IBMS

INDIVIDUAL BUNCH MEASUREMENT SYSTEM

Overview & Results in 2000

System overview

- IBMS system aims at measuring the intensity of the individual LHC bunches
- Due to today's lack of calibration the system instead of absolute intensity only provides relative information of the bunches

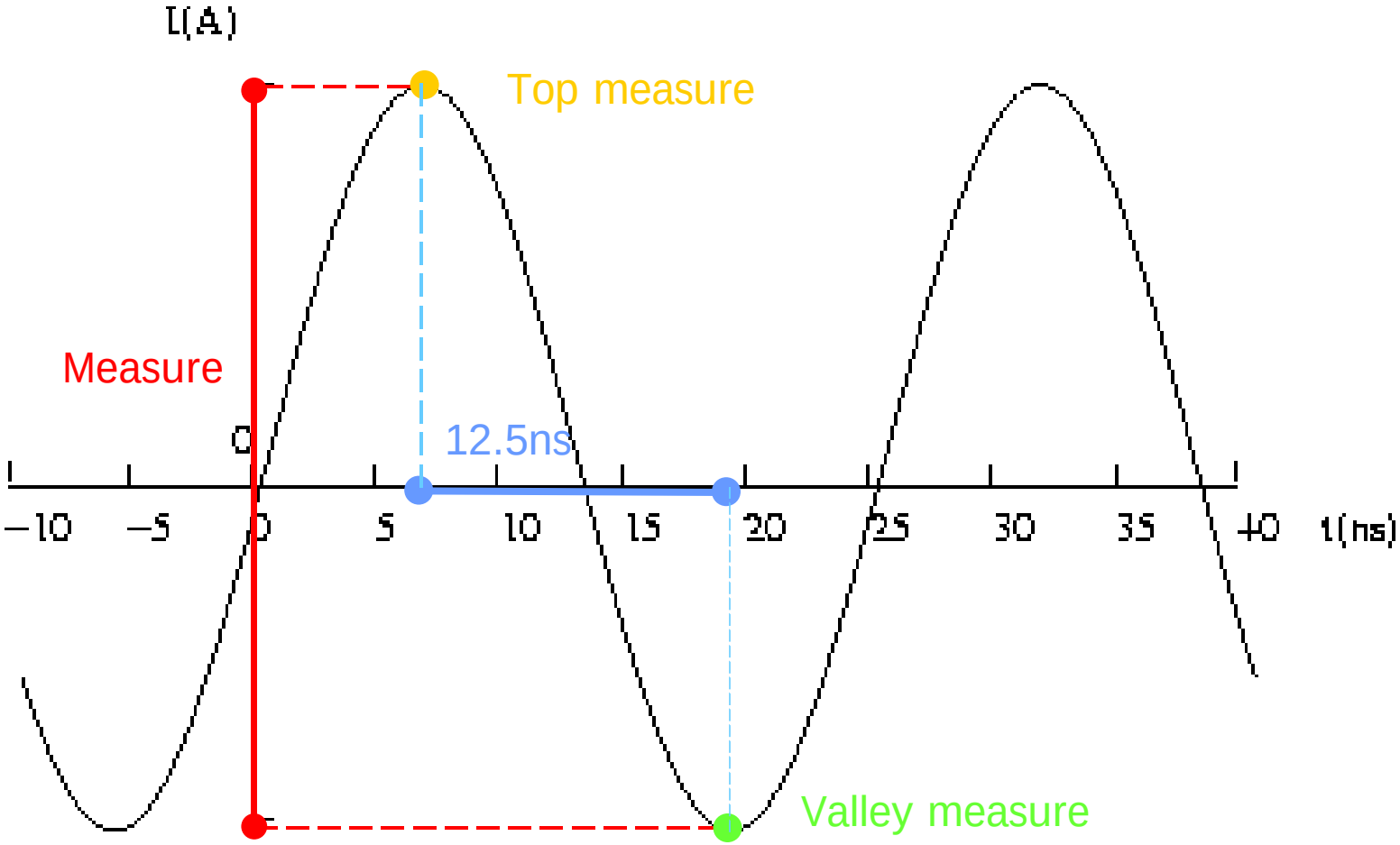
System overview

- SL/OP main interest on the system
  - Measuring the intensity of the individual bunches
  - Finding losses within batches (if any), where and when they are produced

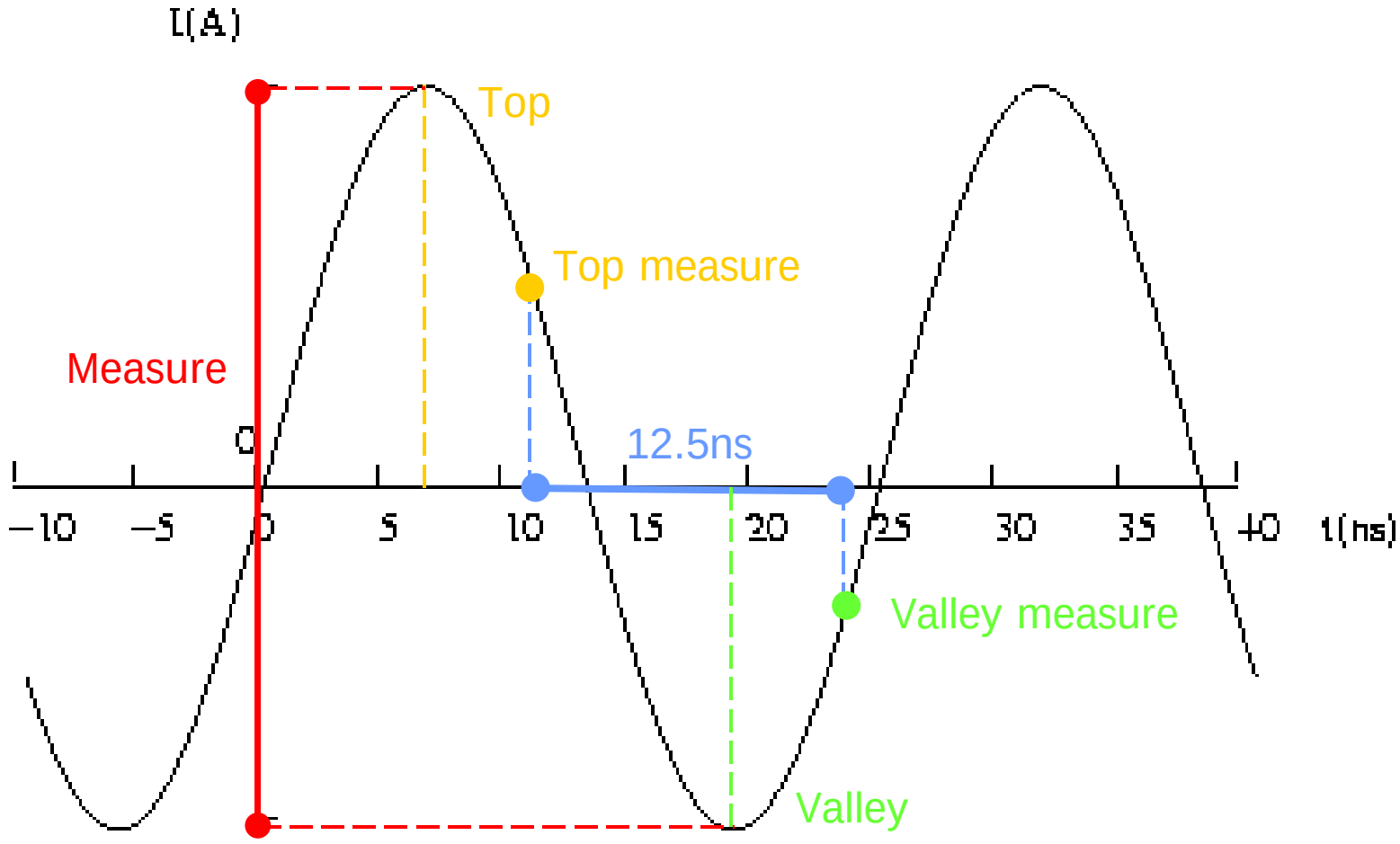
System overview

- Systems: TT2, TT10 & Ring
- User applications:
  - Data visualisation from a single system
  - Overall data visualisation at injection
  - Delay configuration (Ring)

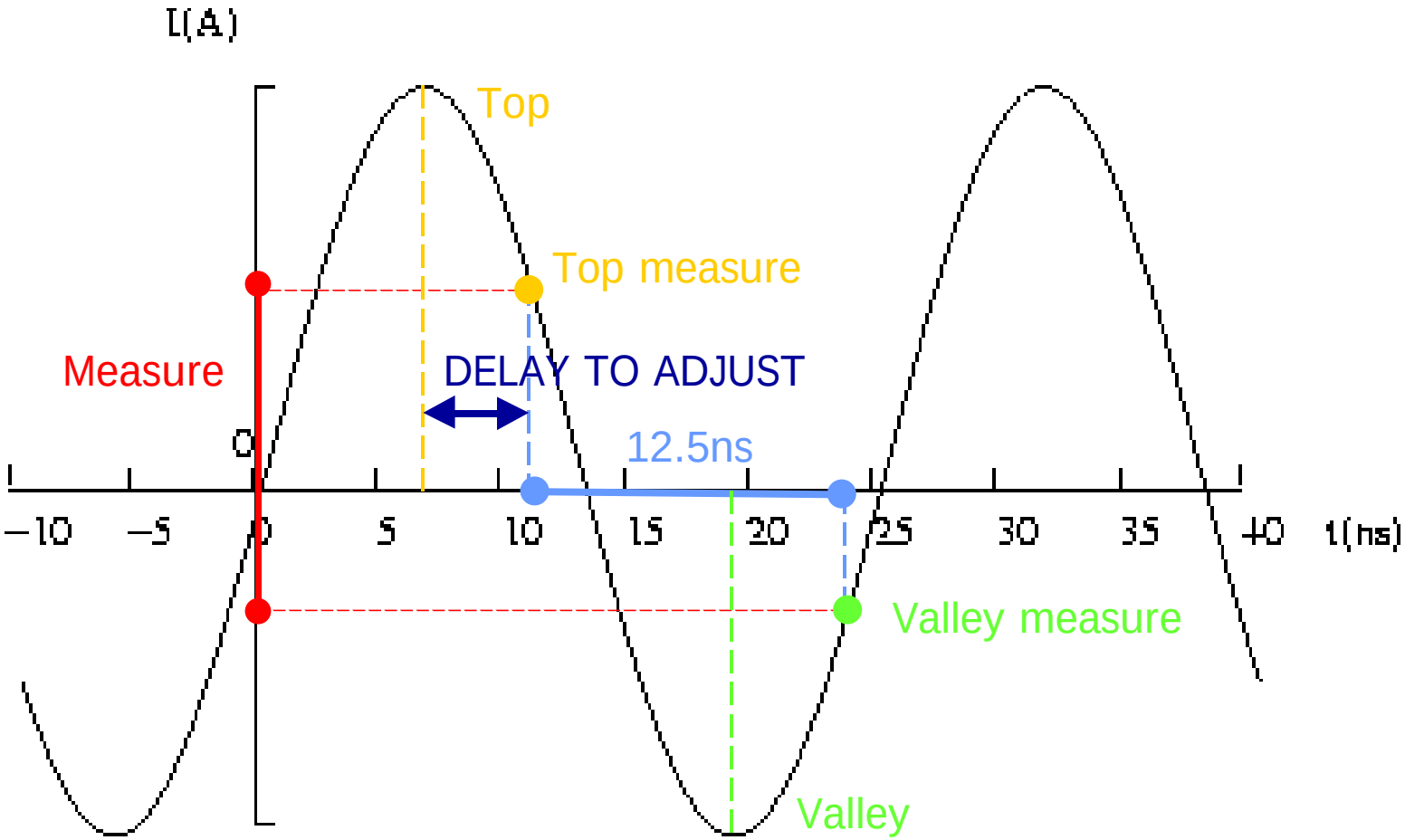
System overview



System overview



System overview

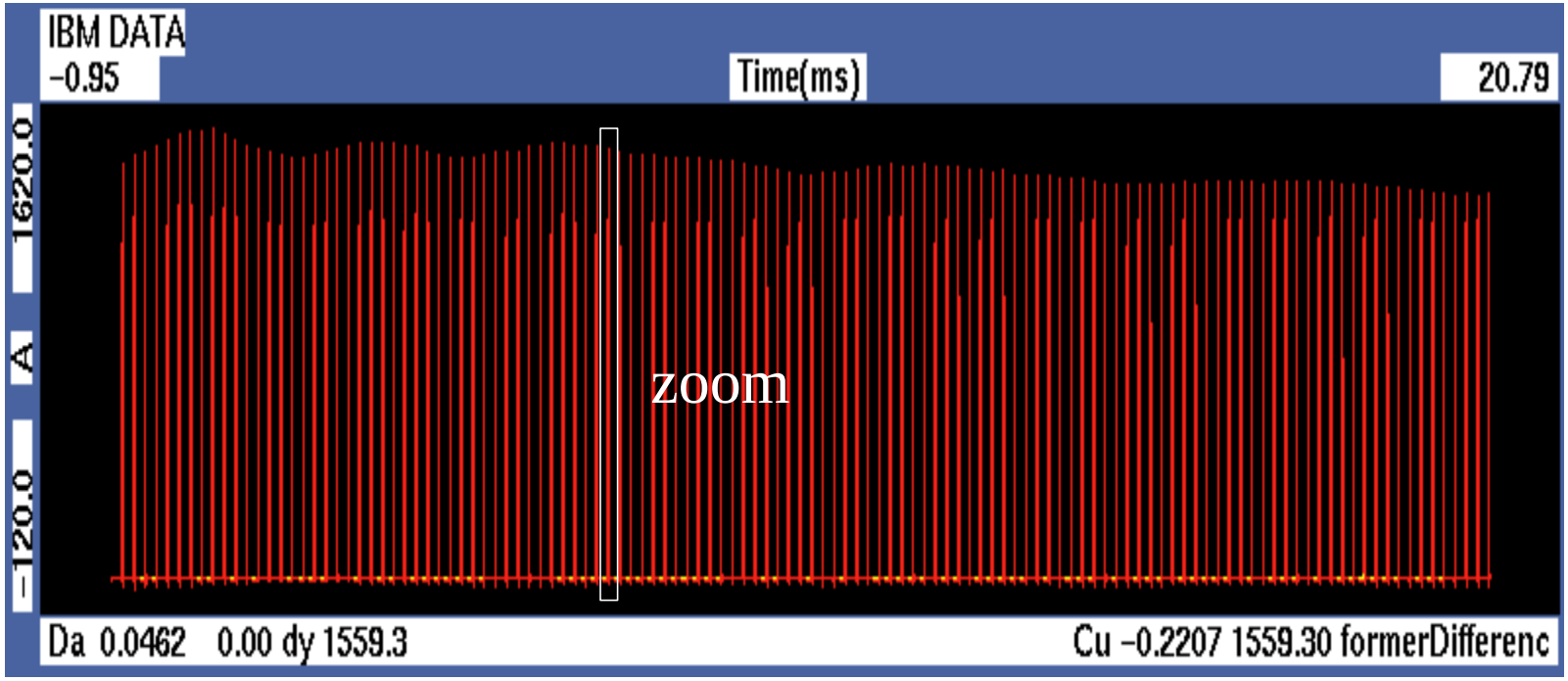


Results: Single System Acquisition

- Data views
  - Bunch by bunch measure for all turns and bunches selected

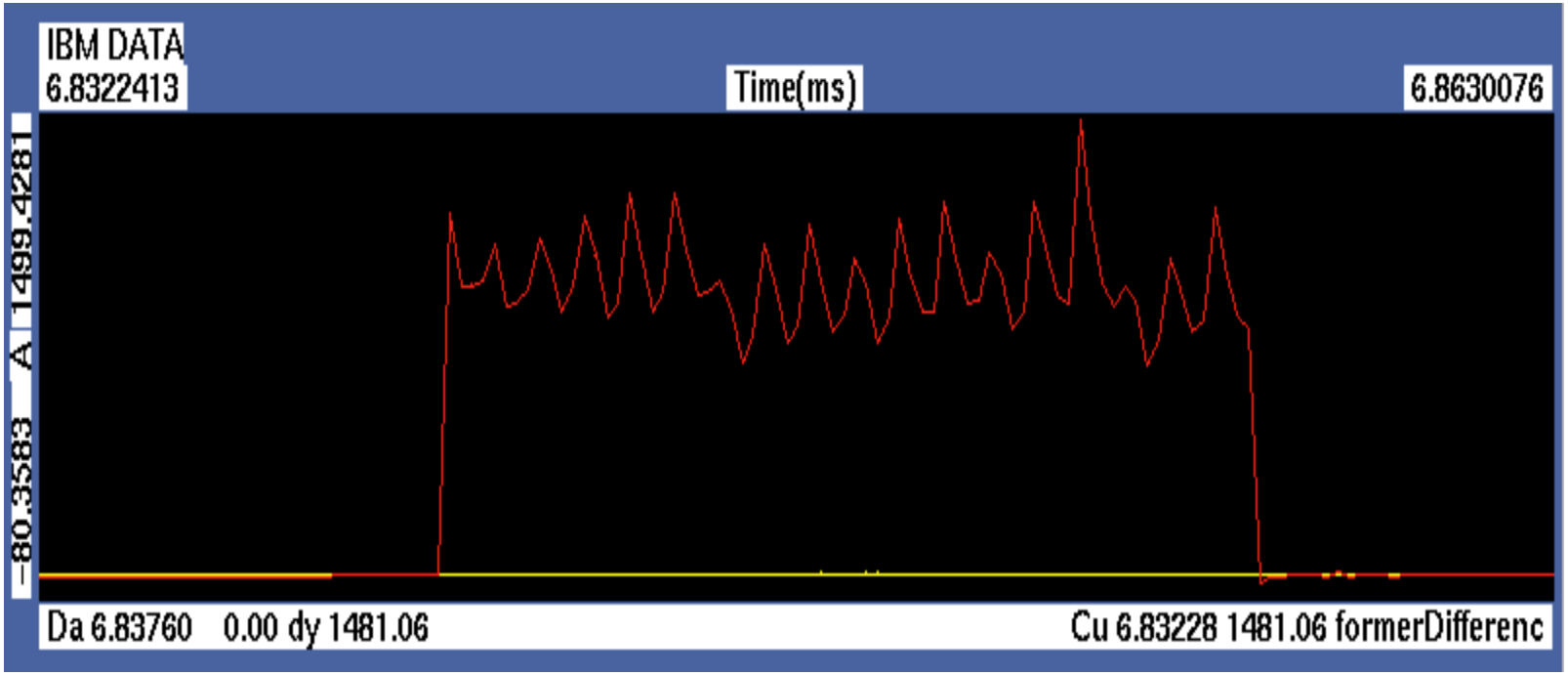
Results: Single System Acquisition

Ring: First 20ms of LHC test



Results: Single System Acquisition

Ring: batch zoom from a 20ms acquisition

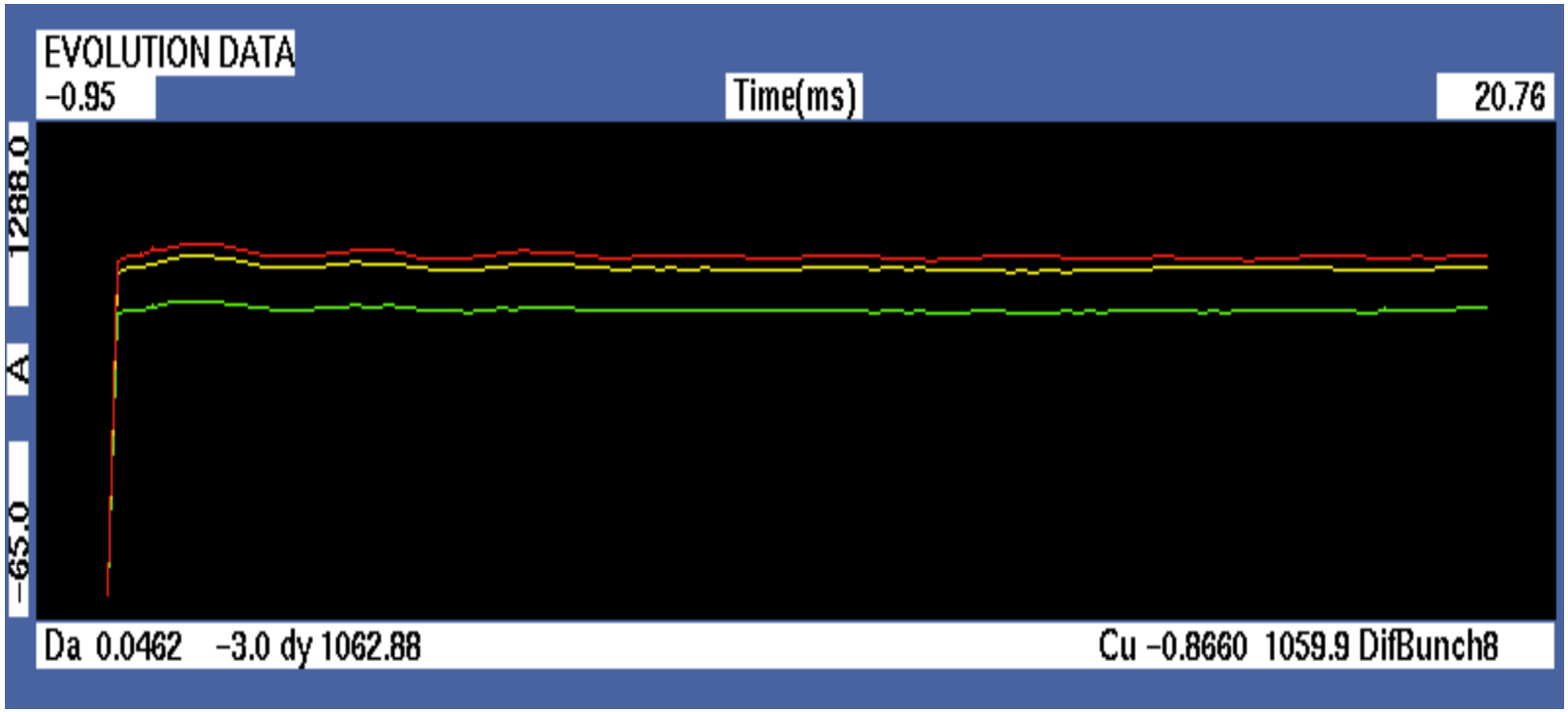


Results: Single System Acquisition

- Data views
  - Bunch by bunch measure for all turns and bunches selected
  - Evolution of maximum eight selected bunches for all turns

Results: Single System Acquisition

Ring: turn by turn evolution of 3 bunches

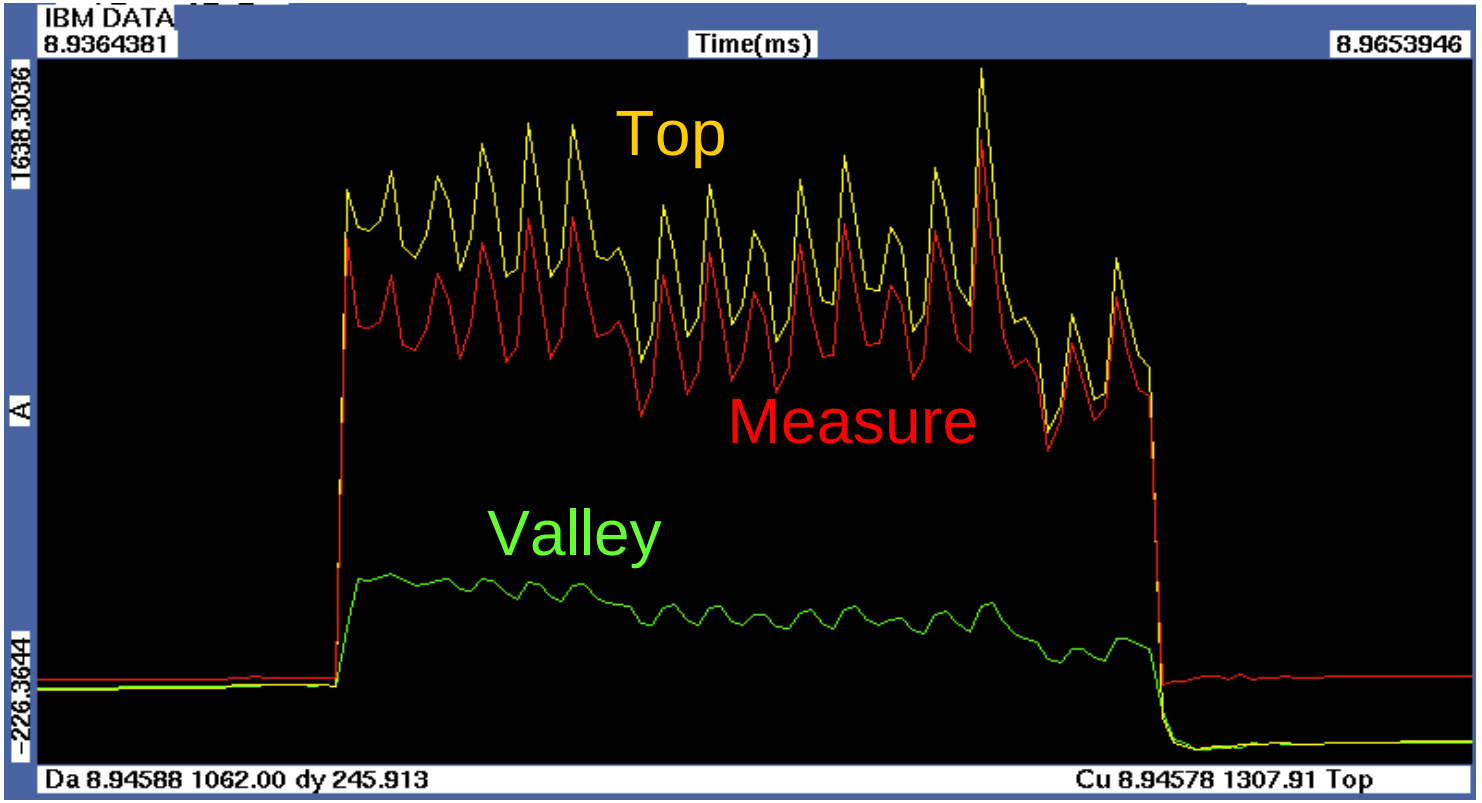


Results: Single System Acquisition

- Data views
  - Bunch by bunch measure for all turns and bunches selected
  - Evolution of maximum eight selected bunches for all turns
  - All acquired data (top, valley & difference). Reference of the measure liability, i.e. proper delay setting

Results: Single System Acquisition

Ring: batch zoom from a 20ms acquisition

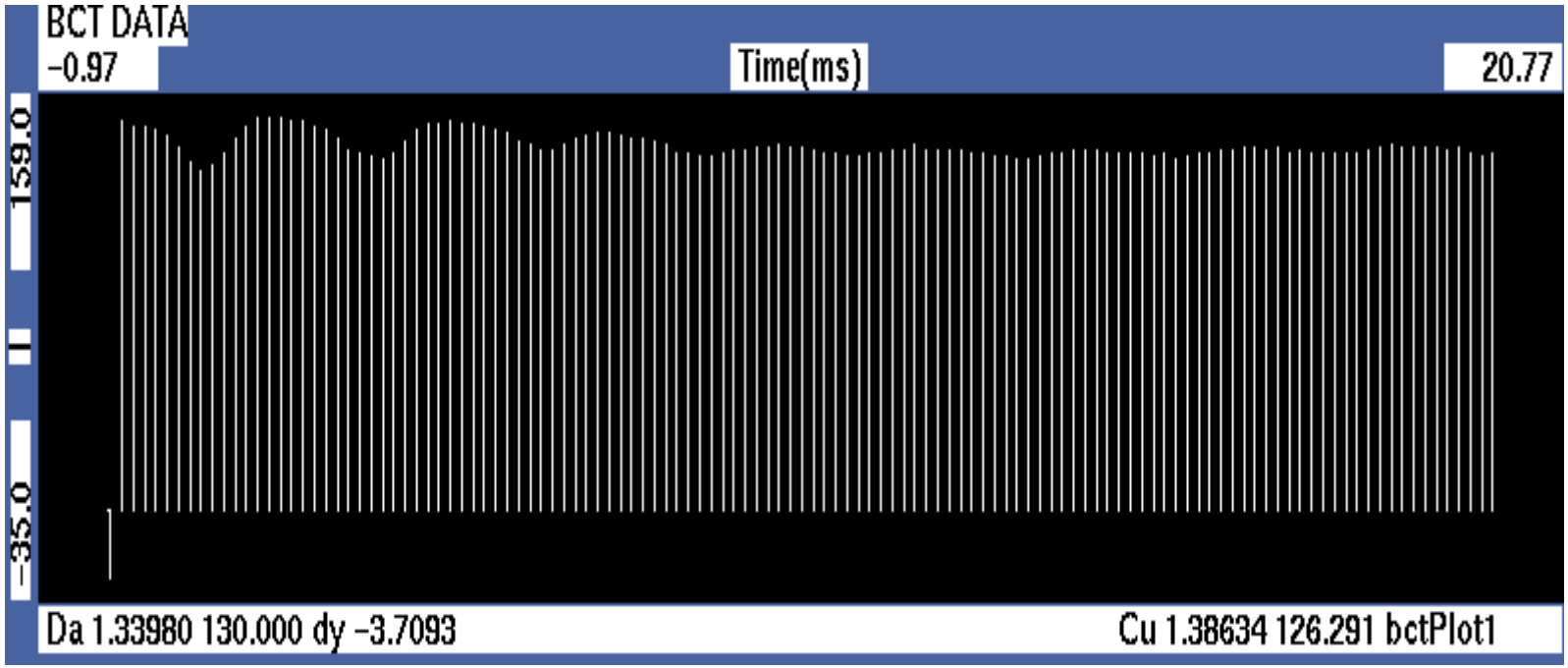


Results: Single System Acquisition

- Data views
  - Bunch by bunch measure for all turns and bunches selected
  - Evolution of maximum eight selected bunches for all turns
  - All acquired data (top, valley & difference). Reference of the measure liability, i.e. proper delay setting
  - Turn by turn BCT acquisition for all selected turns

Results: Single System Acquisition

Ring: Turn by turn beam measure. First 20ms

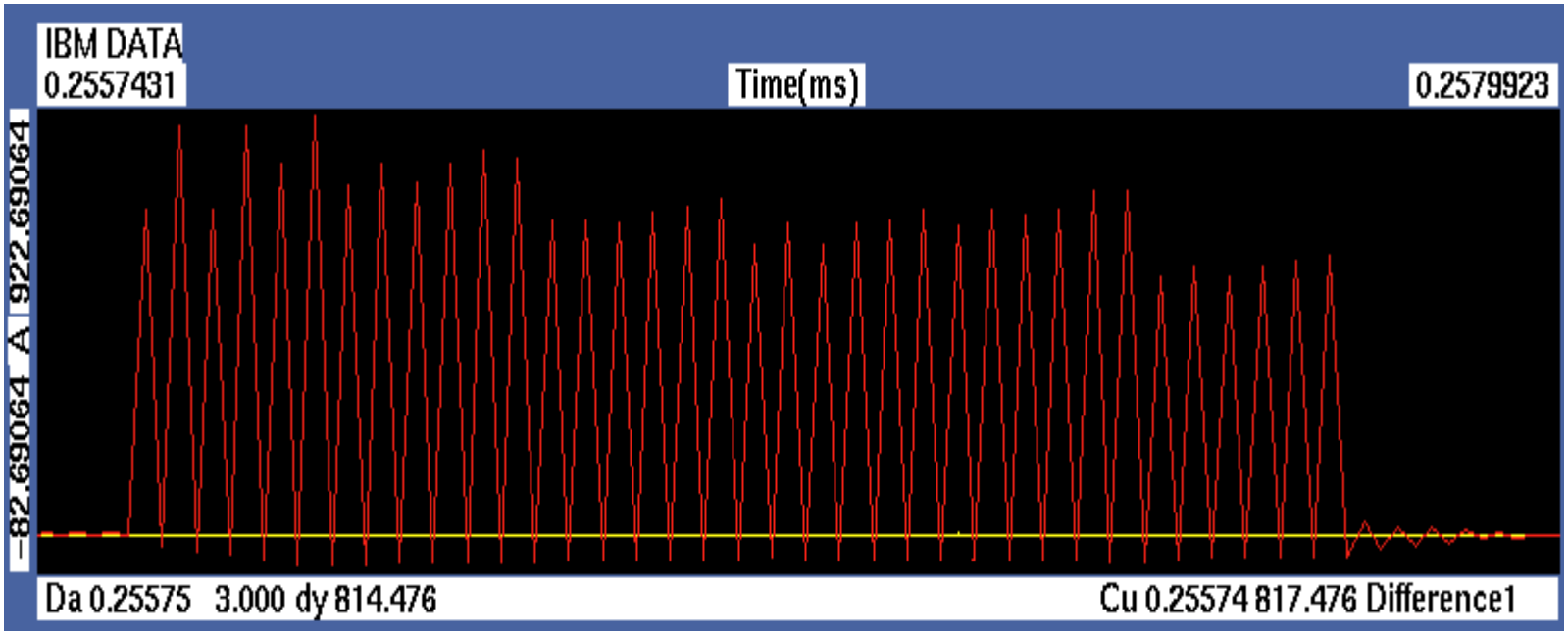


Results: Single System Acquisition

Ring: Other results

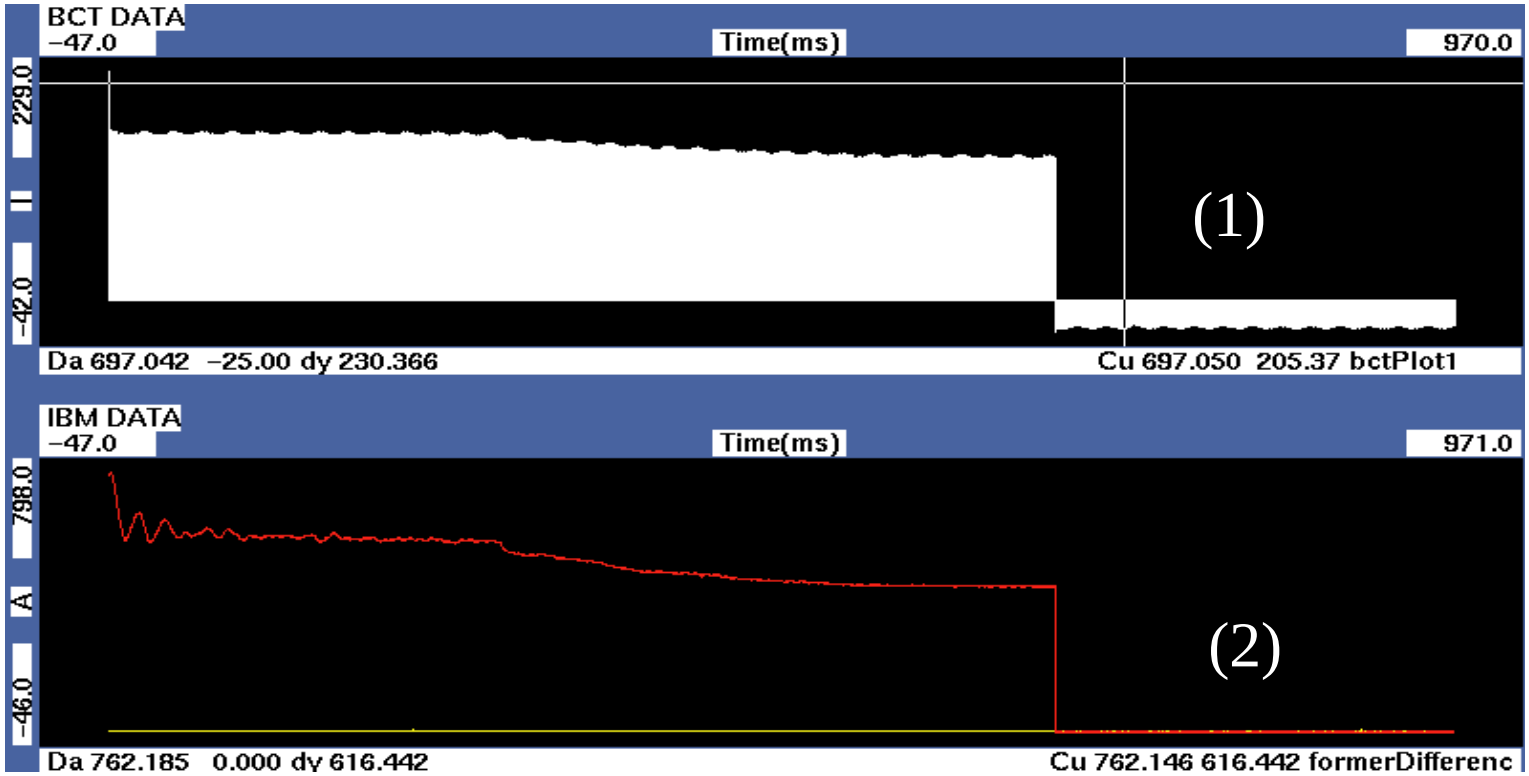
Results: Single System Acquisition

Ring: 50ns bunch spaced batch



Results: Single System Acquisition

Ring: Acquisition along 900ms (P2). (1) Turn by turn batch acquisition. (2) Individual bunch measurement of one bunch

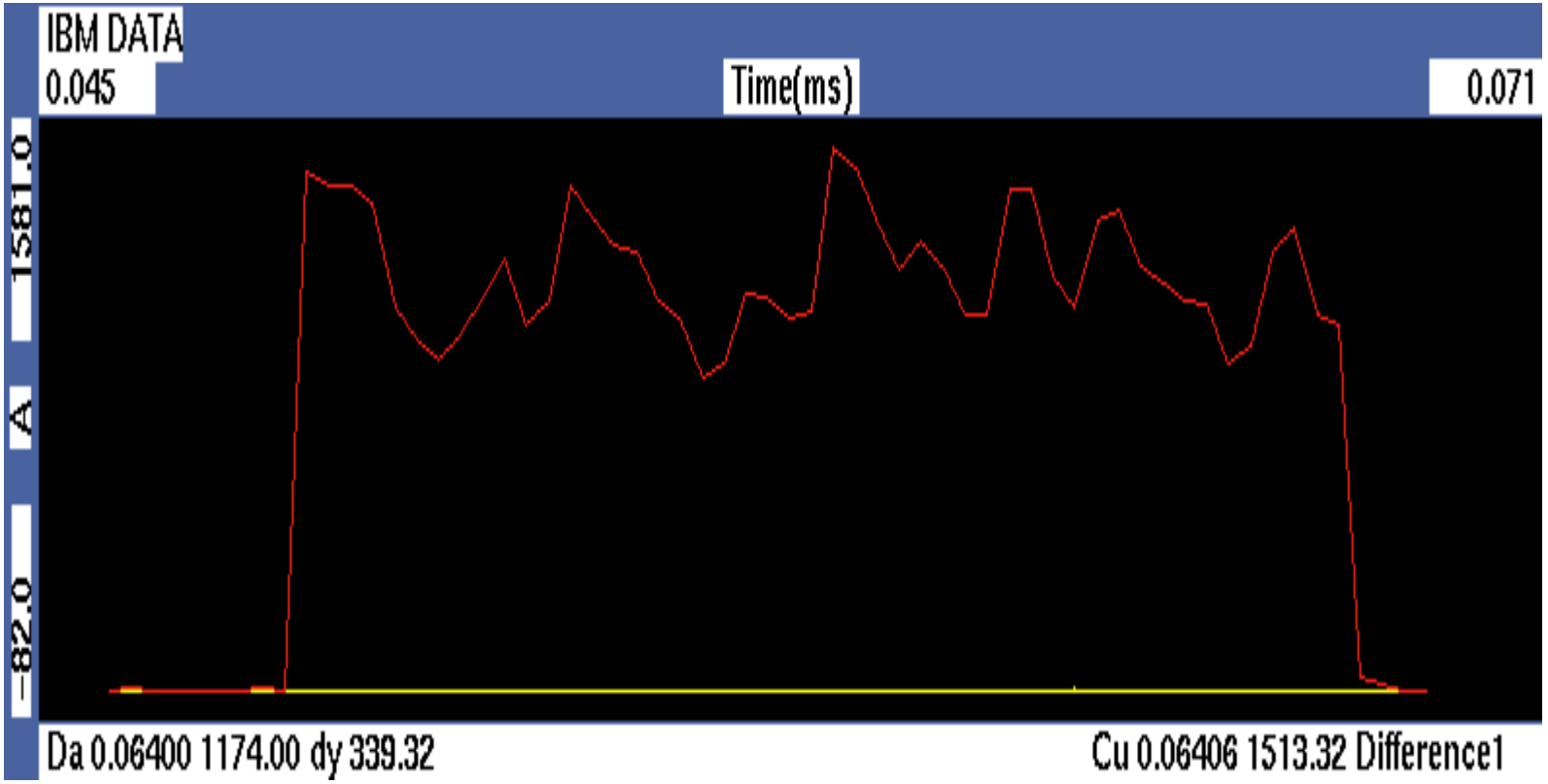


Results: Single System Acquisition

TT2: Some results

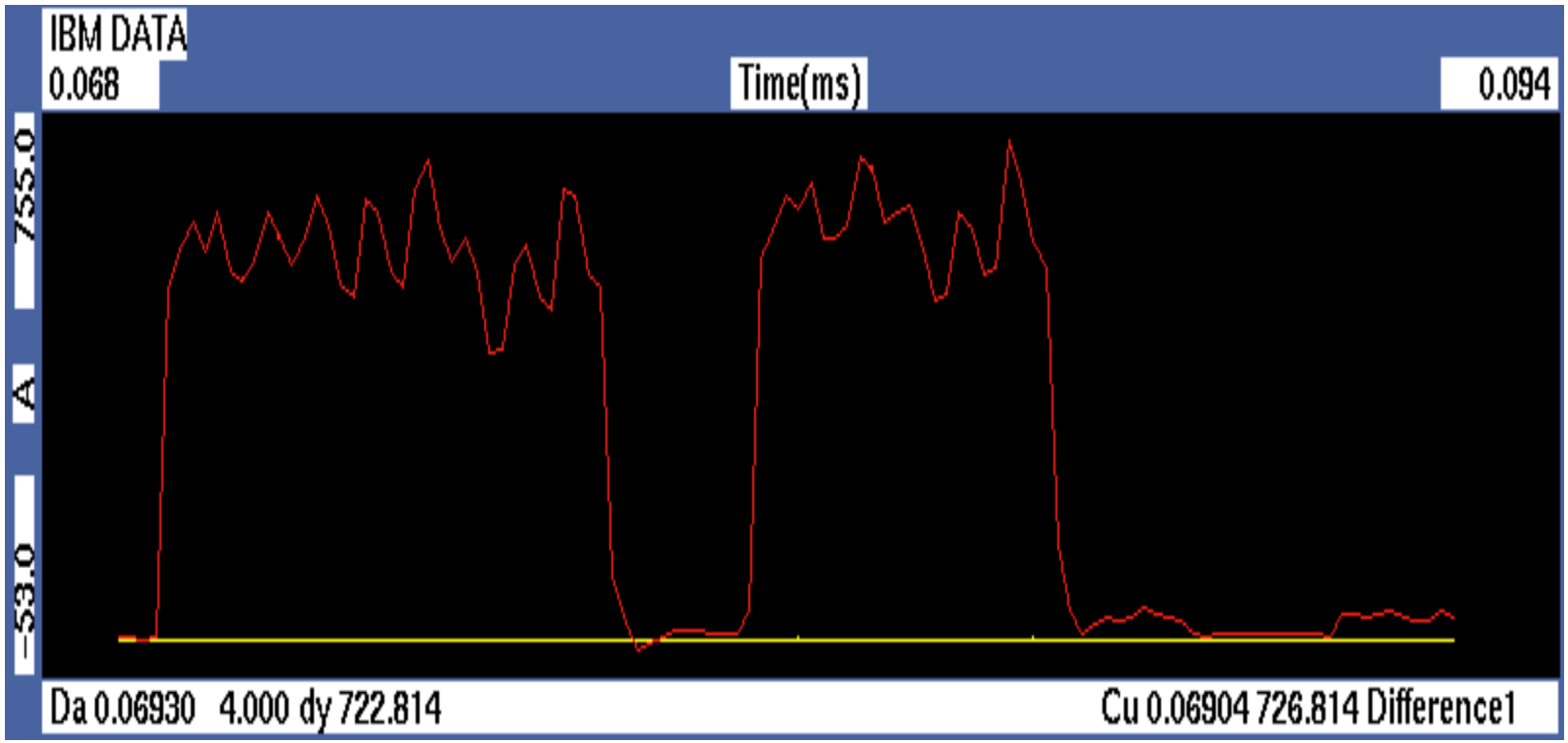
Results: Single System Acquisition

TT2: LHC test injection



Results: Single System Acquisition

TT2: batch with a hole

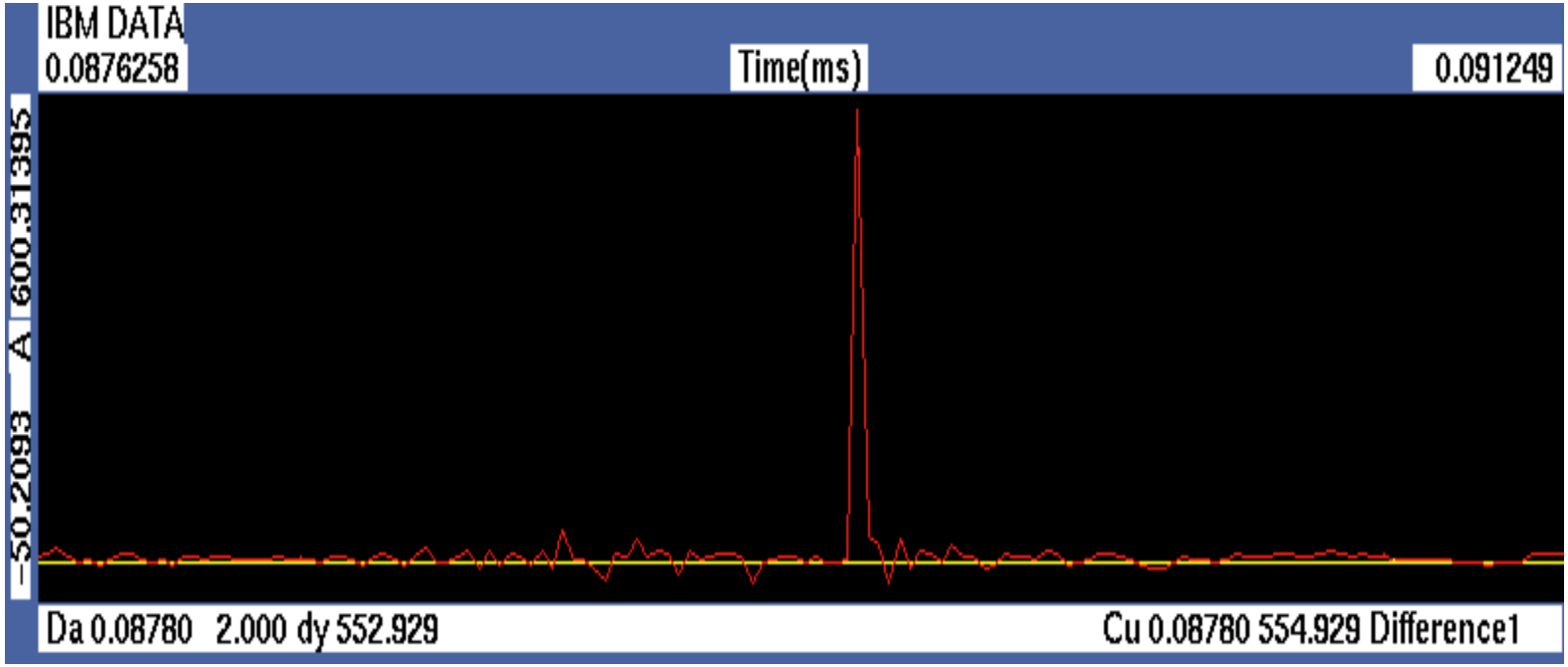


Results: Single System Acquisition

TT10: Some results

Results: Single System Acquisition

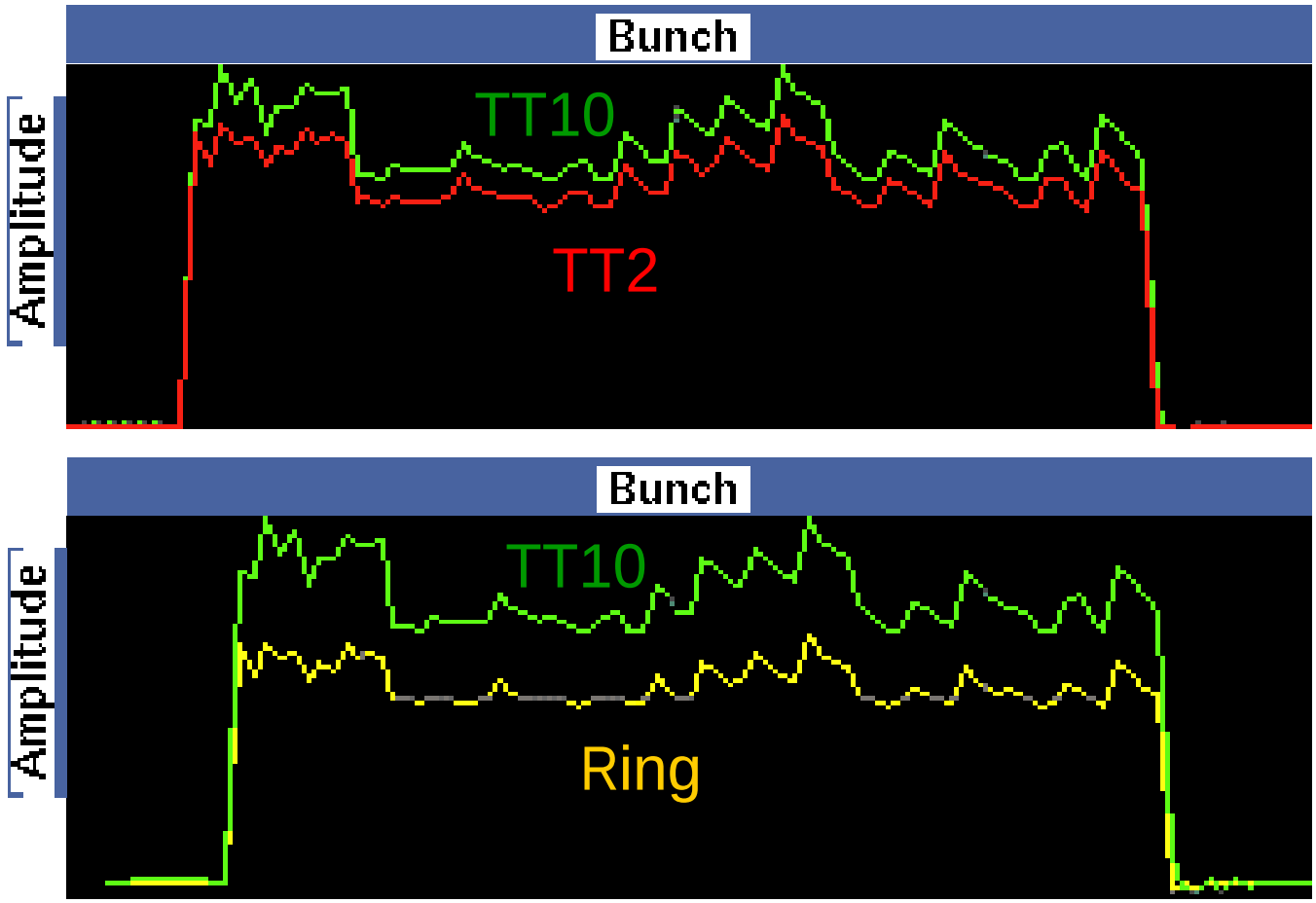
TT10: 1bunch batch



Results: Overall acquisition

- Synchronised acquisition of the same beam is performed from the three systems
- Data are matched to see 3 batches
- TT2 & TT10 injection and first four turns for the ring are available
- Warning: shape ok, absolute value not ok, there is no bct cross-calibration

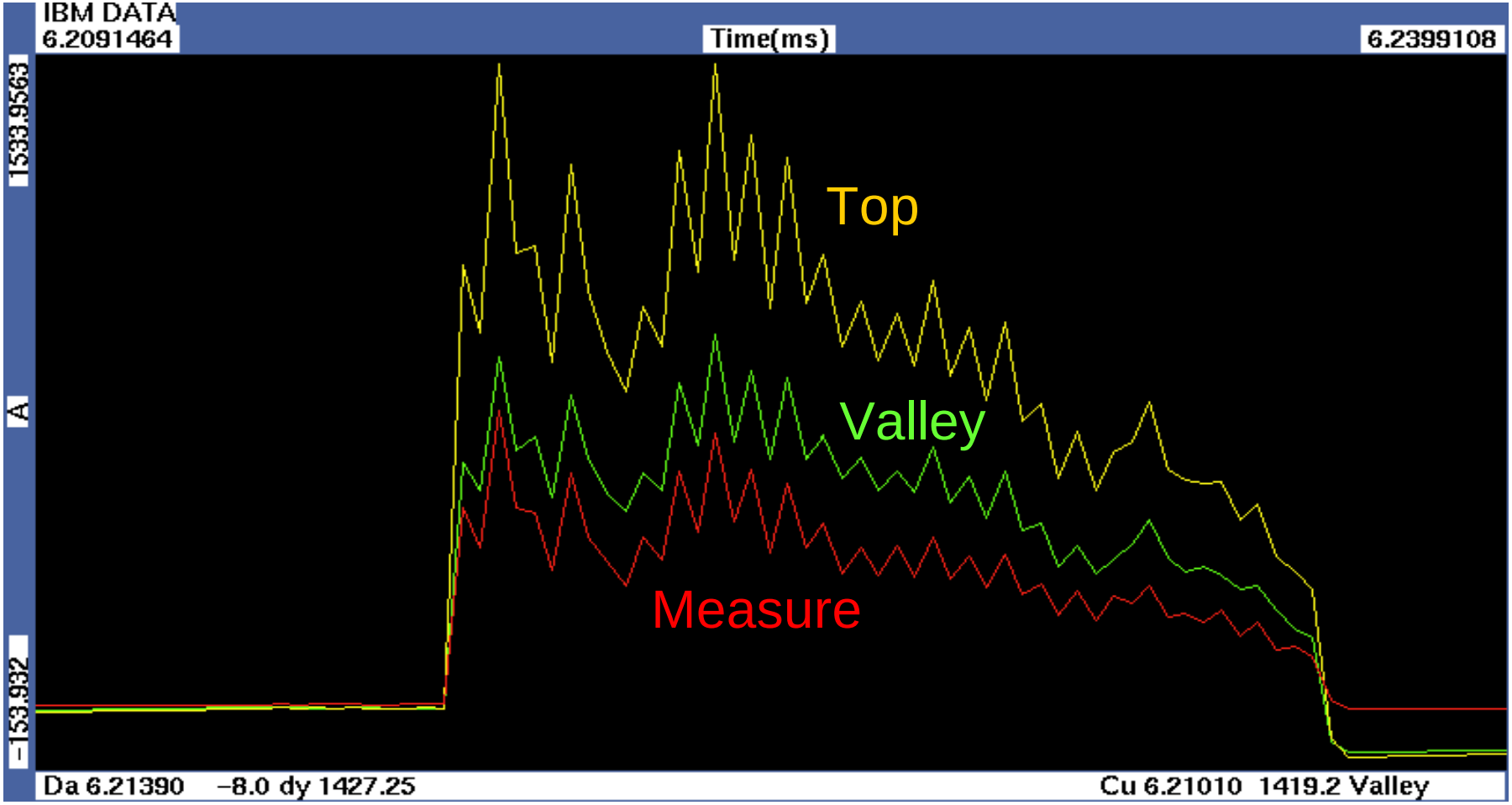
Results: Overall acquisition



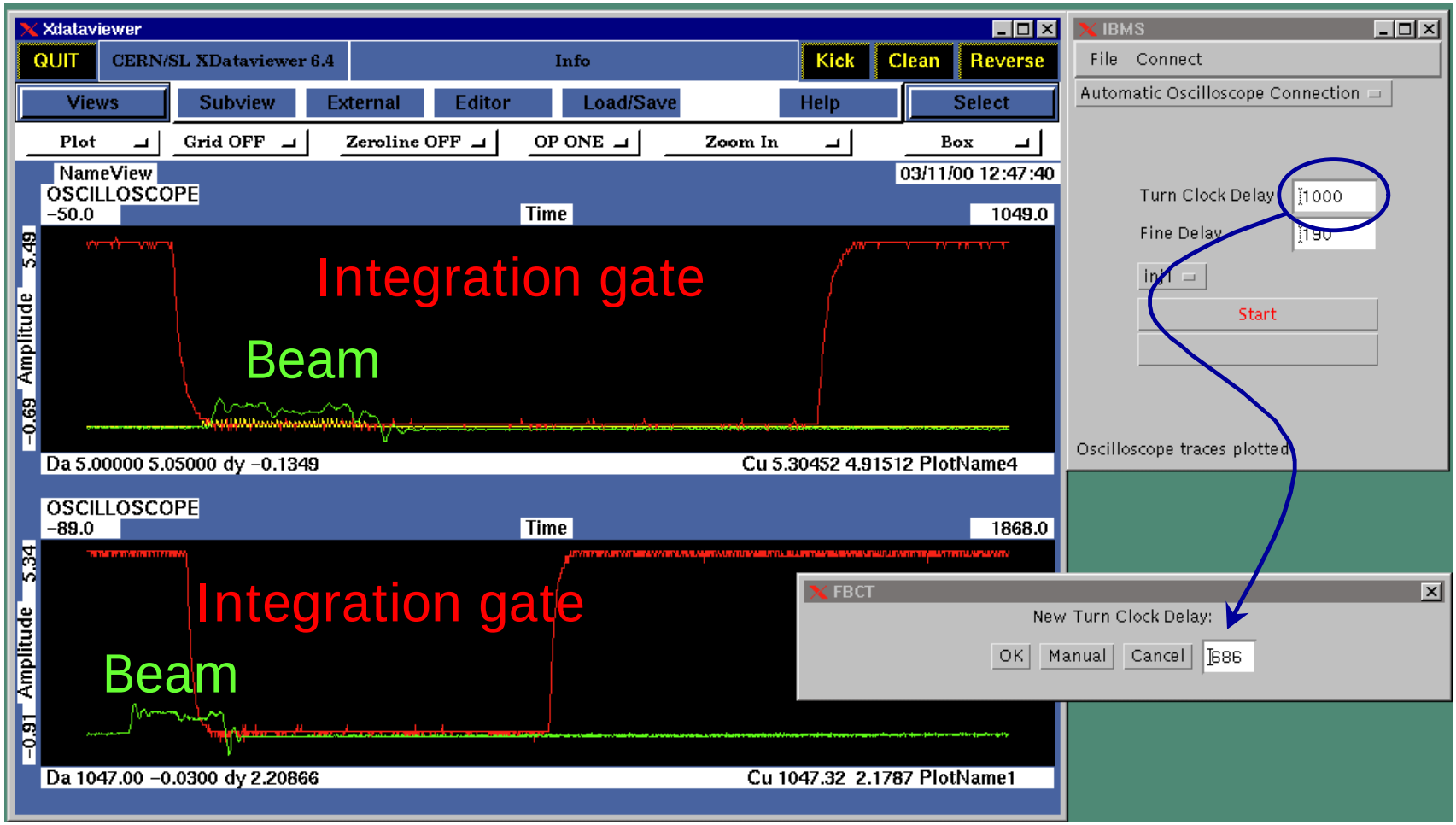
Results: Delay setting

- An oscilloscope is accessed remotely to read the signal traces that will be afterwards analysed to compute new delays
- Currently the delay setting is only available in the Ring

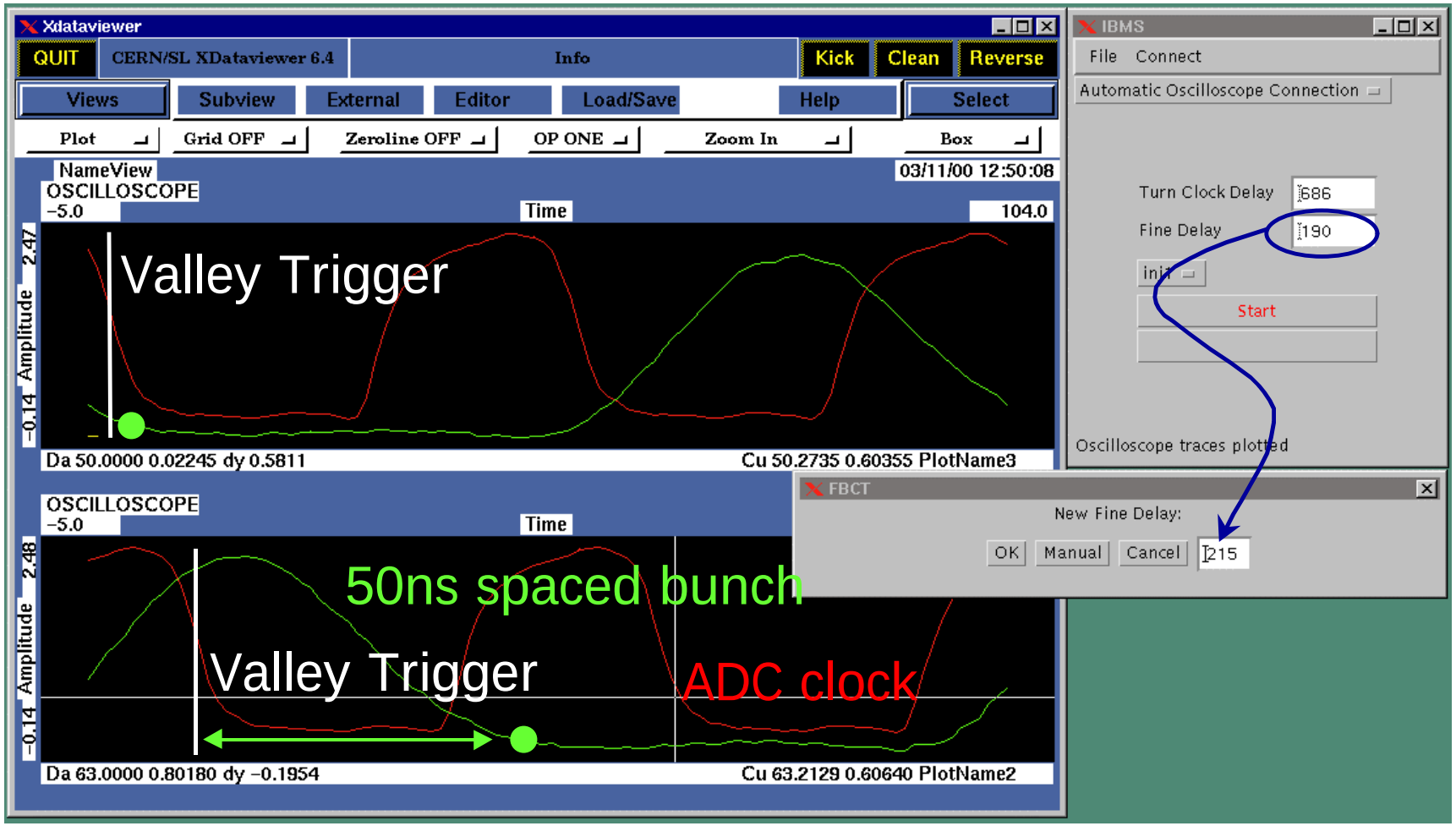
Results: Delay setting



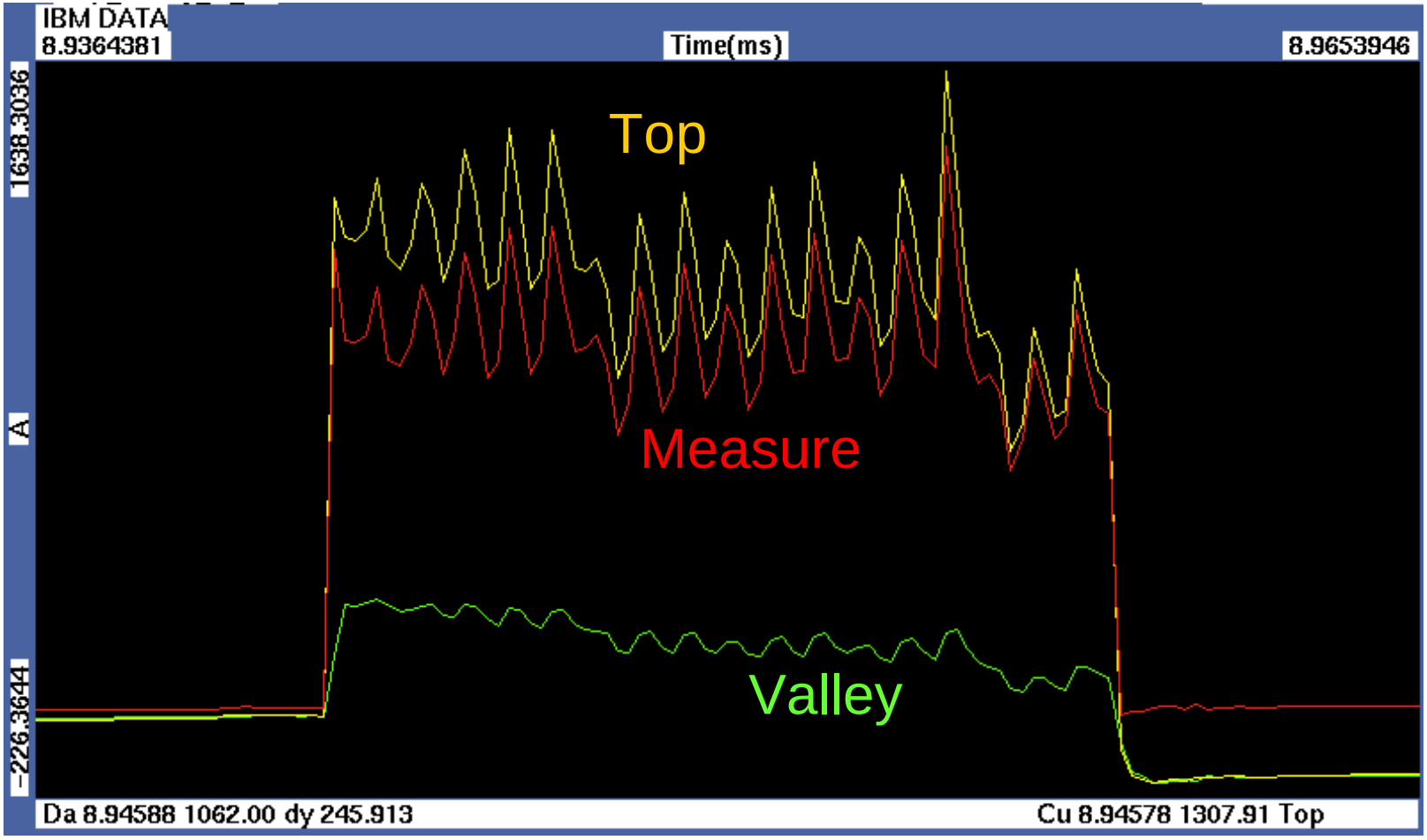
Results: Delay setting



Results: Delay setting



Results: Delay setting

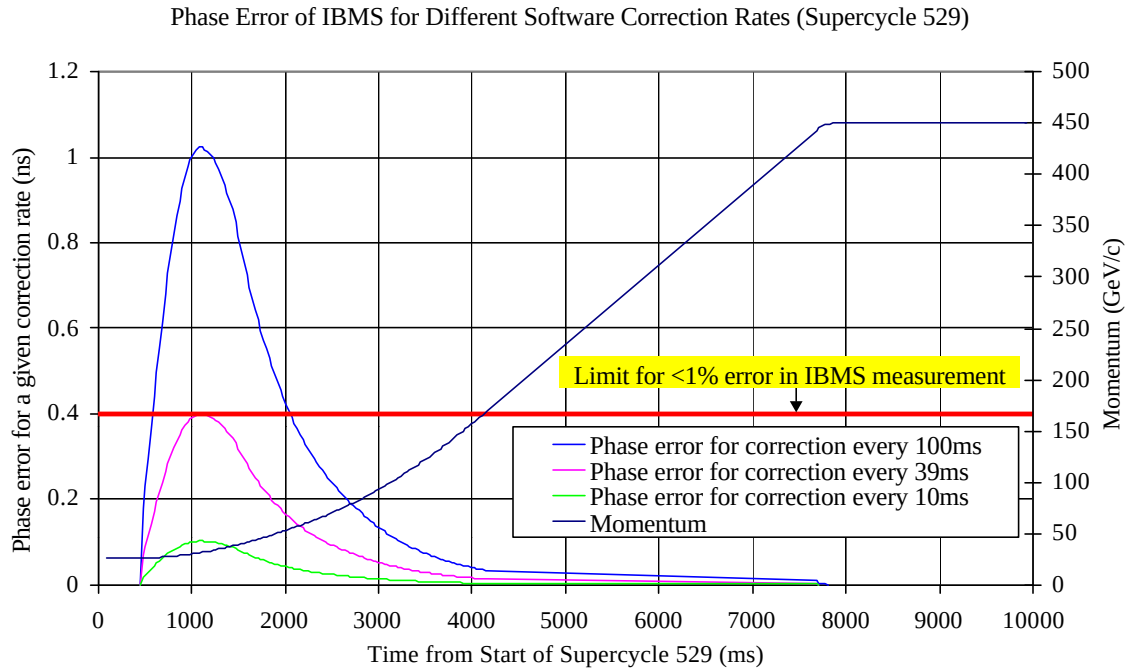


The future

- The system will be maintained all along next year until a new system based on a new BCT detector takes over in 2002. This new system includes beam position.
- For next start up the system will incorporate an oscilloscope per system to be able to deal with delay setting everywhere

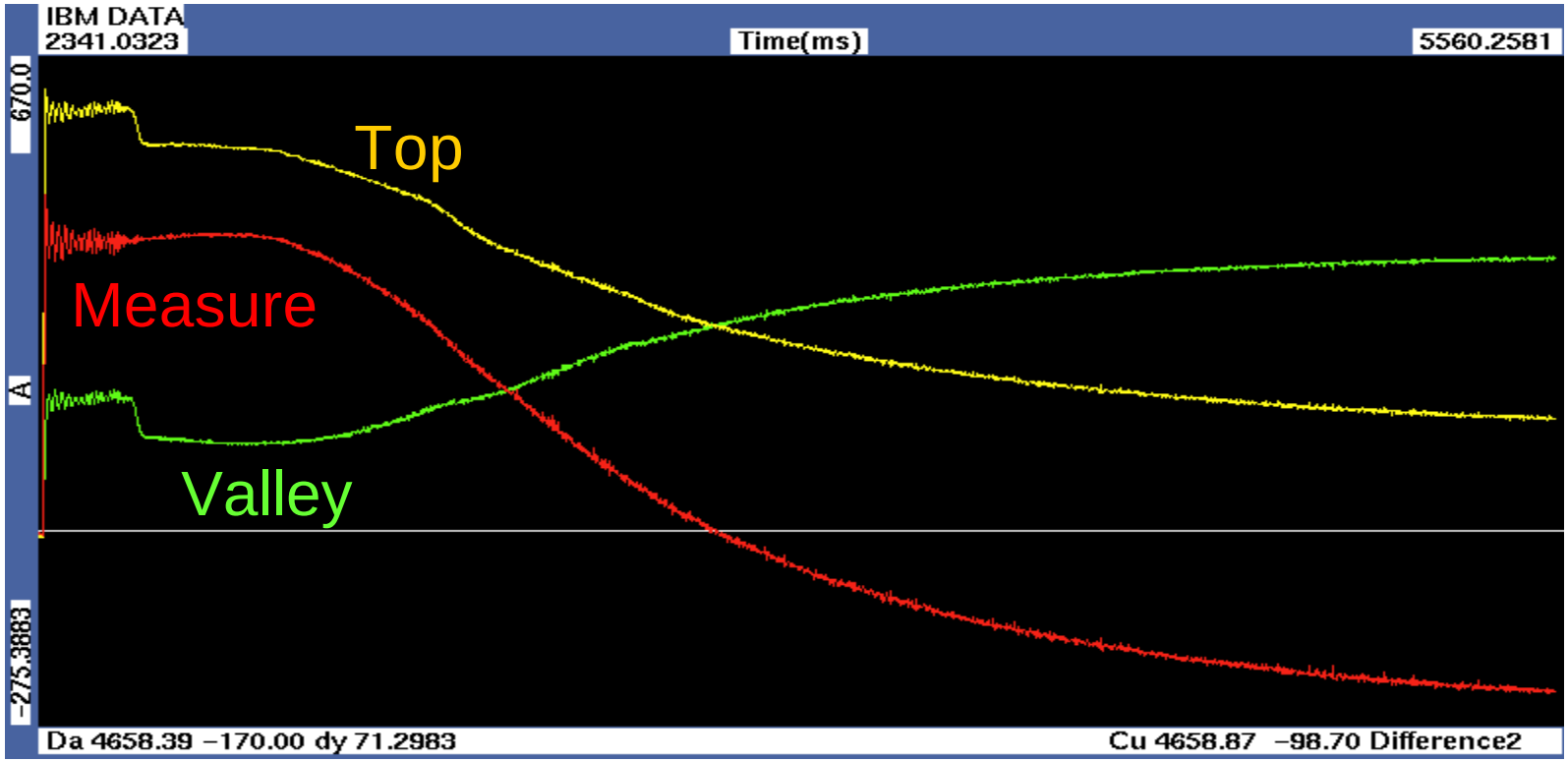
The future

- Also for next start up phase correction due to momentum change will be available



The future

Ring: Phase error for 1 bunch along 3s



Finally...

- Including an OP linkman (R. Giachino) to collaborate in the project has been most useful and helpful. It has allowed us to define clearly and attack the lacks of the system to render a better solution