

ACCEL LLRF Cavity Measurement with RFSoC

Project: DARPA ACCEL

Presenter: Chao Liu

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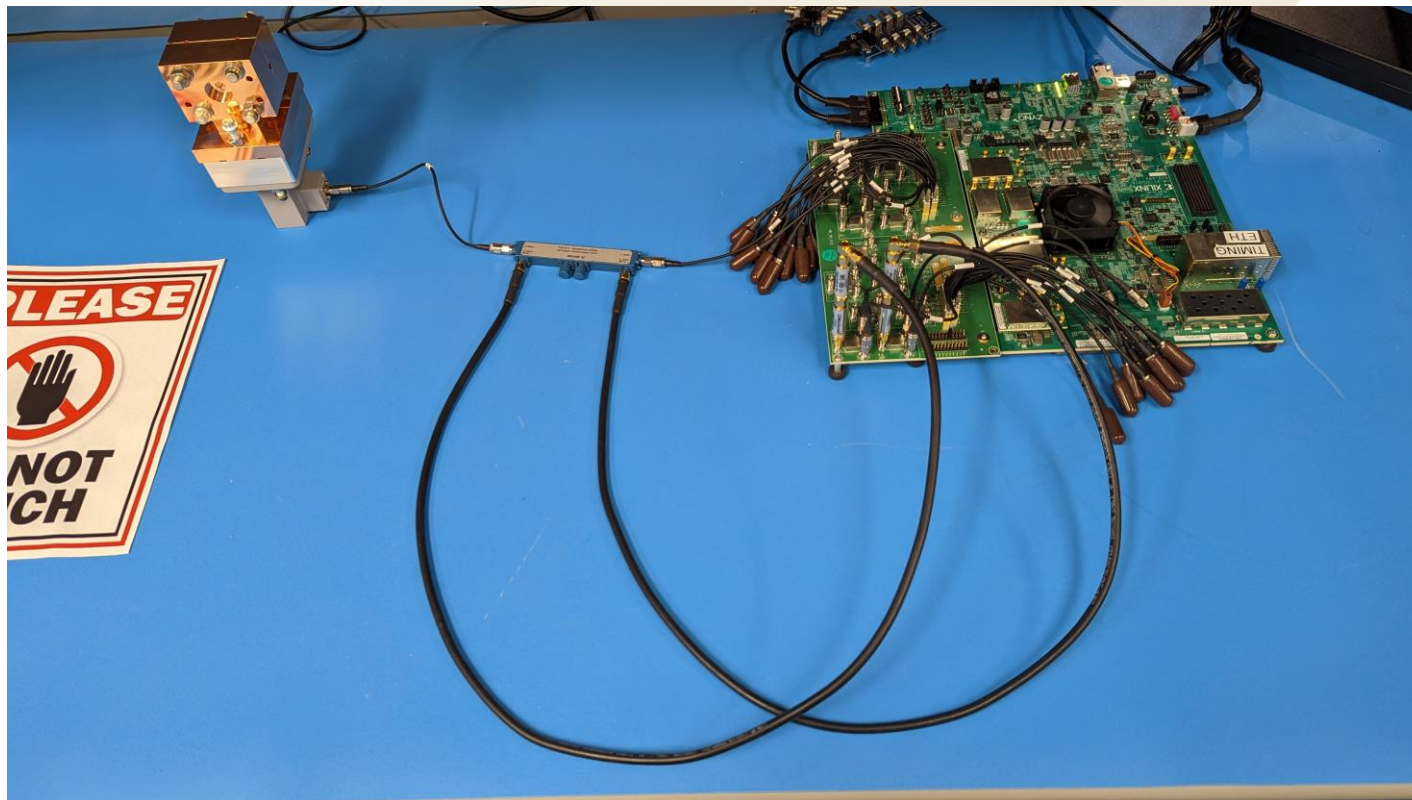
U.S. DEPARTMENT OF
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University



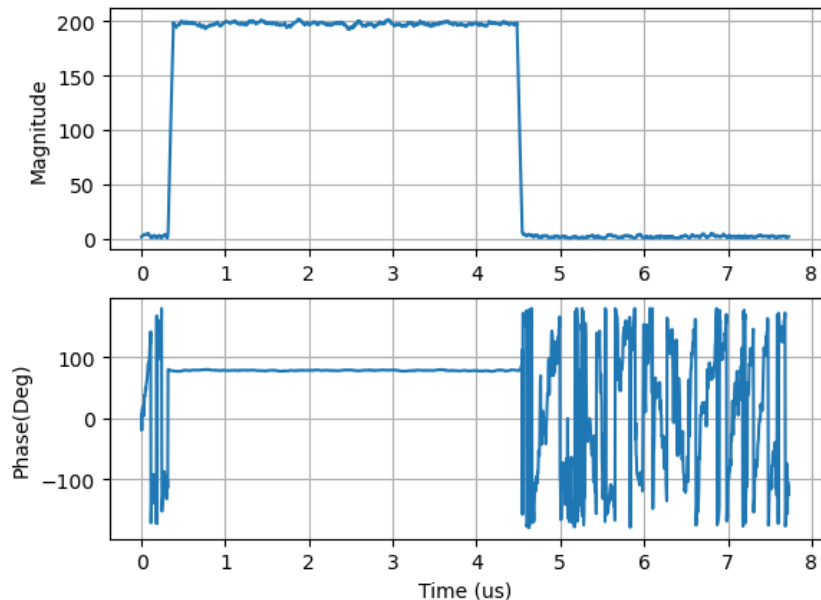
NATIONAL
ACCELERATOR
LABORATORY

Test Setup

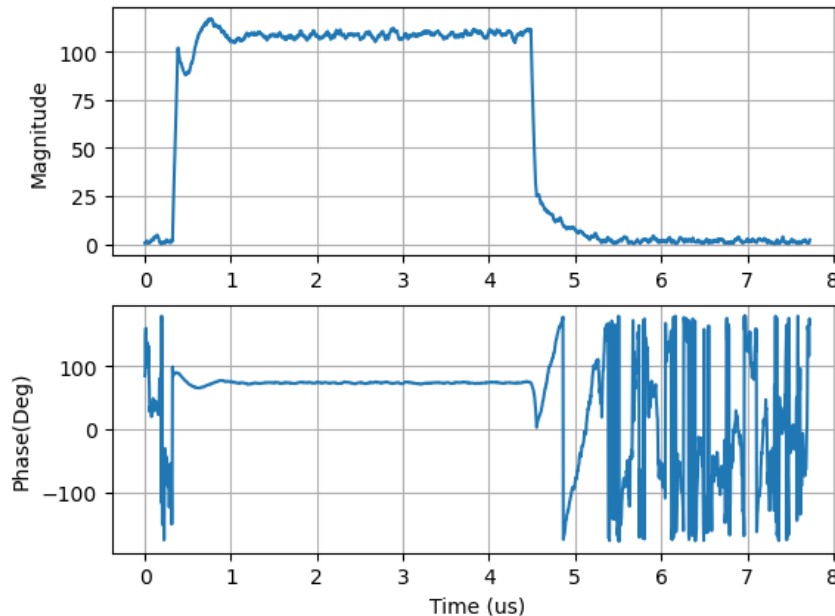


Forward and Reflection Signals with $I=1, Q=1$

DAC signal coupler

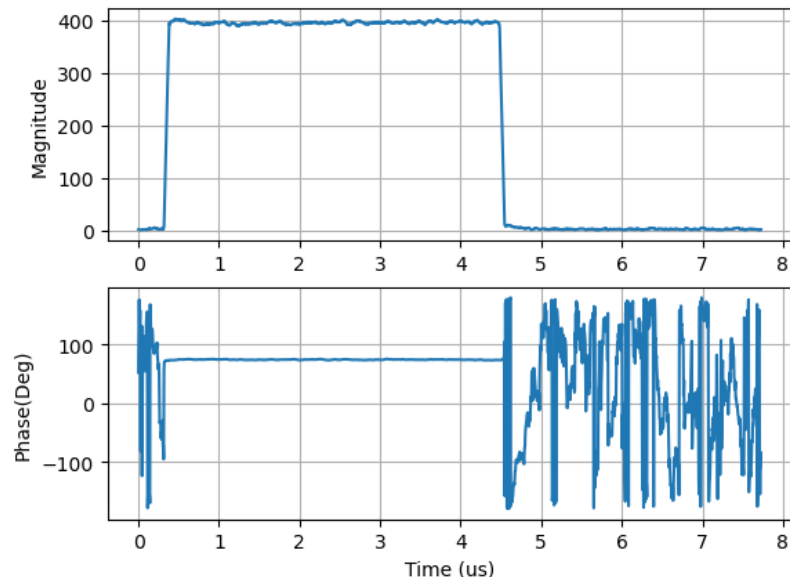


Reflection coupler

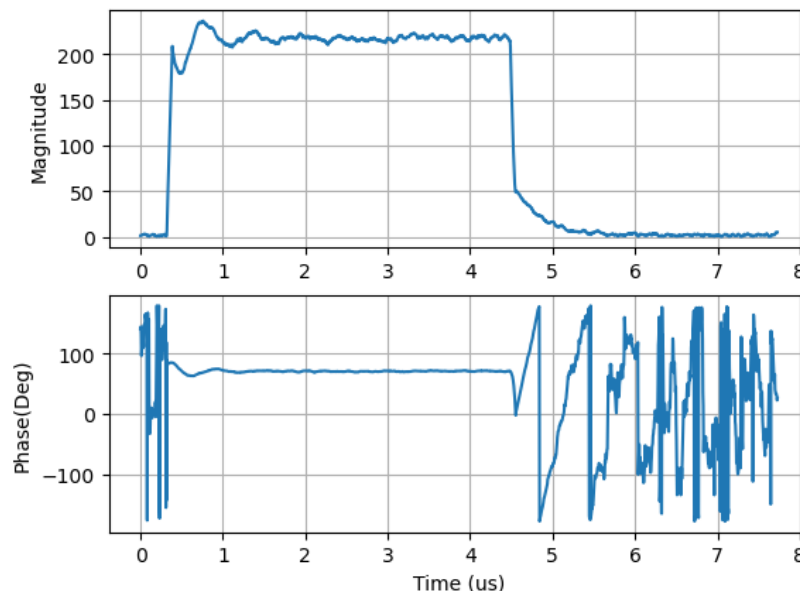


Forward and Reflection Signals with $I=2, Q=2$

DAC signal coupler

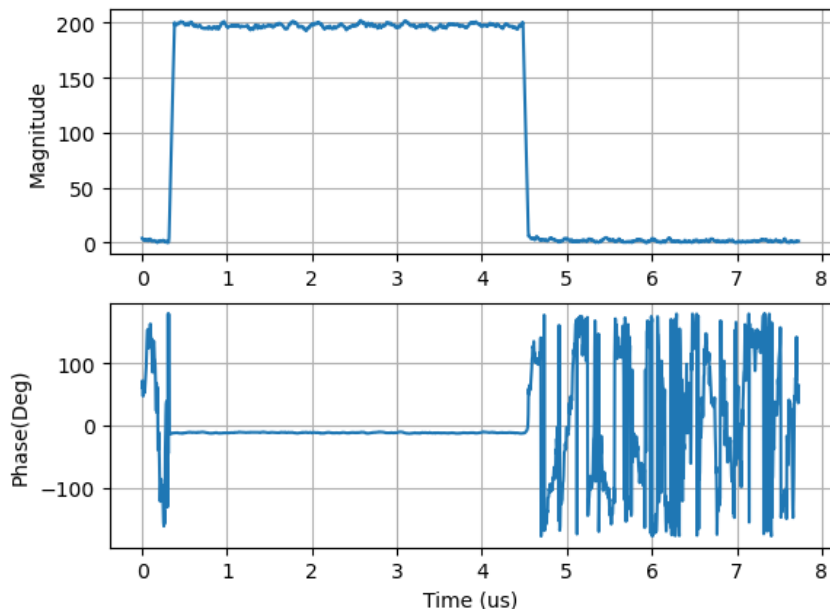


Reflection coupler

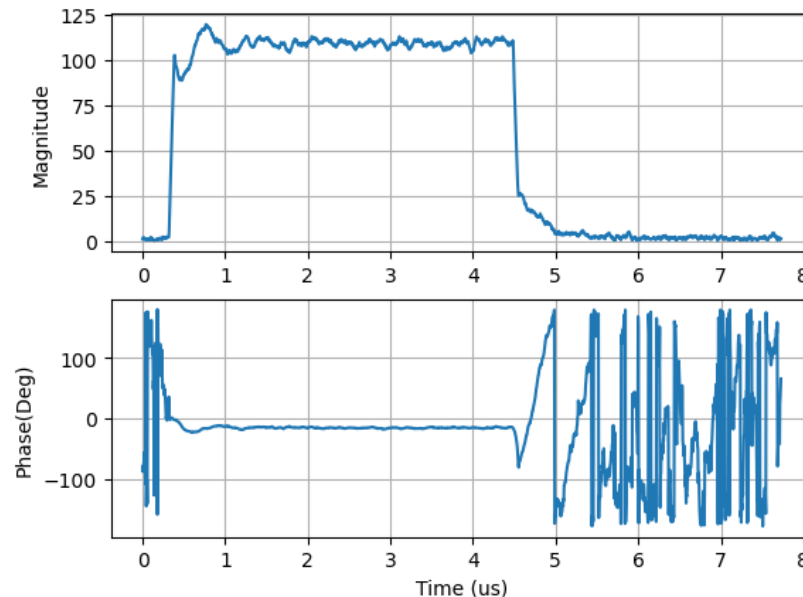


Forward and Reflection Signals with $I=1, Q=-1$

DAC signal coupler

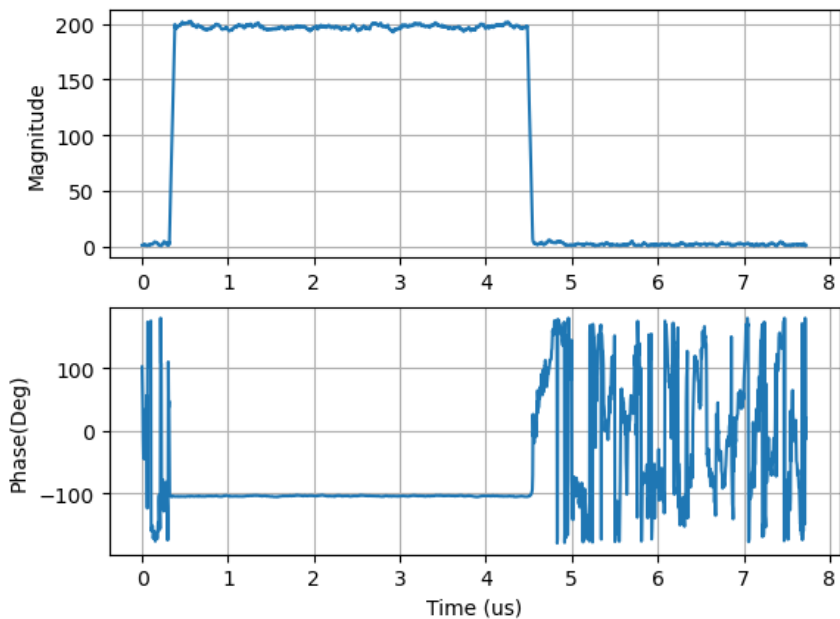


Reflection coupler

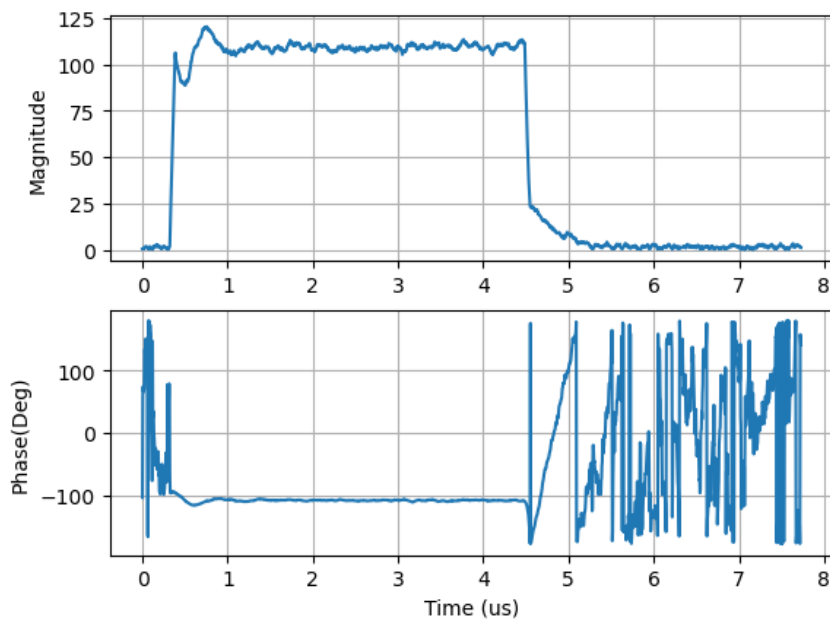


Forward and Reflection Signals with $I=-1, Q=-1$

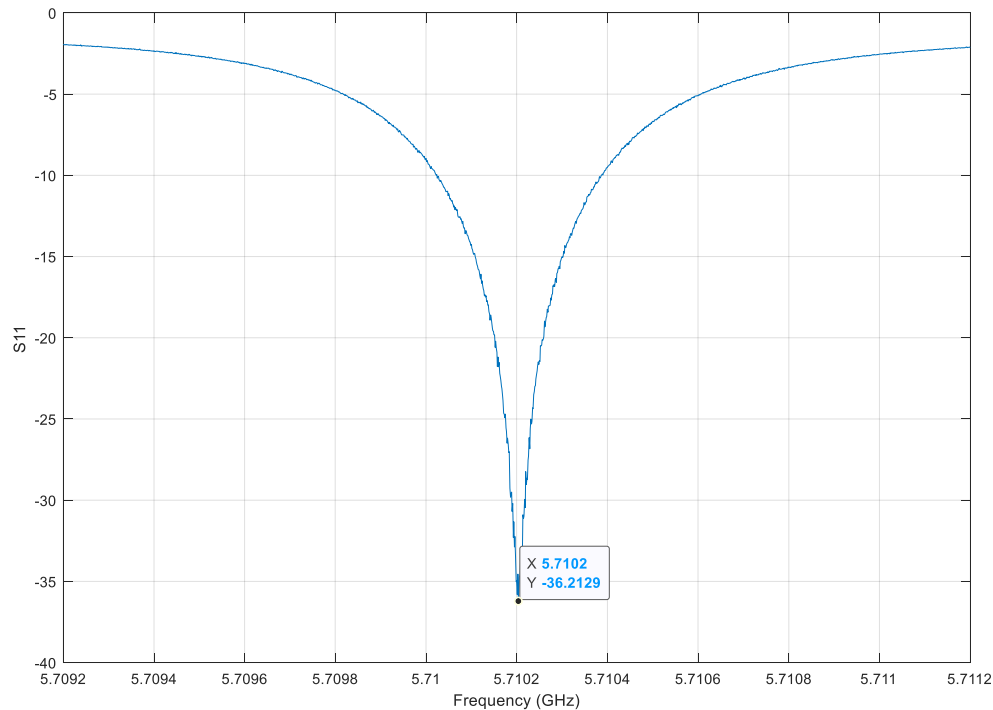
DAC signal coupler



Reflection coupler



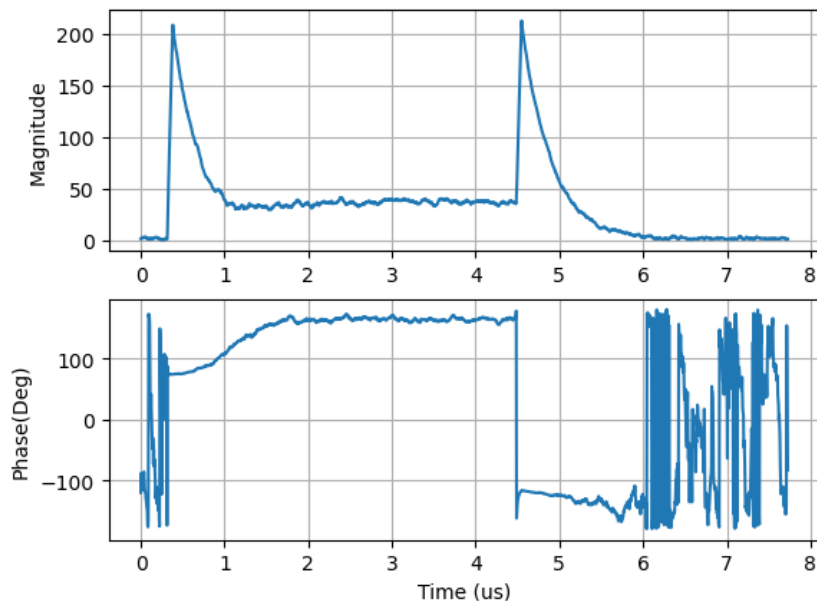
NCO Tuned to Resonance



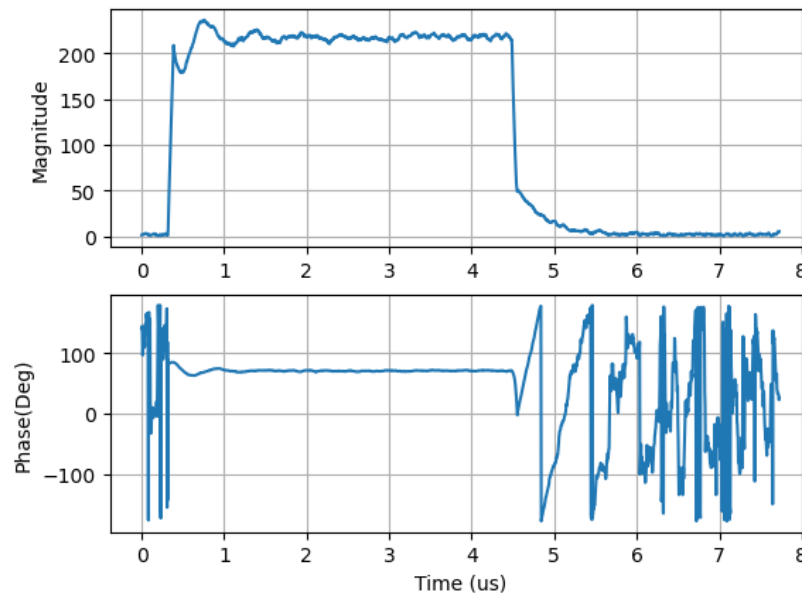
- Resonance of cavity drifts with temperature
- Resonant frequency measured by VNA
- DAC datapath NCO frequency tuned to 5.710203750 GHz
- ADC datapath NCO frequency 795,003,750 Hz
- Generate new bit file and remote update the RFSoc board

Cavity Reflection with RF Pulse on/off Resonance

NCO 5710.2 MHz

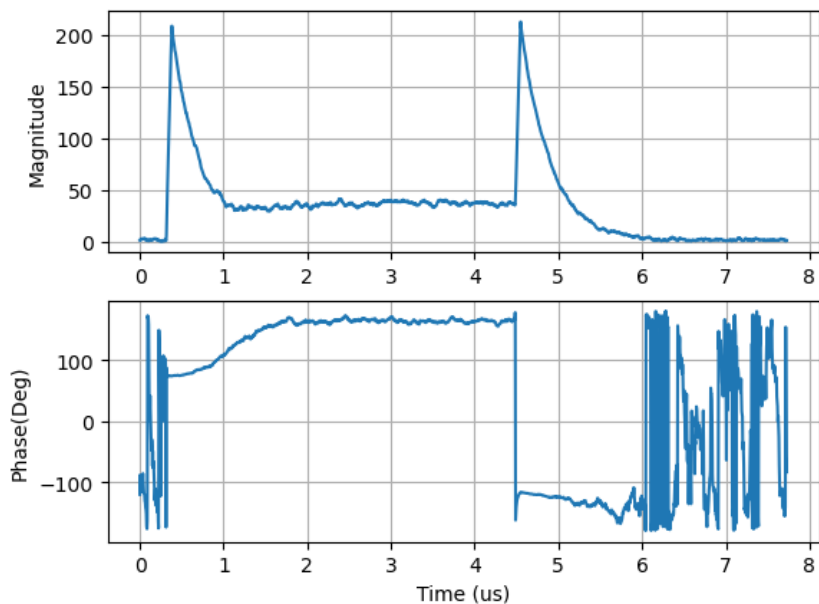


NCO 5712 MHz

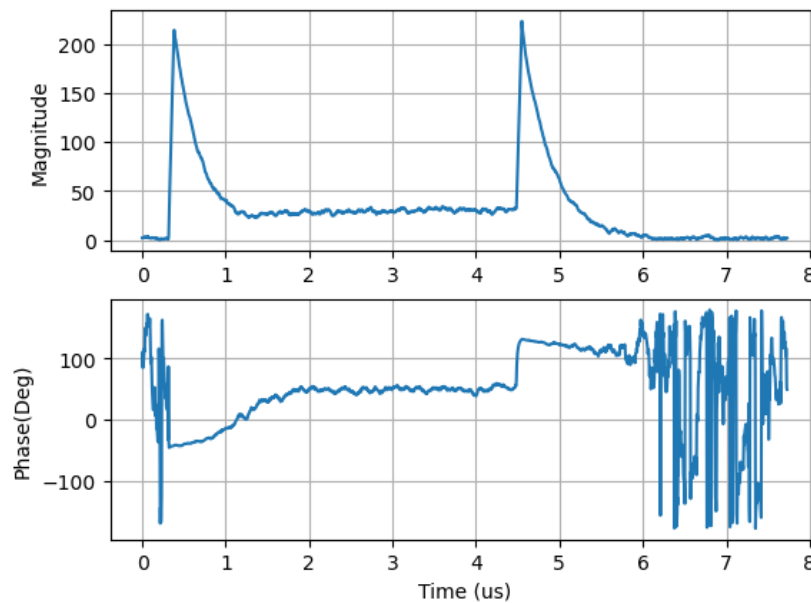


Drift with Time ...

Day 1



Day 2



Thank you!