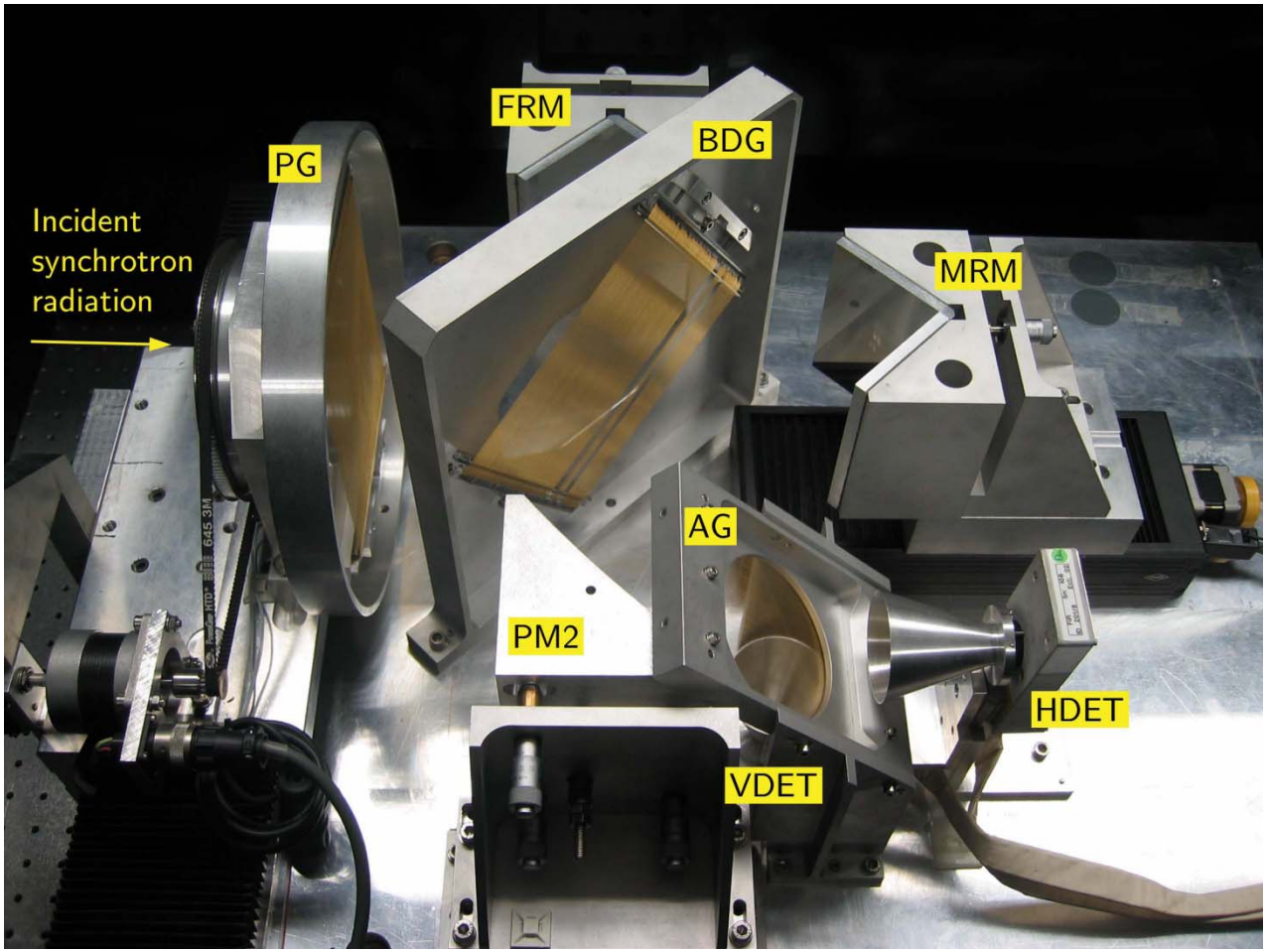
Bunch Length Measurements

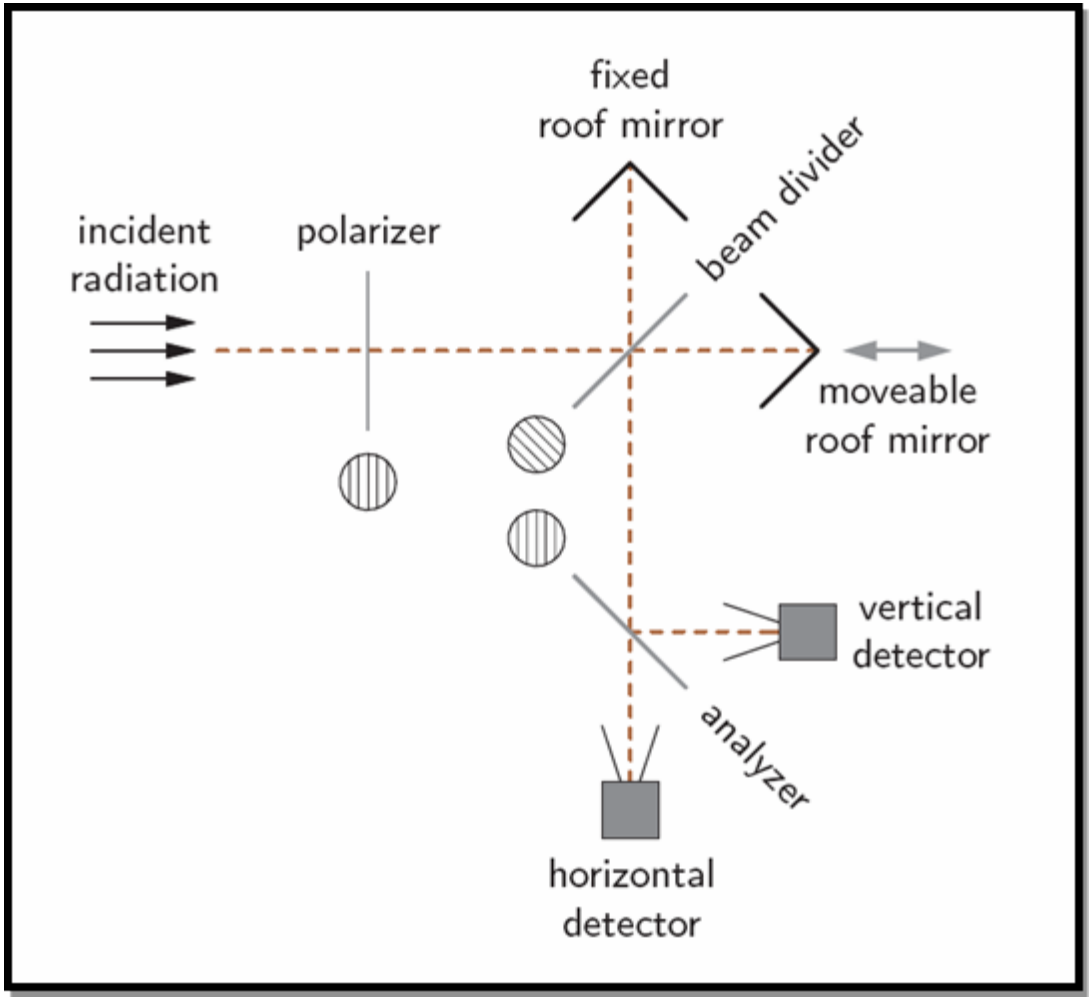
Utilizing the Martin-Puplett Interferometer and Kramers-Kronig Analysis

Randy Thurman-Keup
John Daniel Hlotke

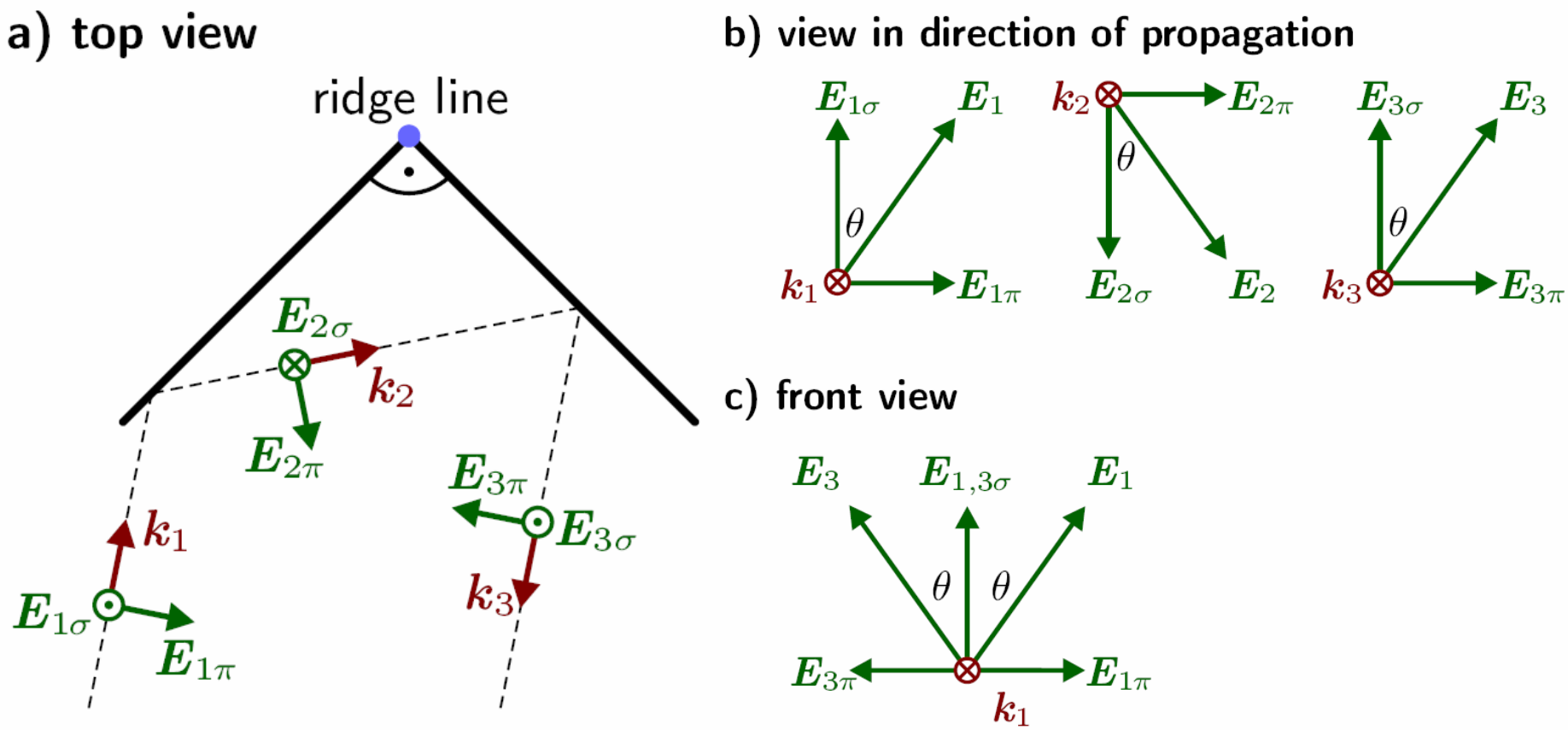
The Martin-Puplett Interferometer



Interferometer Schematic

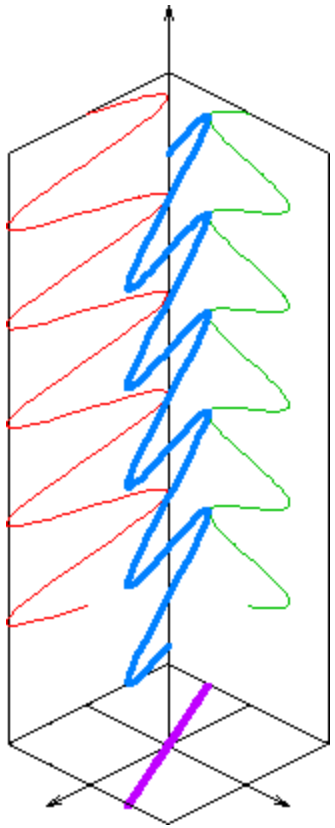


Roof Mirrors

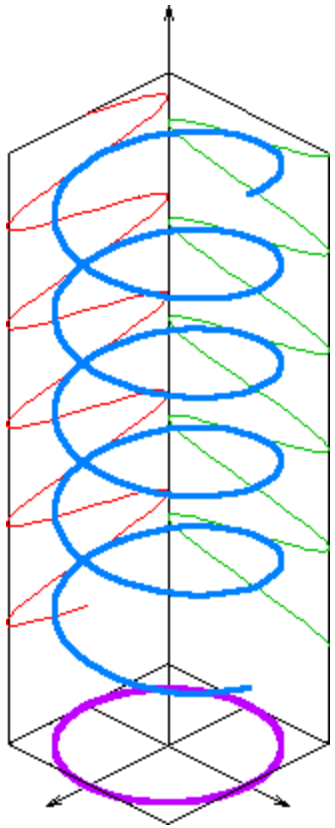


π- Parallel Component σ- Perpendicular Component

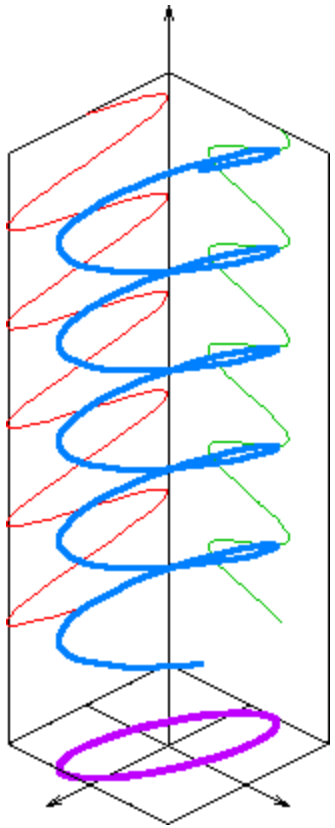
Light Polarization: Lissajous Figures



Linear Polarization

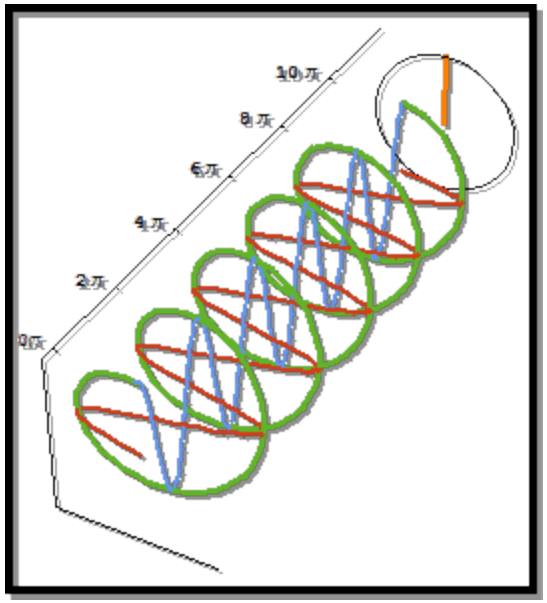


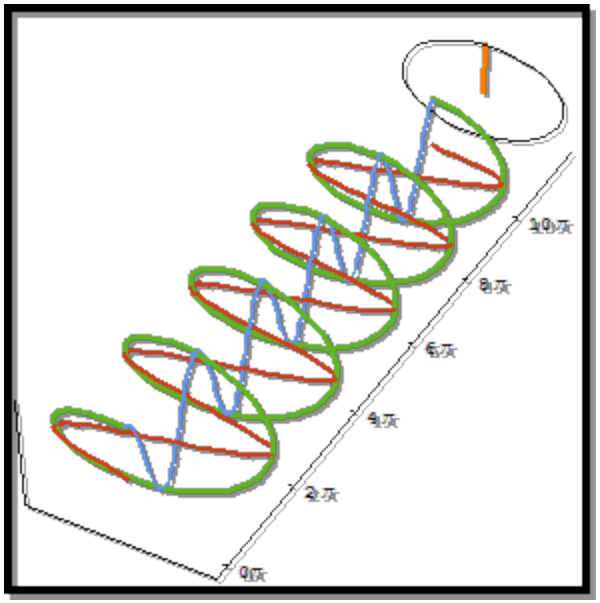
Circular Polarization



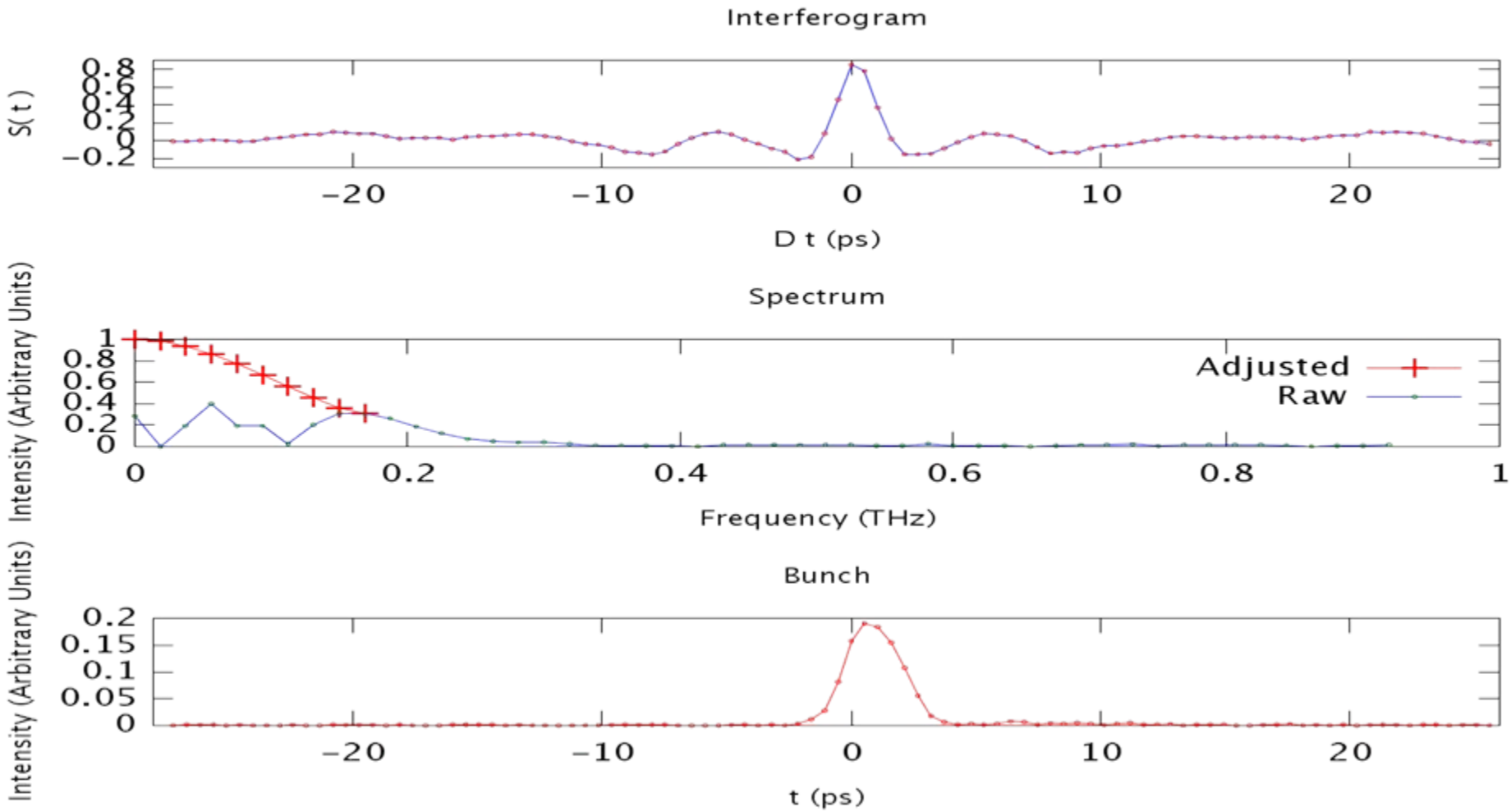
Elliptical Polariation

Electric Field Vector

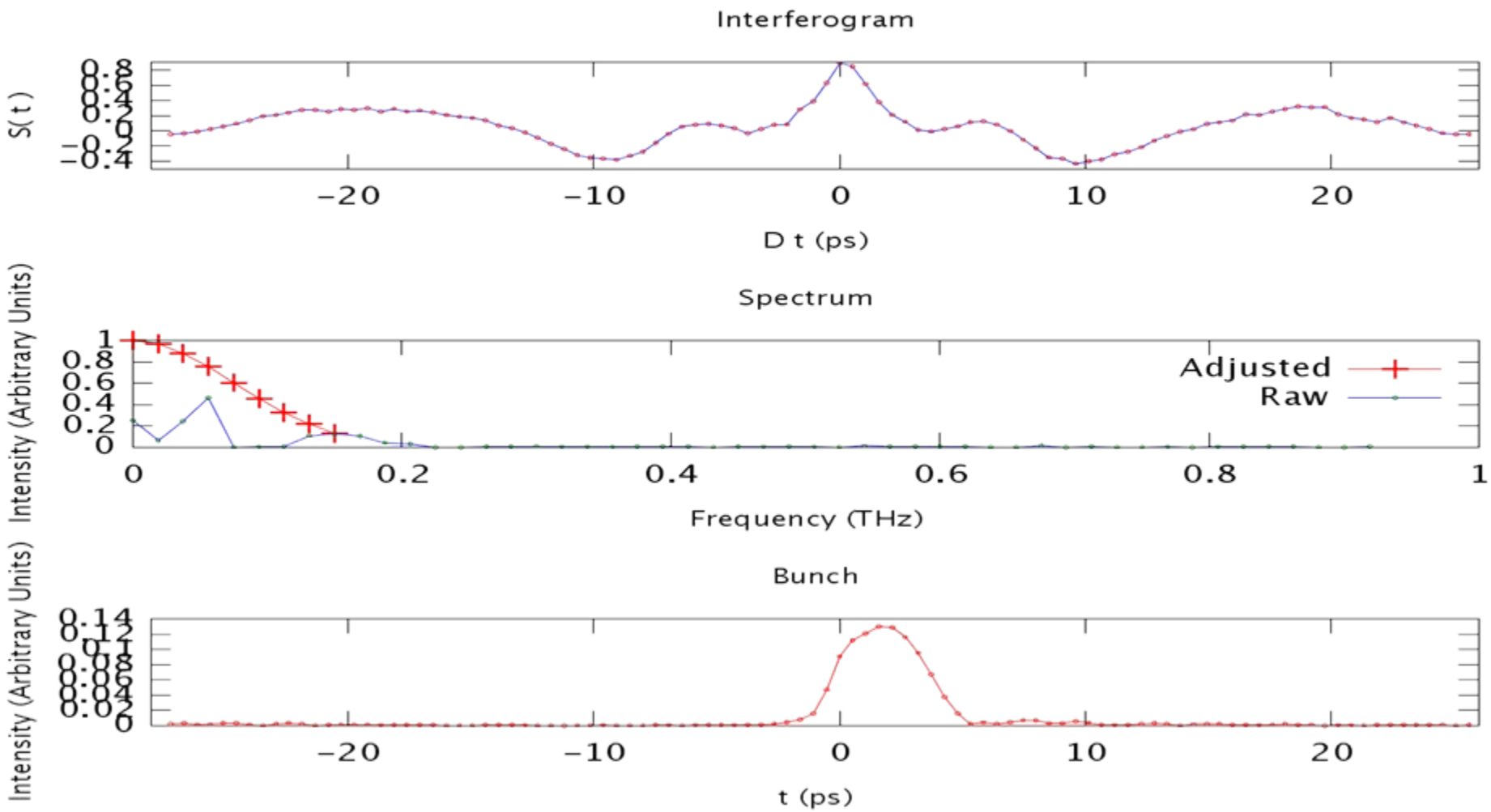




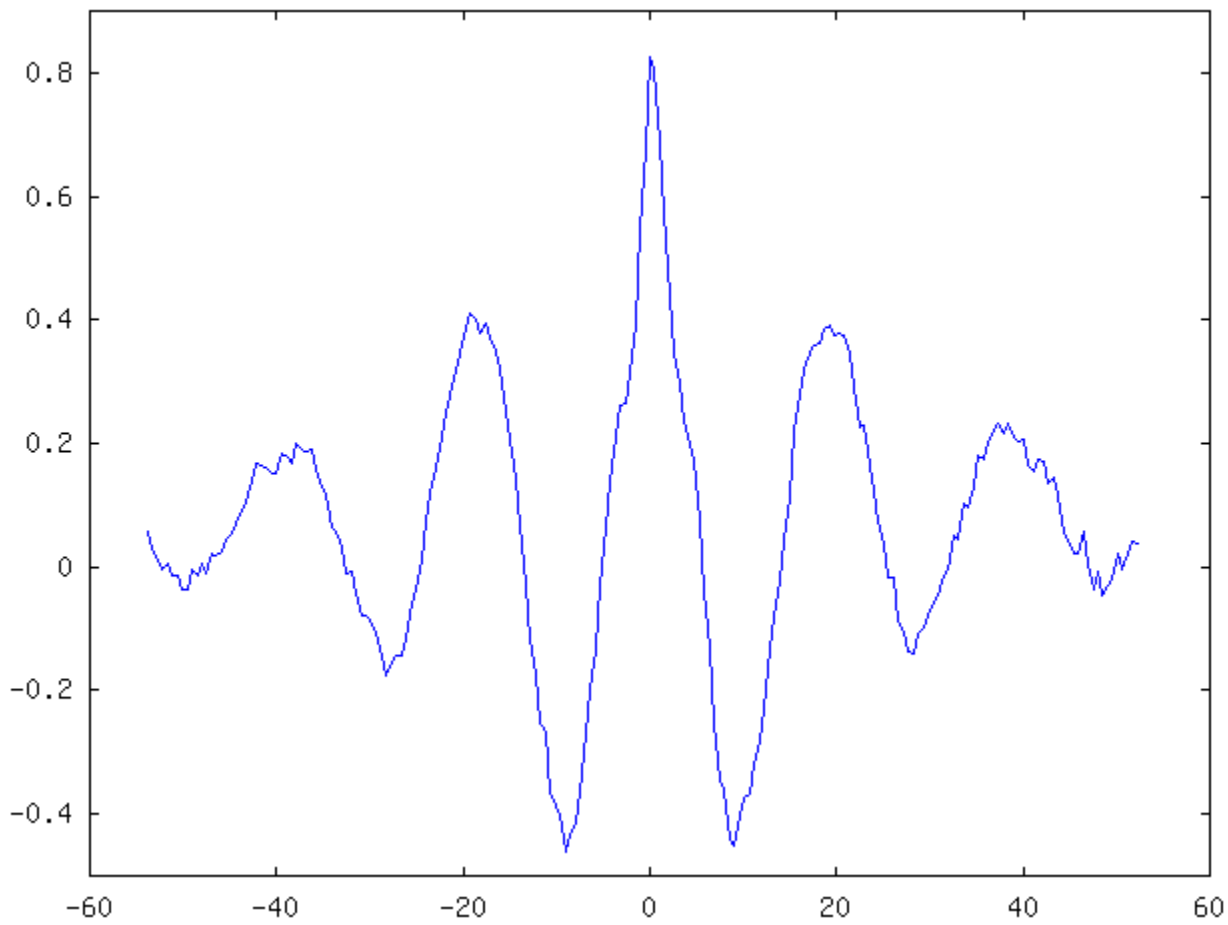
Interferogram



Odd Behavior

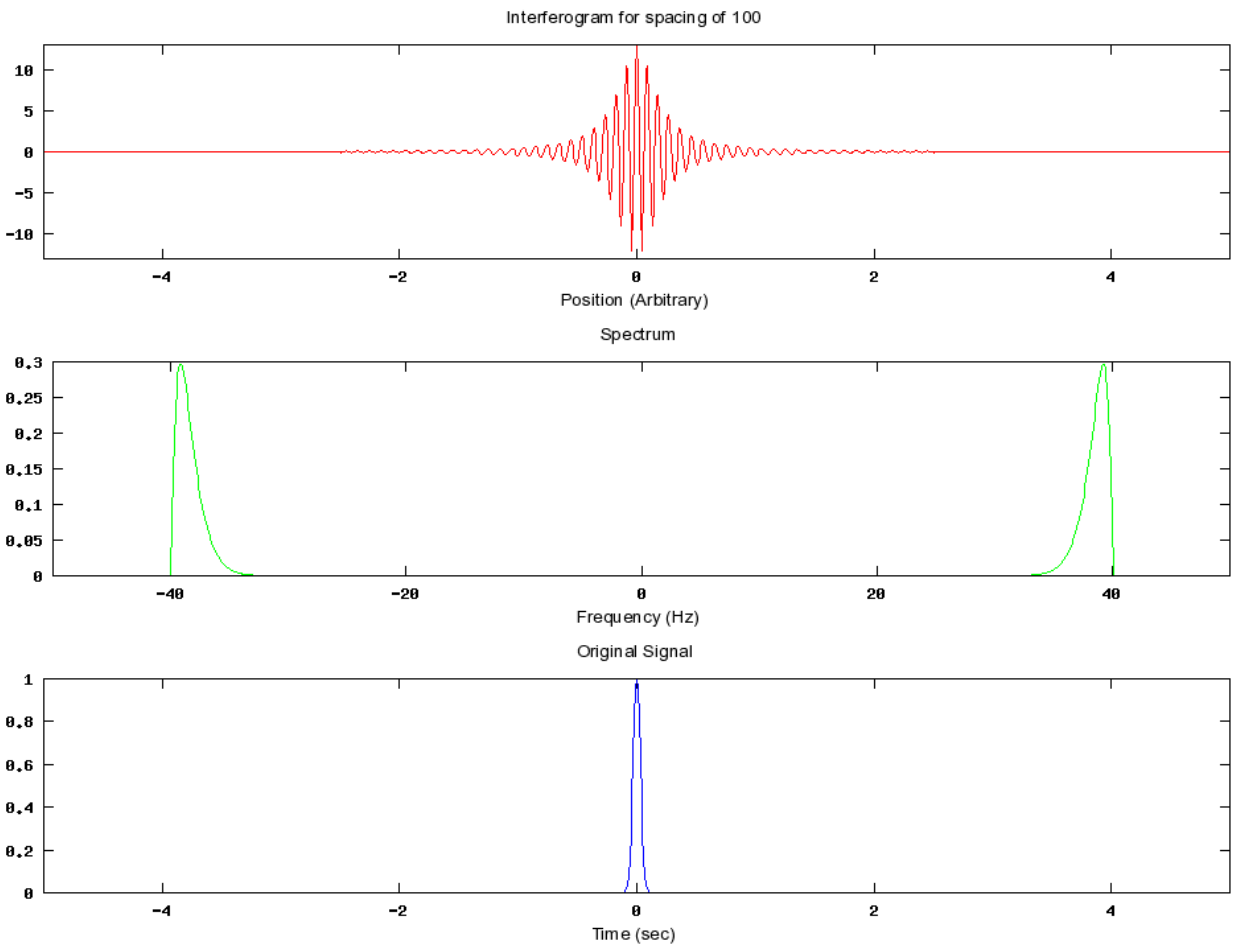


Even More Curious



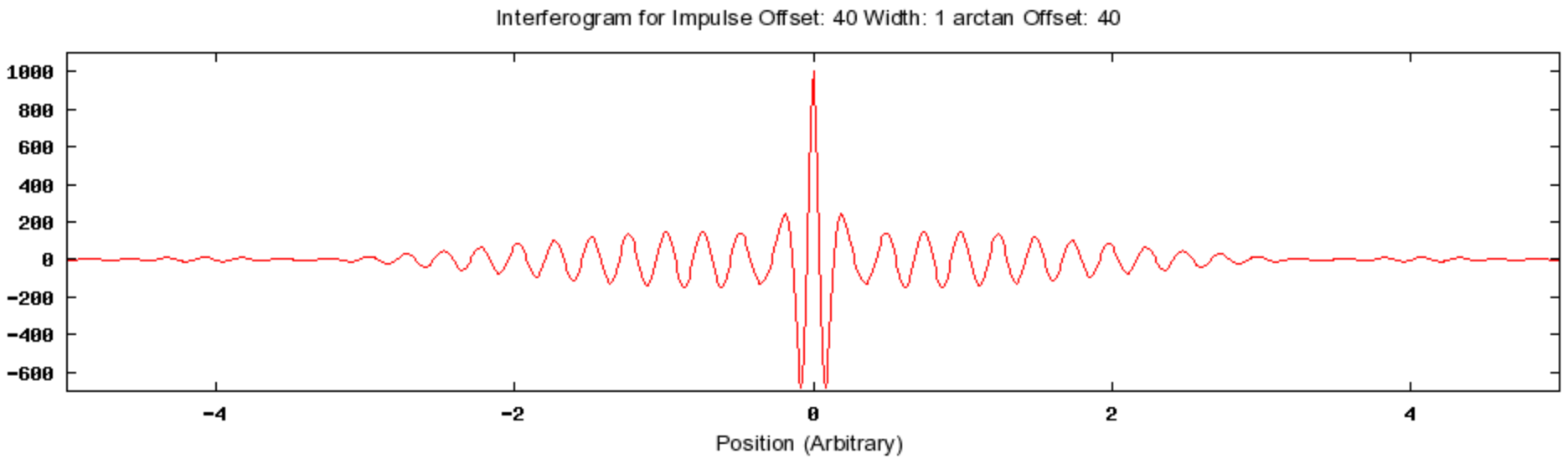
Modeling Detector Error

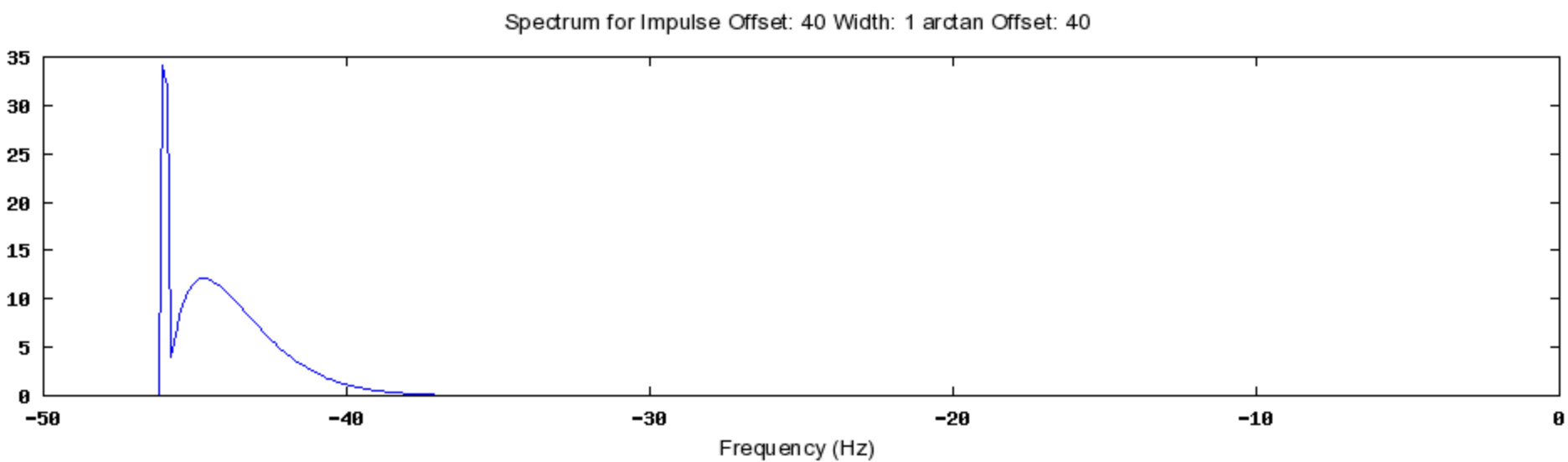
Changing Cutoff Frequency



Modeling Detector Error

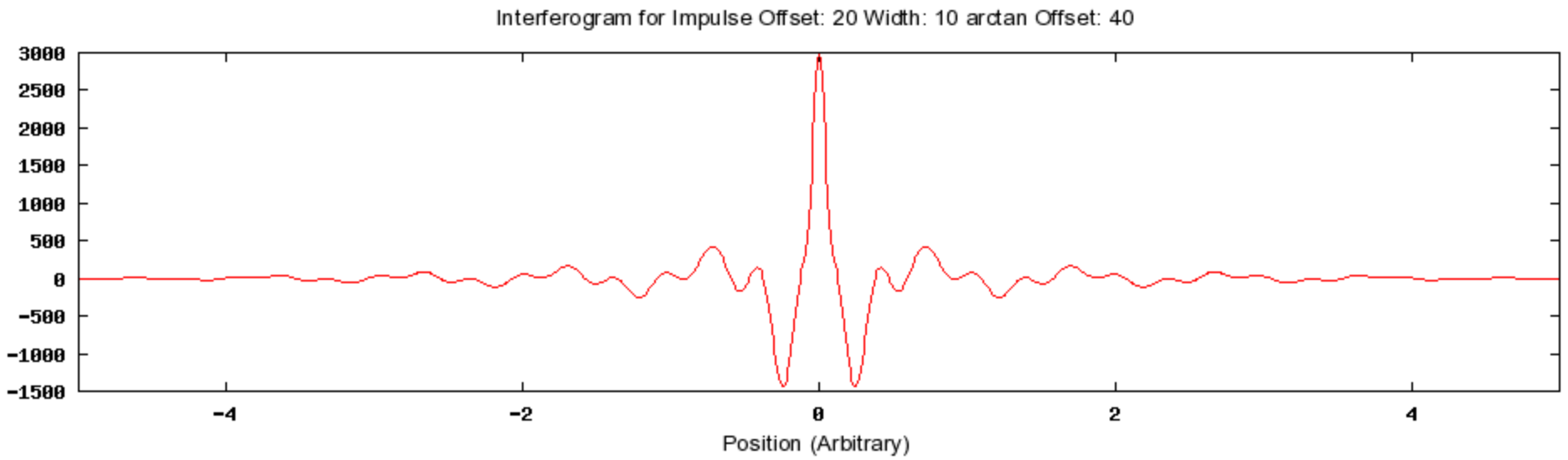
Changing Spike location

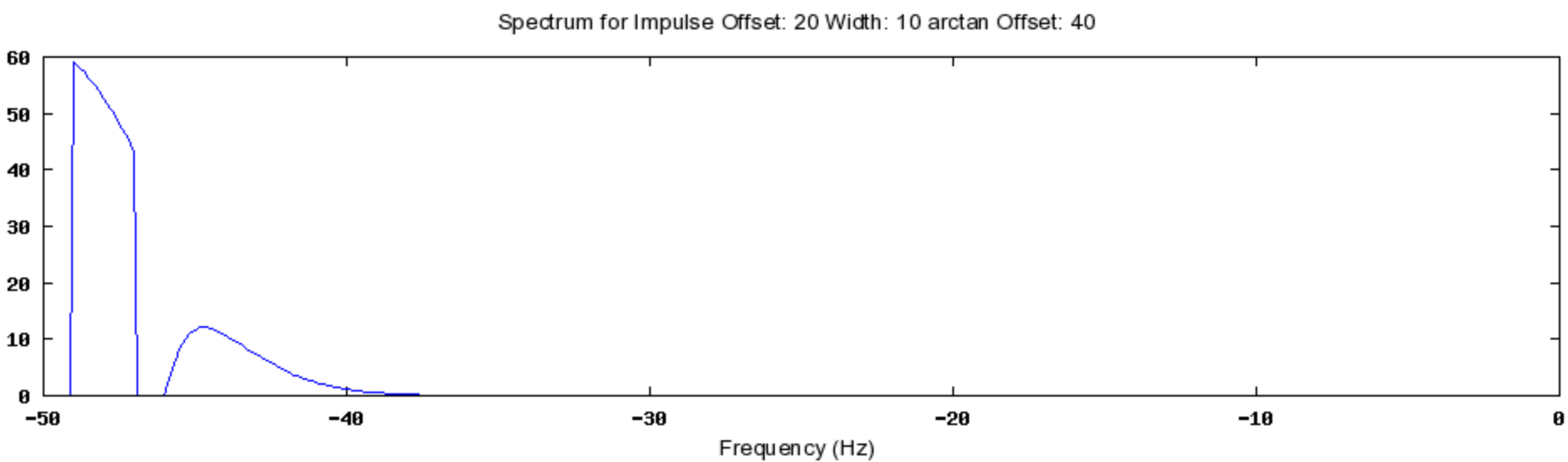




Modeling Detector Error

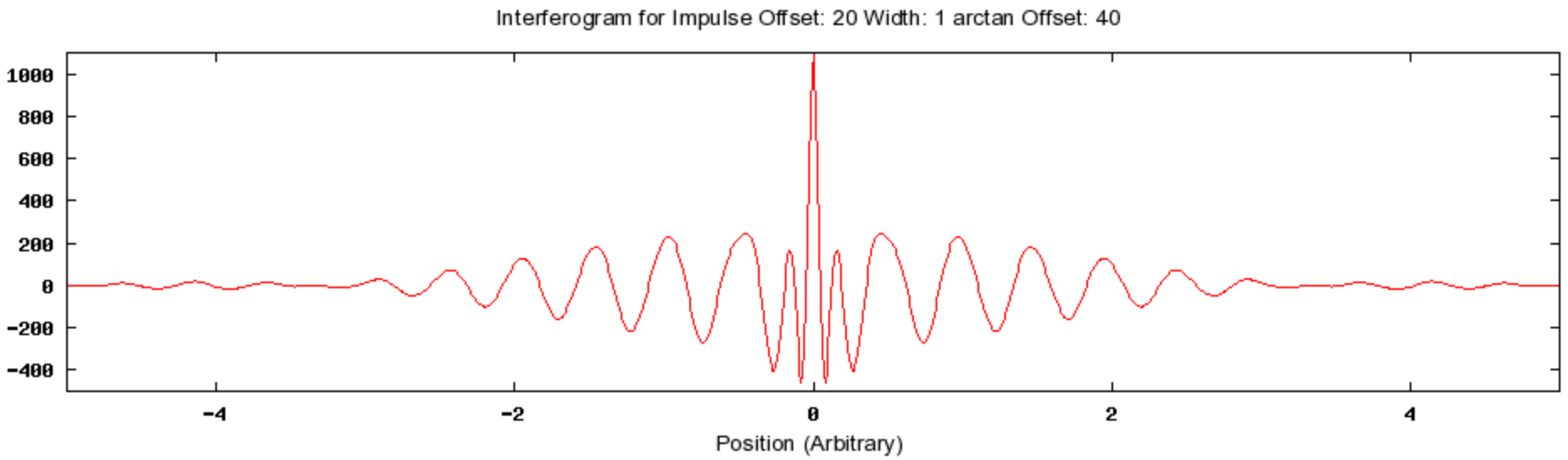
Changing Spike Width

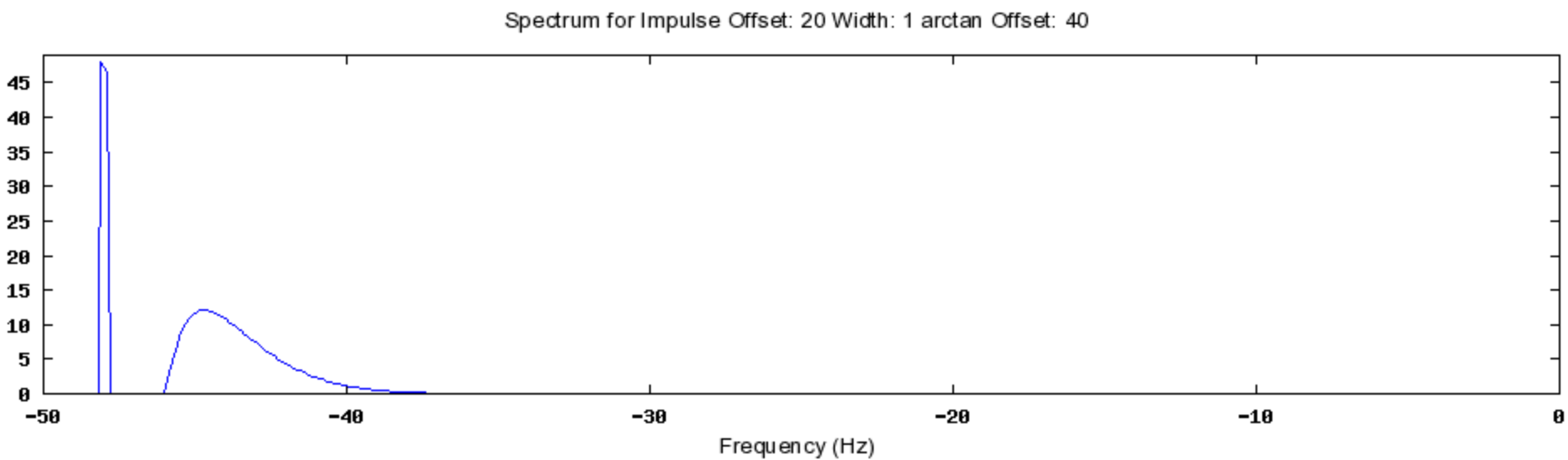




Modeling Detector Error

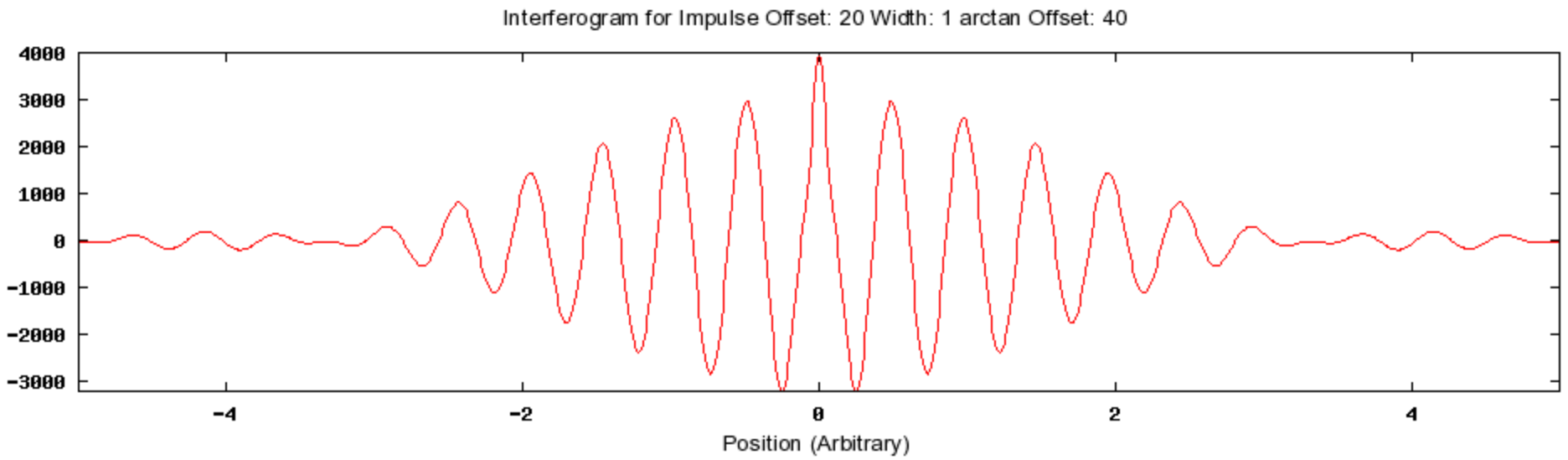
Changing Spike Height (0<Height<1)

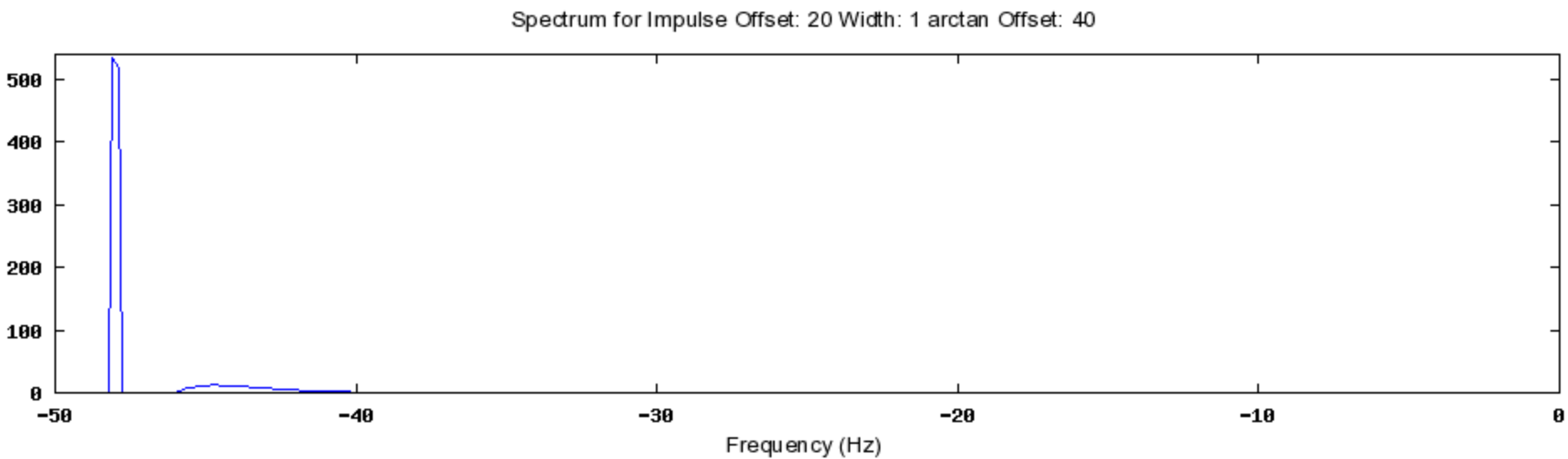




Modeling Detector Error

Changing Spike Height (1 ≤ Height≤10)





Sources

- Bunch Length Measurements Using a Martin-Puplett Interferometer at the VUV-FEL, Lars Fröhlich
- Wikipedia
- http://www.nsm.buffalo.edu/~jochena/research/opticalactivity.html