bunch length measurements at the SPS
## (support for the discussion)

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operational and expert tools

- on LHC-type WCM (APWL)
  - MD scope
  - SPS Beam Quality Monitor
  - Bunch Length Measurement (ABWLM)
  - SPS Tomoscope (newest)
  - PS2SPS measurement (coming soon)

- on SPS-type WCM (AEW)
  - Mountain Range, Picoscope, Peak Detector

- all synchronised to GMT, f_{rev}, f_{RF}
  - i.e. 5 ns buckets

APWL acquisition systems

- MD scope
  - unsplit, best quality signal
  - expert setup (RF-BR)
  - GUI available, manual save to .npy or .asc

- SPS Beam Quality Monitor
  - automated, fixed (inj, ramp, flat top)
    - at flat top needs ok rephasing
  - profiles and results logged

- Bunch Length Measurement
  - two modes, set by user (OP and MD)
    - MD mode for e.g. turn-by-turn acquisitions
  - OP mode publishes e.g. every 20 ms
  - results logged for OP mode (not profiles)

- …usual considerations about accuracy and precision apply
  - 10% accuracy a good guess

APWL and sampling pit 2023
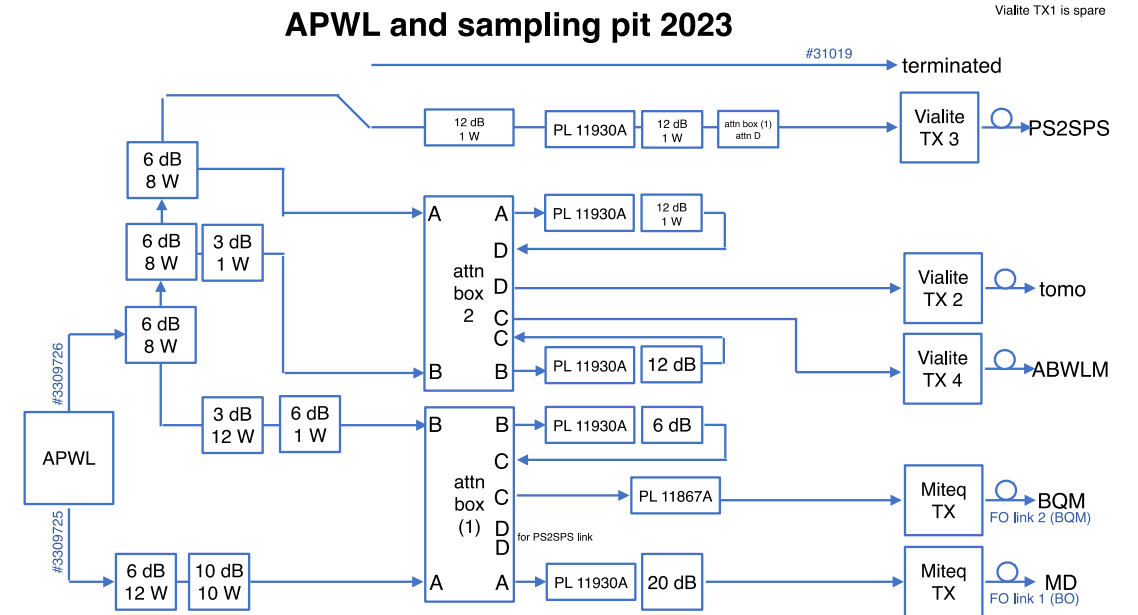
22 April 2023, 5 am

- real measurement for ~5 s, then flatline for rest of cycle
  - first observation of such kind
    - unfortunately at critical time
  - compatible with setting mix-up
    - setting copy to LHC2
    - no "send" of OP mode settings
- solutions for bunch length that day
  - guess-scale from injected values
  - remeasure with similar conditions
- possible system improvements
  - manual check when needed :)
  - OP mode to be set at setting generation
    - started first investigations with OP, quite some work implied