**What can we do with the new amplifiers implemented?**

Radial position measurements:

Present: for any radial probe take around 1 hour. Method is to adjust the radial probe, observe where the probe starts to intercept the beam and take step by step measurements moving the probe inward until the whole beam is intercepted. This is a very useful method to learn about the beam structure, but quite slow to obtain the position of the beam at it's CoM. There is a phase advance between the position of the intercepting probe and the bunch monitor which picks up the signal leading to a certain amount of inference required about what is really happening.

Future: will have real time radial position readout at the triangle plate monitor (for at least half of the beam pipe aperture).

Vertical position measurement:

Present: cannot be directly read out.

Future: Will be read out turn-by-turn using the double plate monitor

Vertical tune measurement:

Present: this is measured by using a vertical offset from the closed orbit (although this is only estimated) then using varying signal from the turn by turn peak height or area under the peak to infer vertical oscillations and determine the tune. This technique requires detailed analysis, which is still under discussion (cf. Machida presentation 16/1/2014).

Future: Hopefully having the double plate monitor implemented will help with a turn-by-turn accurate position readout to measure the tune more accurately.

Horizontal tune measurement:

Present: a number of methods have been used in the past (RF perturbator, RF cavity oscillation or 'magic T' coupler) together with the triangle plate monitors, however this monitor cannot currently be instrumented simultaneously with the other bunch monitors due to a lack of read-out amplifiers.

Future: With new amplifiers we should be able to make this measurement without completely changing the setup which is time consuming. (Q. Can we make this measurement without the horizontal RF perturbator perhaps when RF acceleration is switched off?)

Injection setup:

Present:

With acceleration: Place a single probe in to the normal measured 'ideal' injection closed orbit position and draw out radially to have some turns available & look at loss vs time on the oscilloscope. Adjust manually the injection position and angle using 2 bending magnets, 2 small steerers and the foil position. Longer survival = beam moved closer to CO?

Future:

With the vertical position monitor will be able to adjust vertical position based on actual read-out. With horizontal position monitor will gain additional information on beam position.

Ideal:

Ideally we'd be able to measure both the position and angle at injection. At present this is not possible. There were thoughts on implementing small faraday cups on radial movers in the injection section. Not sure if this has had anything done on it...

COD correction:

Present:

CO position measurement as described above. However it is possible to have a 'hollow beam' due to injection mismatch, where the whole beam might be scraped away in a few turns before the probe even gets to the CO position.

Future:

Having a real-time horizontal position readout (in one position at least!) may allow us to distinguish between closed orbit distortion and injection mismatch, especially if using a combination of the triangle plate position monitors and the radial probes.

Acceleration-based measurements:

Present: We determine the position of the beam at one 'energy' or after a particular time during the acceleration cycle (the energy is an estimate based on the RF settings) based on the time taken for it to 'vanish' when intercepted by a radial probe.

Future: Hopefully will have a turn-by-turn position measurement to add to existing info from radial probes?

Other?