BPM Meeting with Rhodri Jones and Jocelyn Tan at CERN – RD, SJ

- Linac4 tests to be carried out in 2-3 weeks time, using a 3 MeV H^- beam. Aims:
  - test electronics and the BPM from DIPAC paper
  - make first ToF measurements
  - synchronise LO and reference freq. to within 1ms

- Updated RJ and JT on the NTG BPM design. Mentioned they will provide everything up to the SMA connectors quoting £22k all in. Was considered a competitive price for this setup with 6 BPMS.

- CERN still debating the relative merits of button versus shortened stripline (SS). A phase tolerance of 0.1^o was required but the button couldn't provide this. Extensive CST simulations have been performed for SS but not for buttons.

- CERN 3MeV SS is 100mm flange-to-flange. The 74mm BPM should be good enough for ns resolution.

- RJ agrees the FETS 10nm resolution depends on the electronics. Increasing the diameter of the button by a factor of 2 won't affect this too much.

- Button BPMs are non-linear in radius so larger errors further off-axis. Knowing this could a fast button (2GHz?) be used between the fast chopper and beam dump?

- The CERN SS electronics setup was briefly described:
  - digitiser has 10MHz bandwidth with a sampling rate of 88MSa/s
  - RF downmixes to intermediate frequency then filters
  - ref. freq. = 352MHz, LO = 330MHz, then downmixed to ~22MHz
  - sampled at 4 x intermediate freq.
  - all channels are then sampled, with diff./sum performed
- Can't go lower than 10MHz as it is necessary to look at properties of the bunch, e.g. head versus tail.

- The bunch length for FETS is ~1ns. Will the same NTG buttons work for the fast BPM? Need to ask NTG as the signal may be too small.
- Maybe use a SS BPM for this? Get approx. five times more signal out with an SS over a button.
- Limited to 100-200mV signal with 4 buttons in one BPM. Might not be enough.

- CERN are willing to lend us a constructed SS BPM and button bodies to test (long term loans are dependent on the collaboration contract) as the FETS bunch train properties are similar to Linac4 (10mA current, 0.4ms pulse, 352MHz, etc.).