**MBF Front end setup**

**Code location**

Git clone <https://github.com/alunmorgan/Multi-bunch-feedback-applications.git>

Add the resulting folder to your Matlab path.

**Machine settings**

* Inject a single bunch into bucket 400.
* Run the “Zero Bucket” code to ensure MBF bucket numbers into agreement with the fill pattern from the Picoharp.

Upstream of the MBF frontend there is a DORIS unit which locks the MBF to a fixed relationship to beam phase (rather than RF phase)

**DORIS phase**

The following code will scan the phase of the DORIS unit to identify an optimum value.

**>> single\_bunch\_location = 400**

**>> DORIS\_target\_phase\_scan(single\_bunch\_location)**

**Frontend phases**

In the front end there are two phases (delays) we are interested in optimising. The system phase which determines how accurately our detectors are aligned with the target bunch, and the clock phase which determines how close to the peak of the signal we are sampling.

**System phase**

The following Matlab code will run a system phase scan on each axis sequentially. The graphs will be displayed, and the data is automatically stored.

**>> single\_bunch\_location = 400**

**>> BBBFE\_system\_phase\_scan(‘X’, single\_bunch\_location)**

**>> BBBFE\_system\_phase\_scan(‘Y’, single\_bunch\_location)**

**>> BBBFE\_system\_phase\_scan(‘S’, single\_bunch\_location)**

This is an example of the output. You are looking for the phase value with the largest gap between the excited bunch and each of the other bunches.

In this case -40o looks to be a reasonable working point.

A picture containing text, plot, diagram, line

Description automatically generated

**Clock phase**

The following Matlab code will run a clock phase scan on each axis sequentially. The graphs will be displayed, and the data is automatically stored.

**>> single\_bunch\_location = 400**

**>> BBBFE\_clock\_phase\_scan(‘X’, single\_bunch\_location)**

**>> BBBFE\_clock\_phase\_scan(‘Y’, single\_bunch\_location)**

**>> BBBFE\_clock\_phase\_scan(‘S’, single\_bunch\_location)**

This is an example of the output. You are looking for the phase value with the largest gap between the excited bunch and each of the other bunches.

In this case -80o looks to be a reasonable working point.

A picture containing diagram, line, plot, text

Description automatically generated  
  
**Once these two phases are optimised then the tuning of the front end is complete.**