 3 to 80 kV over 90 ms for coalescing
- 2.5 MHz and 53 MHz RF buckets are realigned each machine cycle

**Beam Transfer Timing with Phase Alignment**

**Digital PLL with Phase Alignment for 2.5 MHz RF**

**LLRF Requirements**

- 8/21 booster cycles in machine cycle used to provide beam to Delivery Ring
- Two batches are captured in 53 MHz buckets. 53 MHz RF is ramped off and 2.5 MHz RF is ramped to 80 kV over 90ms
- 8, 2.5 MHz bunches are transferred - one bunch at a time to the Delivery Ring for resonant extraction to Muon Target
- Delivery Ring frequency of 2.36 MHz is non-harmonically related to the RR 2.5 MHz.

**Location of RF system components**

Delivery Ring LLRF and the Recycler 2.5 MHz LLRF systems are implemented in one SoC FPGA card located in the same VXI crate as the Recycler 53MHz LLRF system

The Recycler 53MHz, Recycler 2.5 MHz and Delivery Ring LLRF systems are tightly integrated allowing for various operational sequences to be supported.

**Summary**

- Delivery Ring LLRF and the Recycler 2.5 MHz LLRF systems are implemented in one SoC FPGA card located in the same VXI crate as the Recycler 53MHz LLRF system
- The Recycler 53MHz, Recycler 2.5 MHz and Delivery Ring LLRF systems are tightly integrated allowing for various operational sequences to be supported.