

Night shift Feb 4th

ACC67 vector sum calibration.

QI scans as a function of QI tuners for all 16 cavities. This study showed:

- Non linear behavior or at least step wise linear behavior with 2 slopes (for higher and lower QI).
- Measurement of high QL ($\sim 1e7$) may be affected by larger errors.
- Repeatability of these scans show a 5% error in QI measurements.
- QI of cavities in the same RF feed are affected by large scans of the QL tuner in the other cavity. For instance, after setting ACC6C1 QL at $3e6$, tuning ACC6C2 tuner at the minimum range lowers ACC6C1 QL to $2.85e6$.

Simulator modeling validation:

We set the ACC67 vector sum to $7.85MV/m$ took 30 seconds of data and adjusted the simulator parameters to match the real data. There is a good agreement between the simulator and the data.

We acquired more data at other (higher and lower) Vectorsum gradients and tried to fit the data to the model by only adjusting the simulator's Vectorsum to match the data Vectorsum. The agreement is still good but limited by few changing variables in the real data such as microphonics, QI variations of up to 1 or 2 % and LFD which has been kept OFF in the simulator.

What have we achieved:

The model can explain the real data very well. However, some variables are continuously changing and the simulator needs to incorporate those changes every time we fit new data.

The simulator is in good condition to test with beam loading and used the calculated QI values that will flatten the gradients in individual cavities. Of course this will be easier at low gradients were the LFD is small.

For higher gradients we need to rely on piezotuners or find a way to subtract the LFD effect from the beamloading.