**IGOR instructions for Harmonic Cavity Beam Monitor Error Correction:**

Each of these steps has been performed in the attached IGOR file called “procedure.pxp”. The history of each step can be seen by scrolling back the command line history.

1. Scope capture: Center a brief pulse (High voltage , moderate current), 668 ps, one pt per picosecond, . Call this 668 pt list “Rawdata”
2. Calculate a Gaussian Fit to the data: Analysis, Curve Fitting, select Gaussian, and on the output options page, fill in the number of points 668, and check the box for full width of graph, press “do it”. The Gaussin fit is called fit\_Rawdata
3. Perform an FFT with complex outputs for the raw data and its Gaussian fit. . Pull down Analysis, Fourier Transform, check the box for forward, make the output complex and select the source, Rawdata, and again as fit\_Rawdata. The resultant complex number lists are 334 pts long and are called Rawdata\_FFT and fit\_Rawdata\_FFT. To view these new complex number lists, pull down Windows, new table, select one of interest and do it.
4. Create a new complex number called “correction”. Pull down Data, make waves, check the box for complex, fill in the names box “correction”, and fill in the number of rows 334, press do it.
5. Divide the Gaussian FFT by the Rawdata FFT. This can be done by typing into the command line: correction = fit\_Rawdata\_FFT / Rawdata\_FFT
6. Process new raw data, the 130kV10uA data can be processed by calculating its FFT, multiplying it by correction, and then calculating its reverse FFT.

Create a new complex number called “corrected”. Pull down Data, make waves, check the box for complex, fill in the names box “corrected”, and fill in the number of rows 334, press do it.

1. Multiply 130kv10uA FFT with correction, creating “corrected”. Type into the command line : 'corrected' = '130kV10uA\_FFT' \* 'correction’
2. Calculate the Inverse FFT of corrected. Analysis, Fourier Transform, check reverse, real output, select corrected, do it.
3. ‘Corrected’ is The error corrected 130kV 10uA data: To graph this, pull down Windows, new graph, select corrected and calculated and do it.