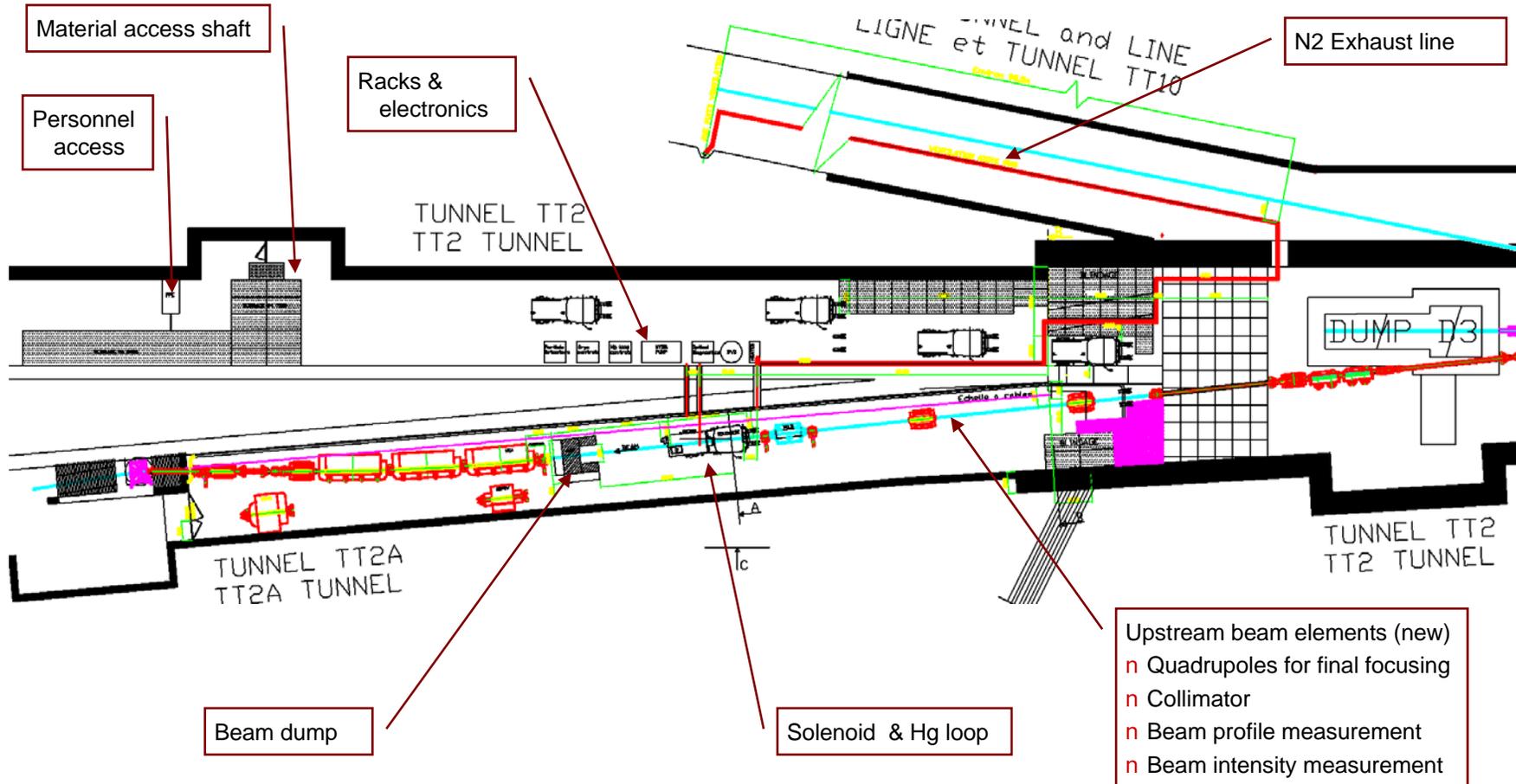


Pump/Probe Analysis

April 10, 2009

Harold G. Kirk

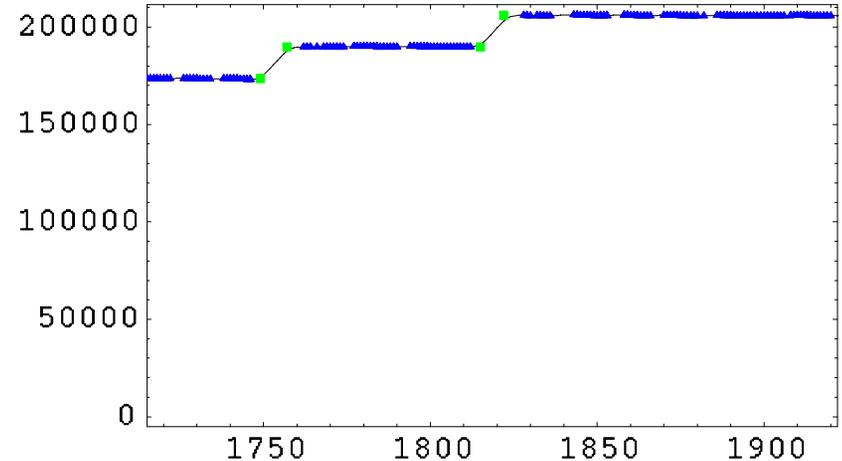
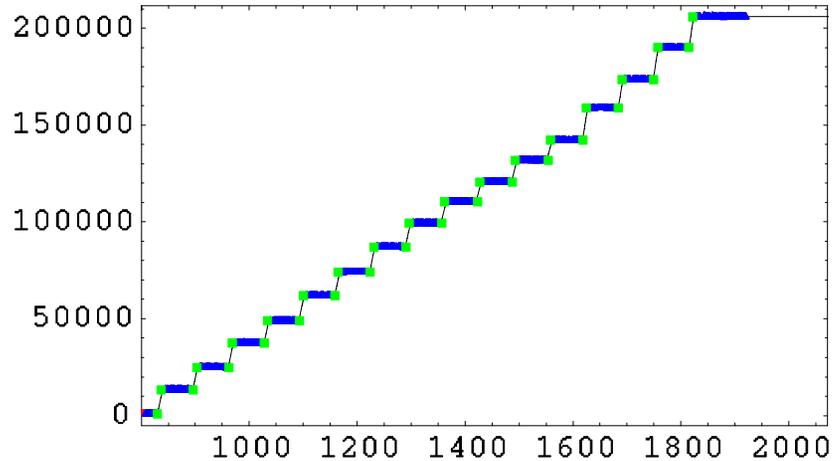
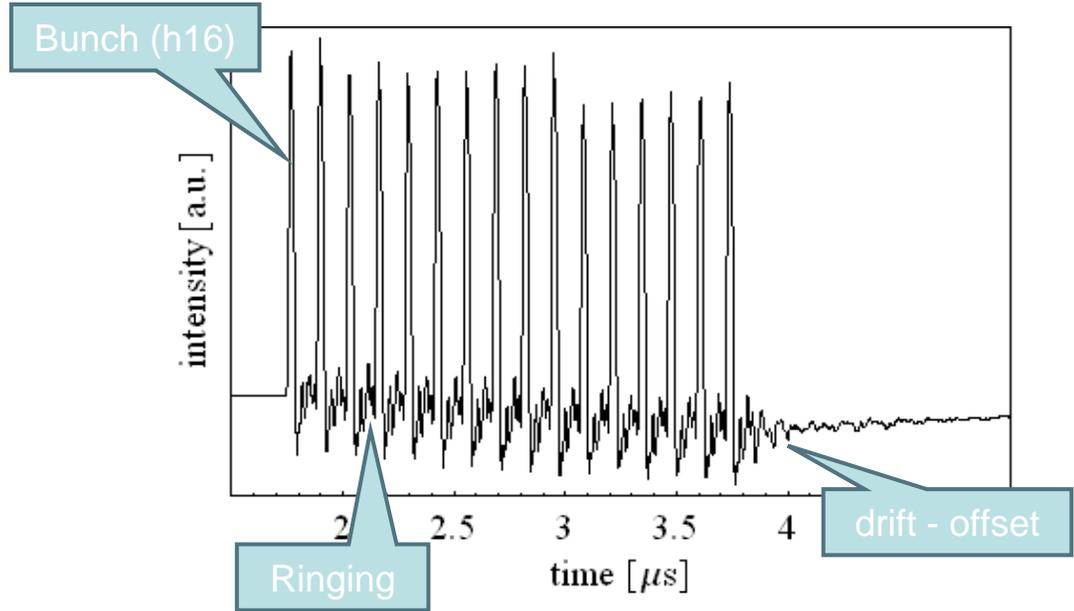
MERIT Experiment in the TT2a Area



Beam-Current Transformer Corrections

The signal from the beam-current transformer “rang” for longer than the time between bunches.

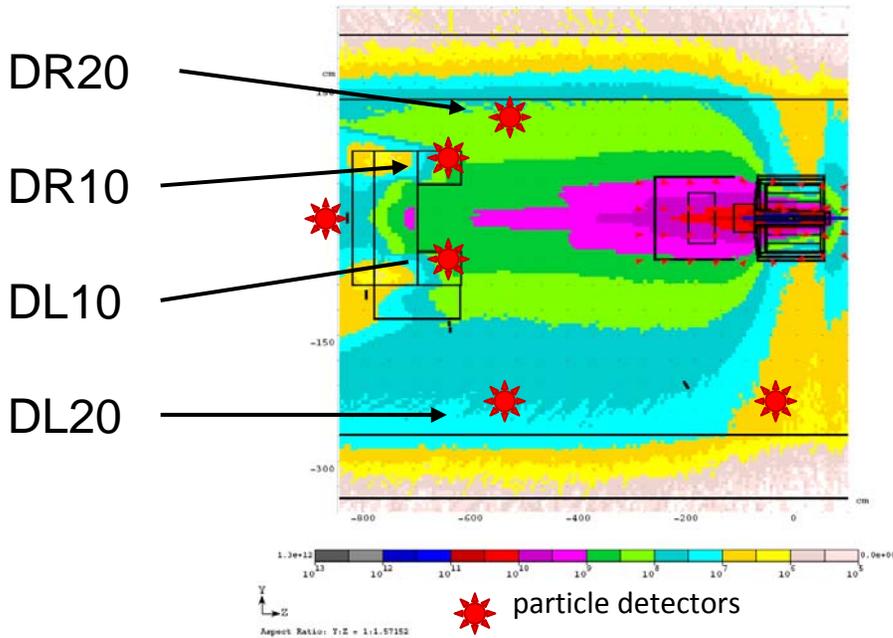
A small baseline drift occurred over a full-turn extraction.



Pump-Probe Data

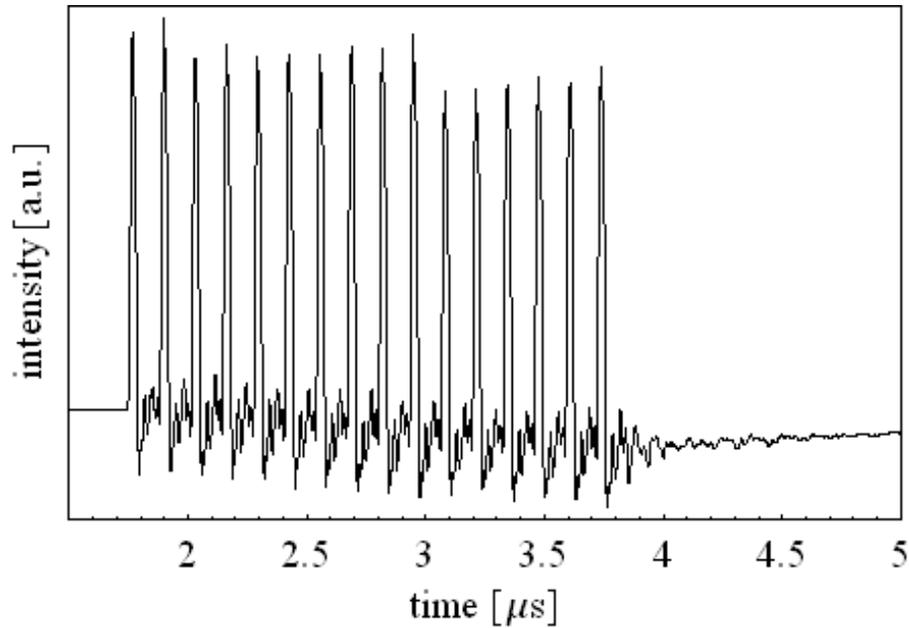
At 14 GeV, the CERN PS could extract several bunches during one turn (pump), and then the remaining bunches at a later time (probe). The septum limited this time delay to be less than 1ms.

The beam-current transformer data is used to correct for fluctuations in the number of protons per bunch.

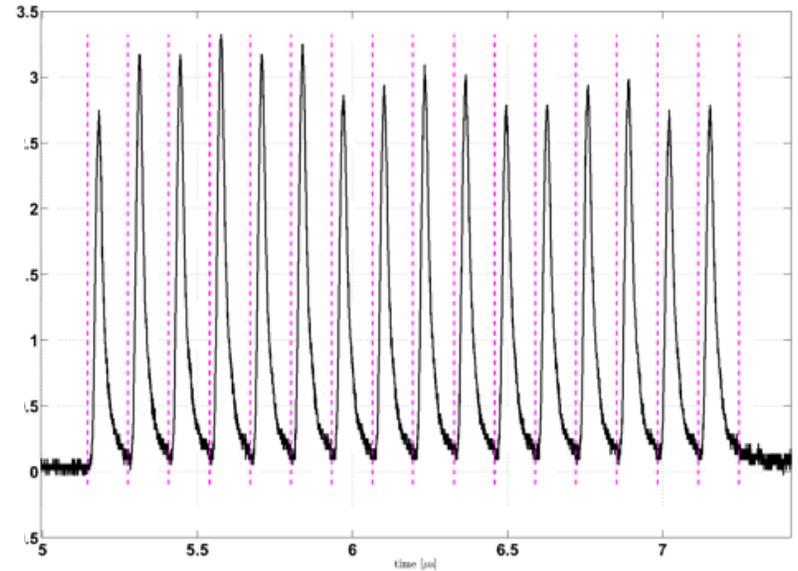


The Current Transformer

The Particle Detector Signal

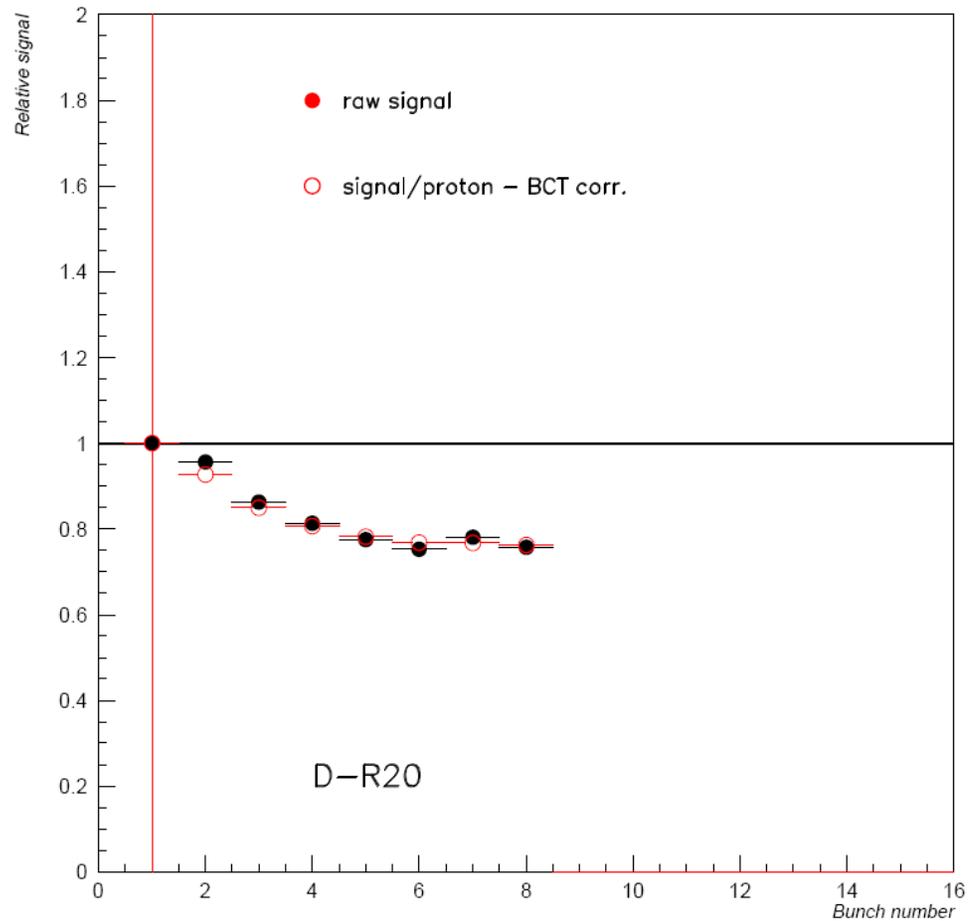


The Current Transformer Waveform



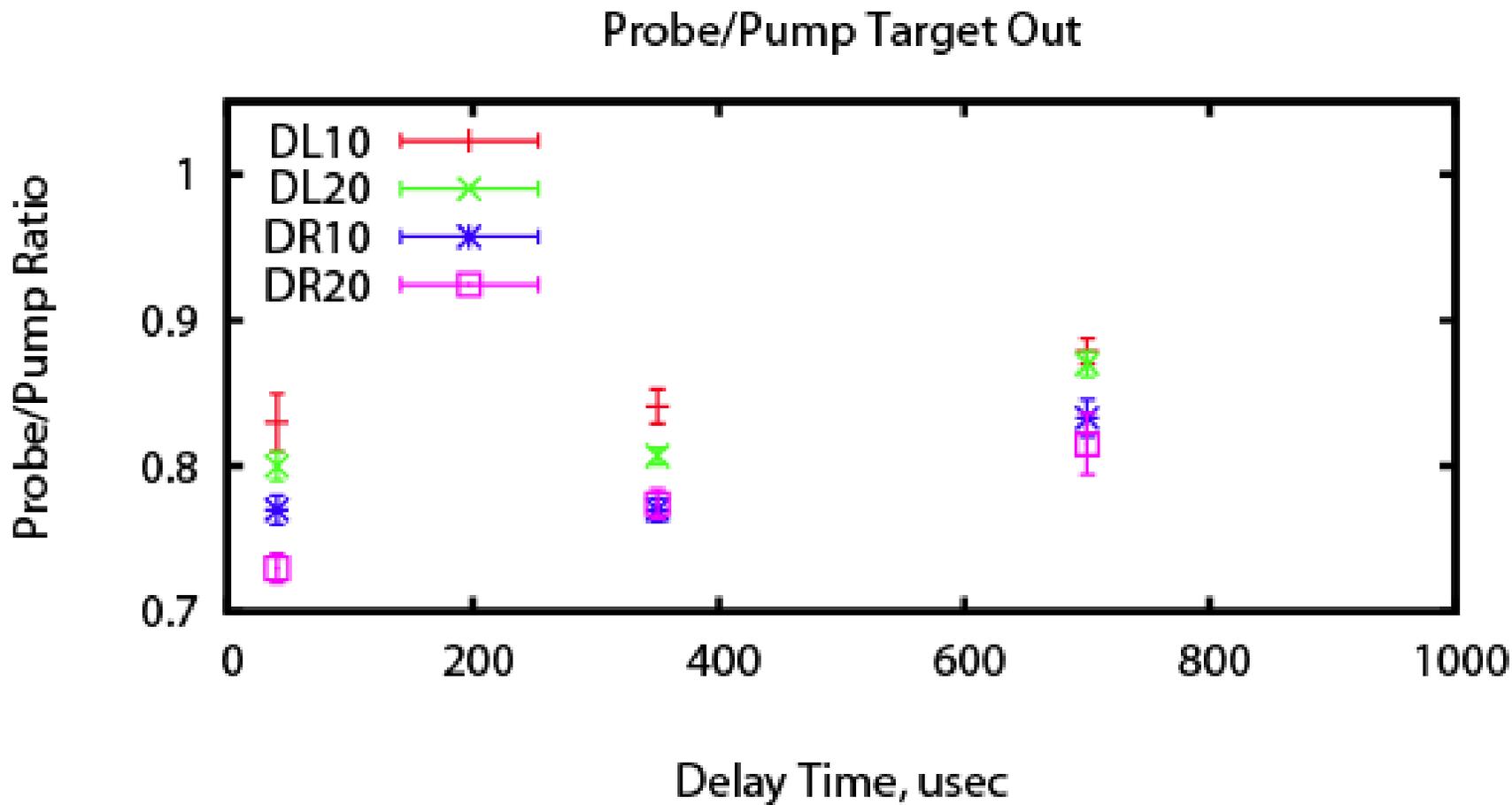
The Diamond Detector Waveform

The Detector Response



Detector response for a harmonic 8 shot

Target Out Data

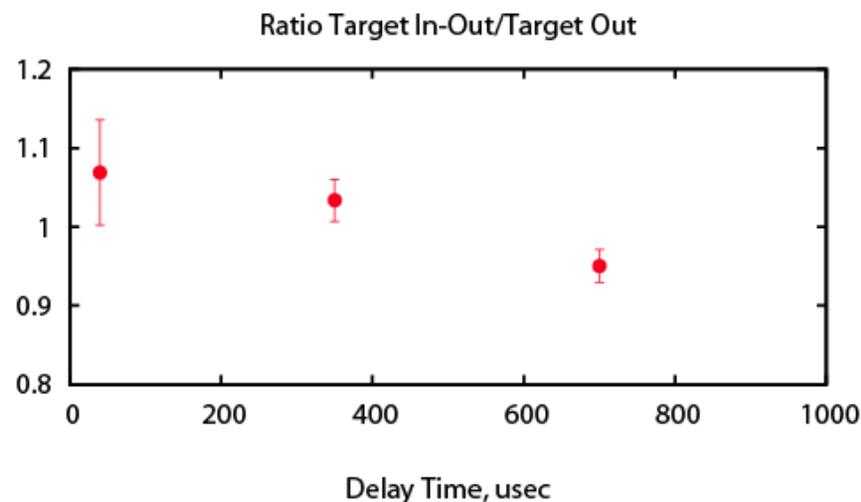
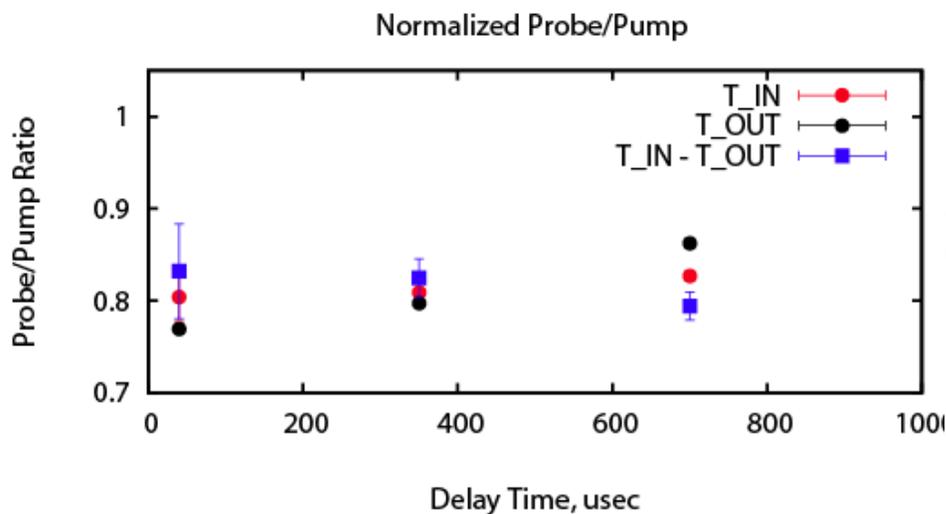


Preliminary Pump-Probe Data Analysis

Both target-in and target-out data showed smaller signals, relative to the pump bunches, for probe bunches delayed by 40, 350 and 700 μs .

Similar behavior seen in all 4 usable diamond detectors:

$$\text{Ratio} = \frac{\frac{\text{Probe}_{\text{target in}} - \text{Probe}_{\text{target out}}}{\text{Pump}_{\text{target in}} - \text{Pump}_{\text{target out}}}}{\frac{\text{Probe}_{\text{target out}}}{\text{Pump}_{\text{target out}}}}$$



Summary

Results are consistent with no loss of pion production for bunch delays of 40 and 350 μs , and a 5% loss (2.5- σ effect) of pion production for bunches delayed by 700 μs .