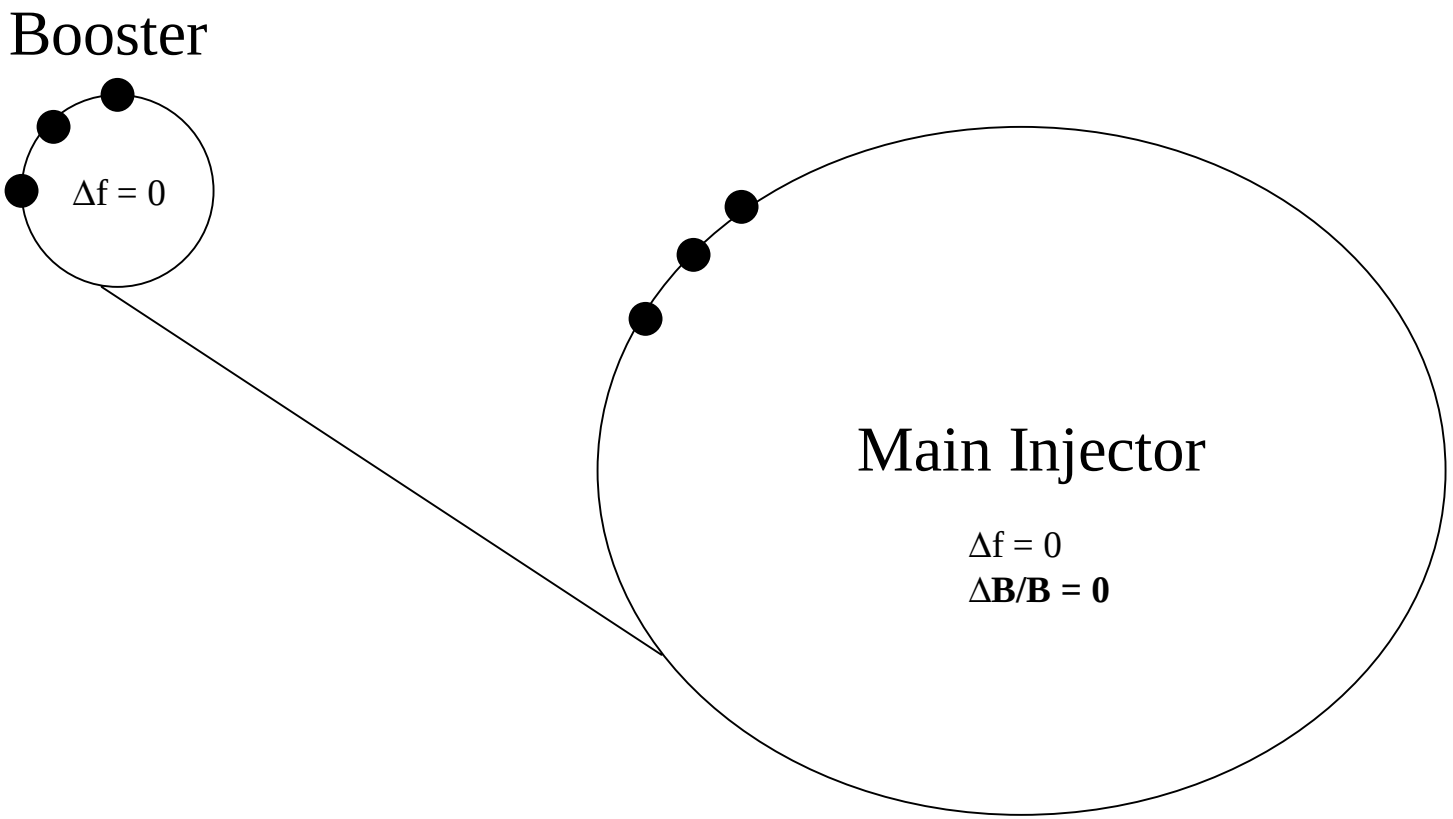
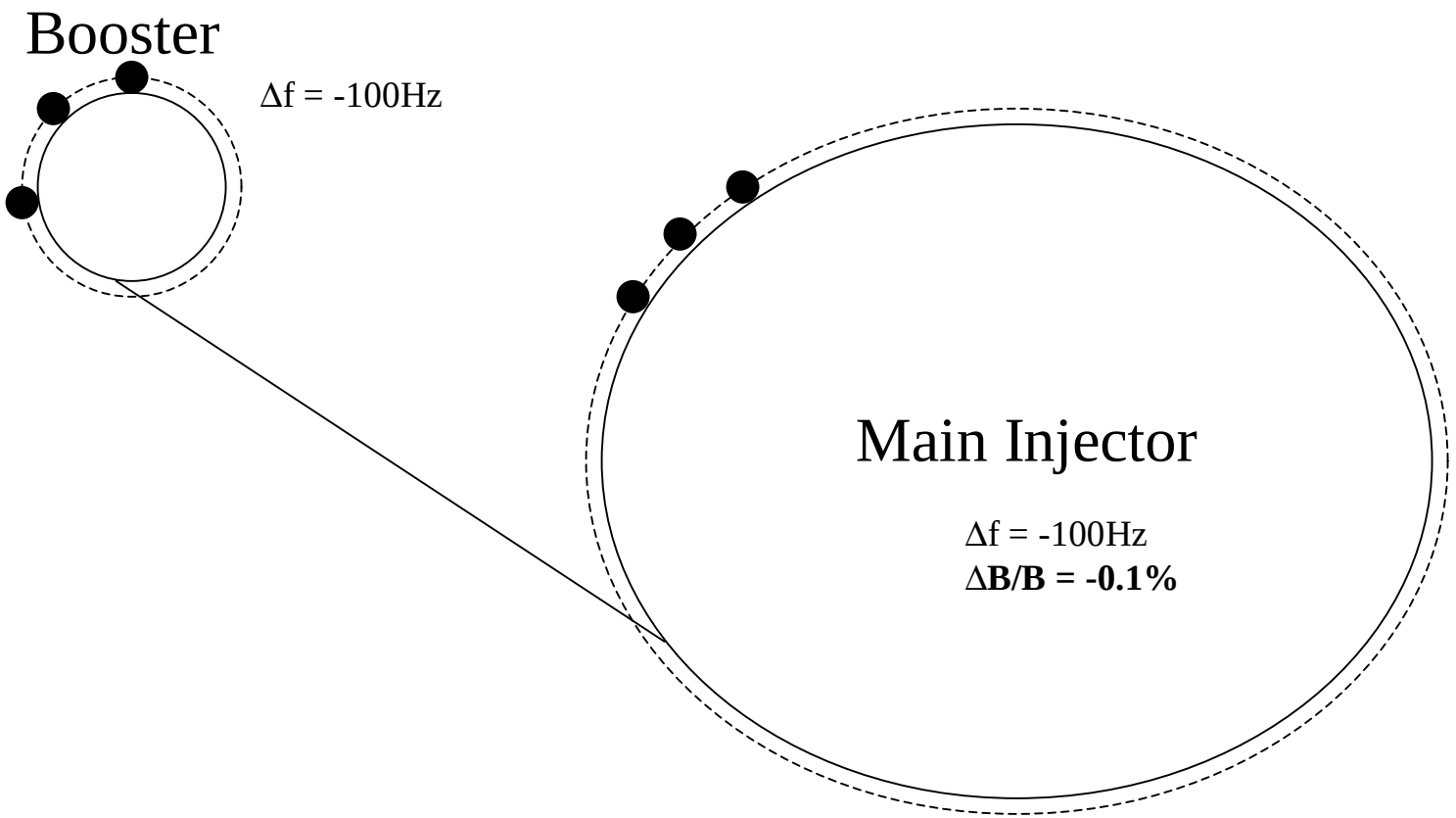
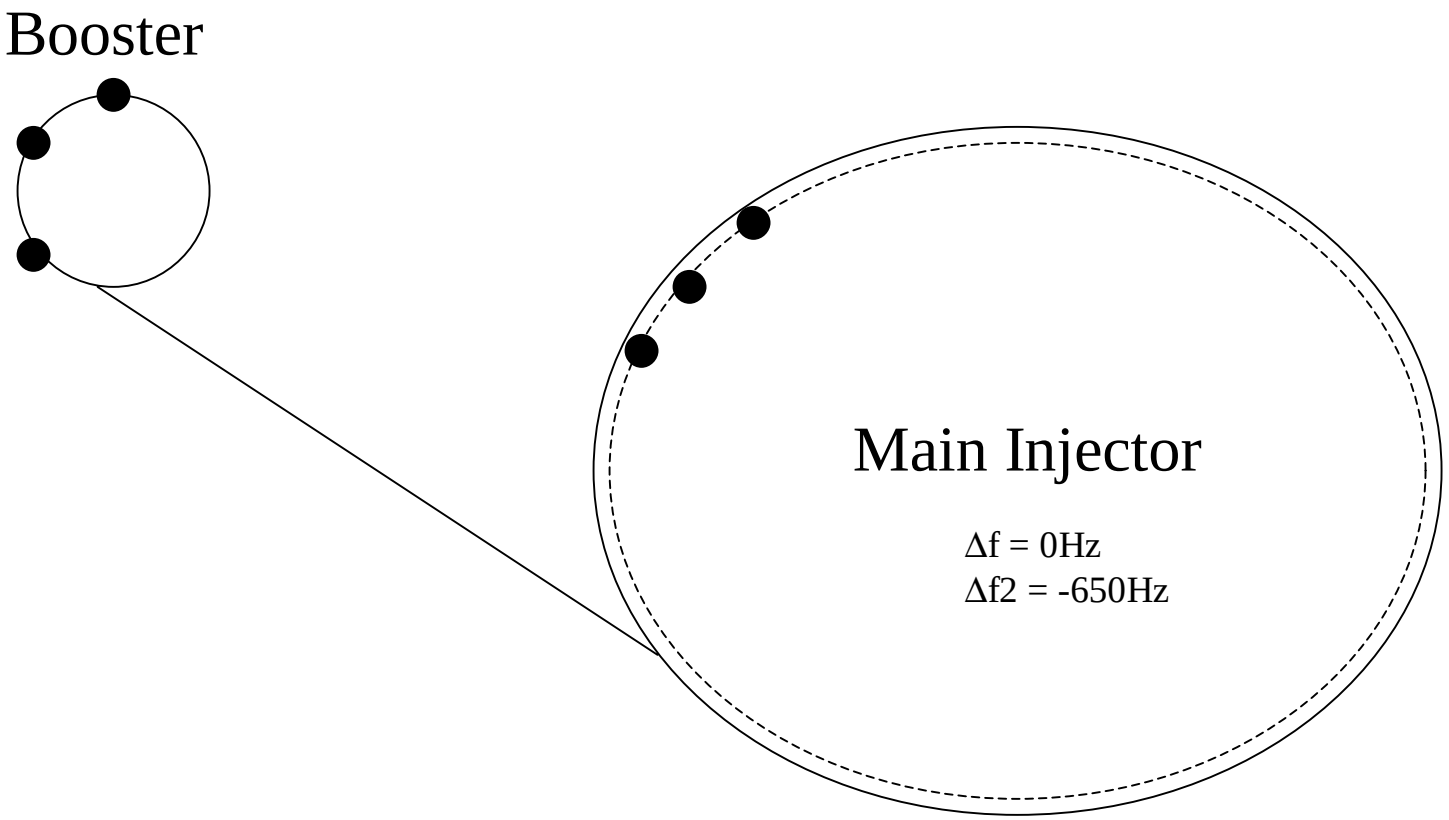
Nominal Orbits



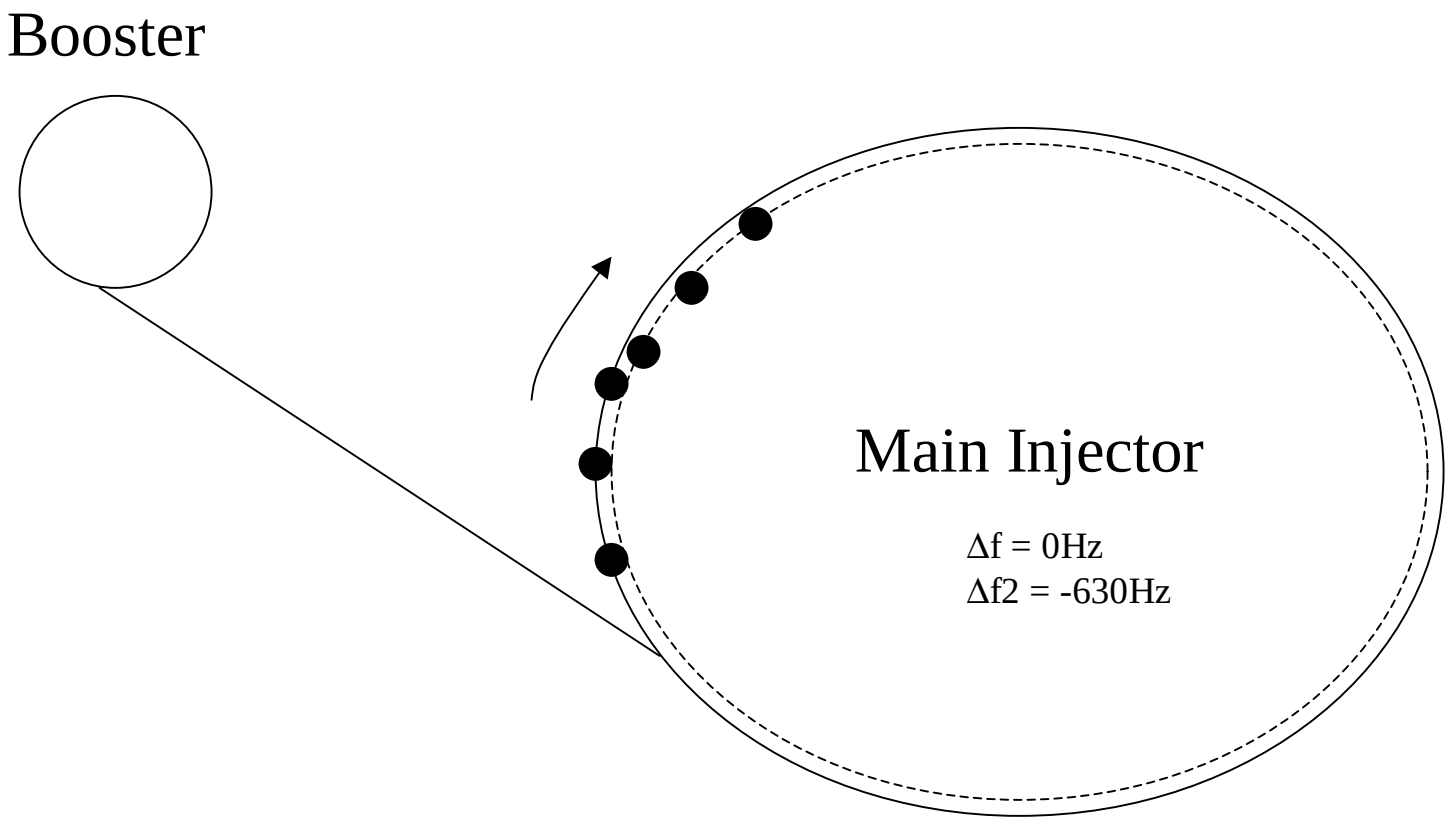
First Injection Orbits



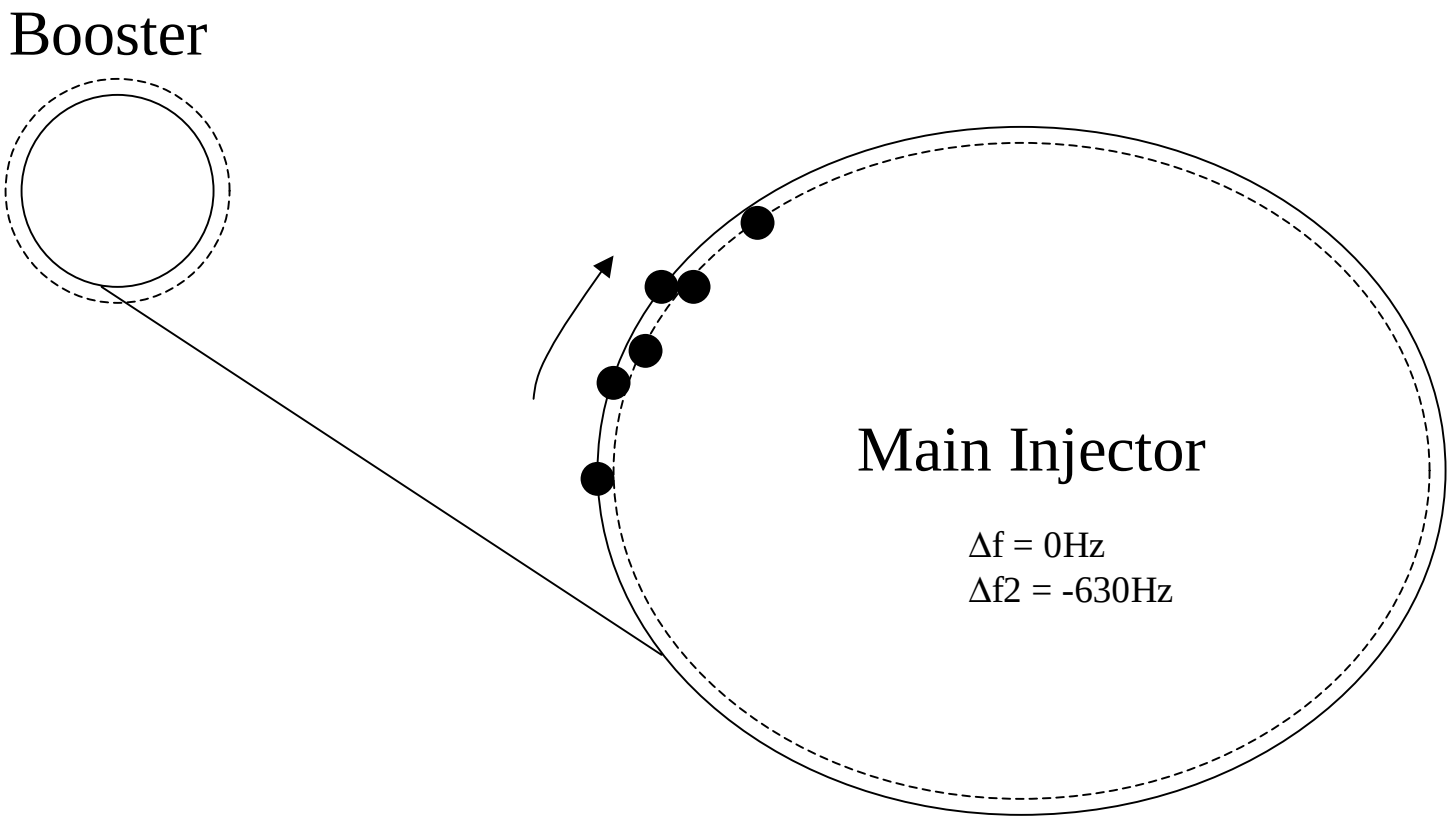
Deceleration



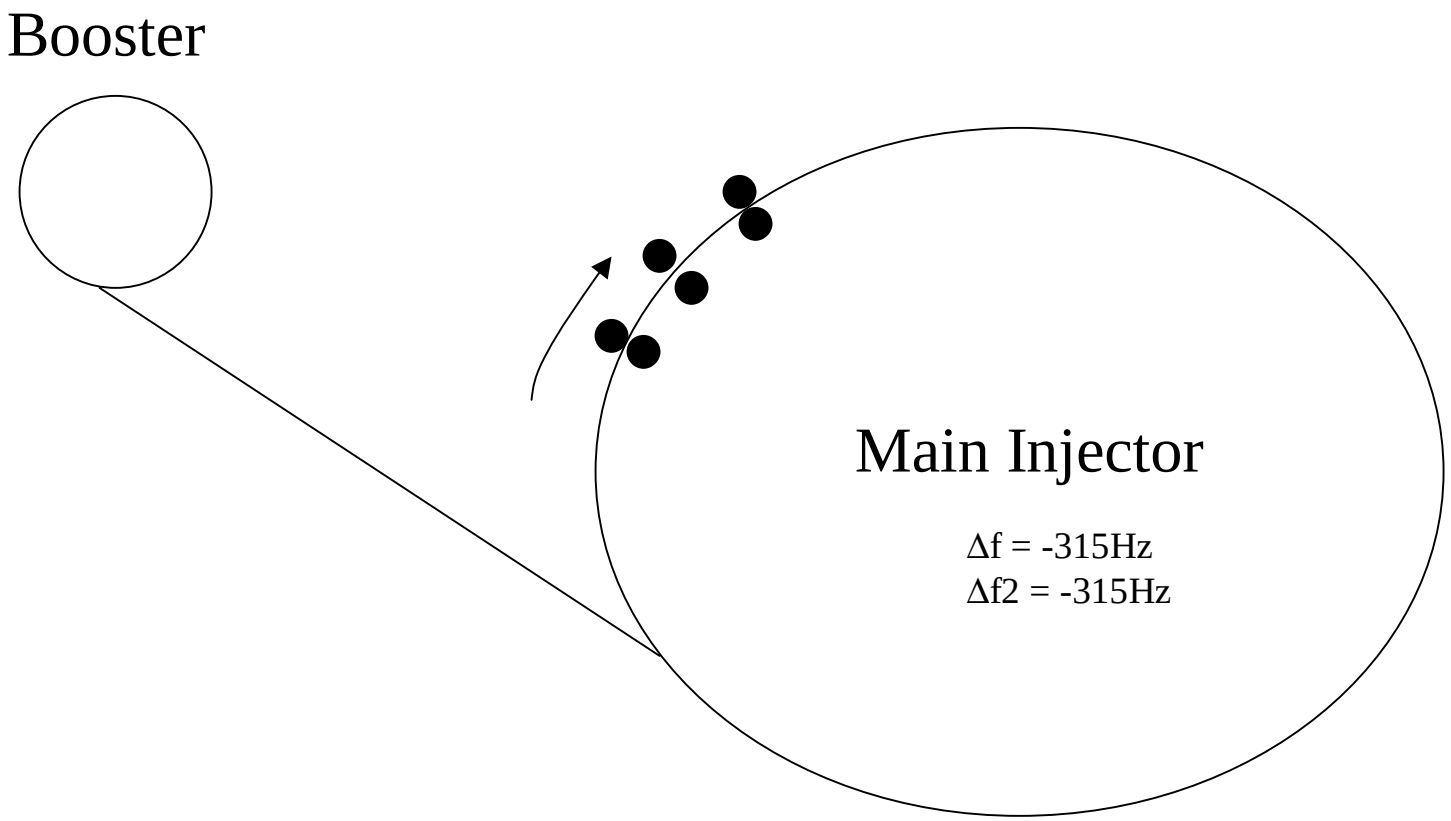
2nd Injection Orbit

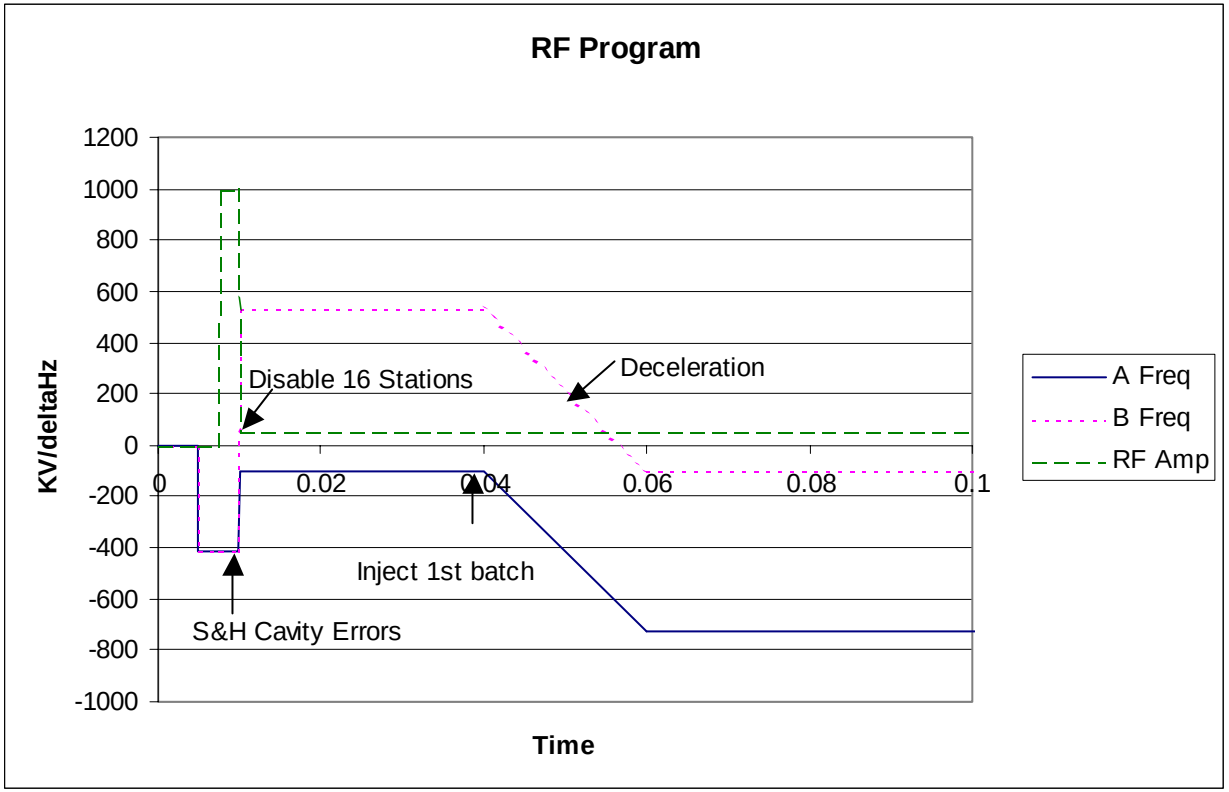


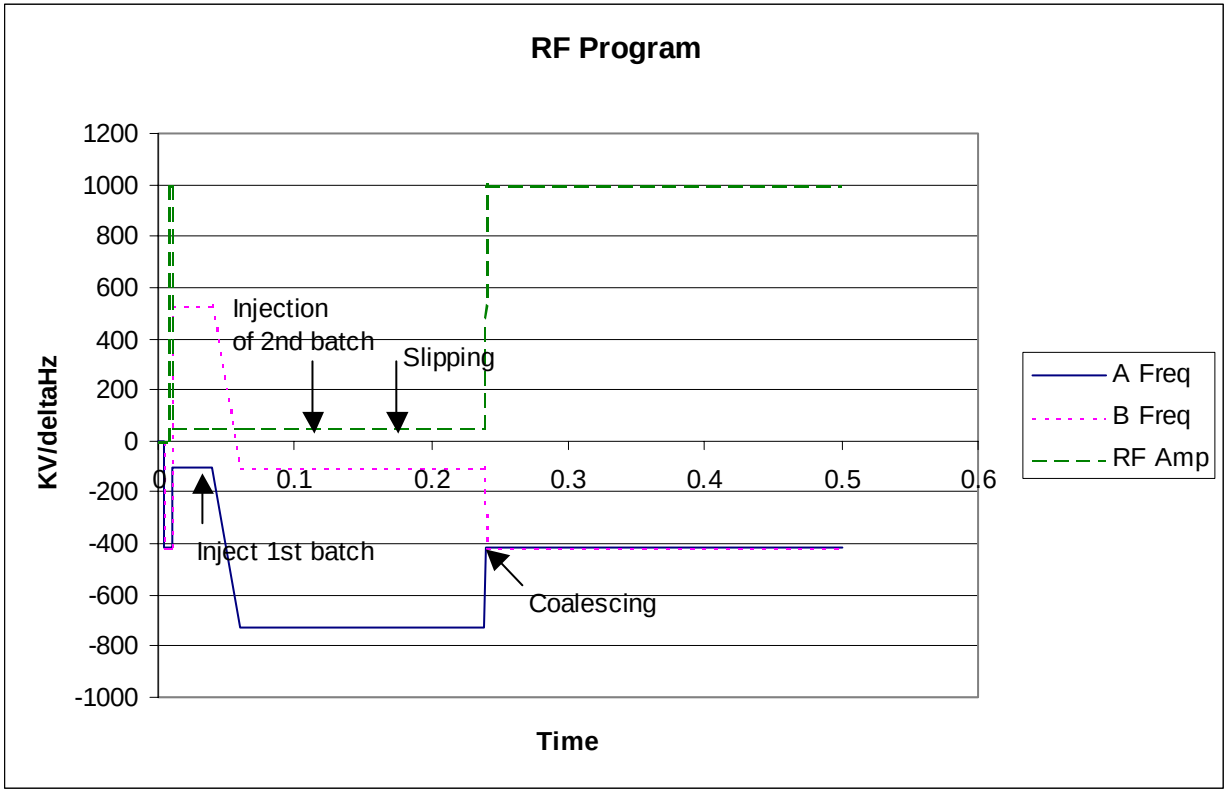
Slipping

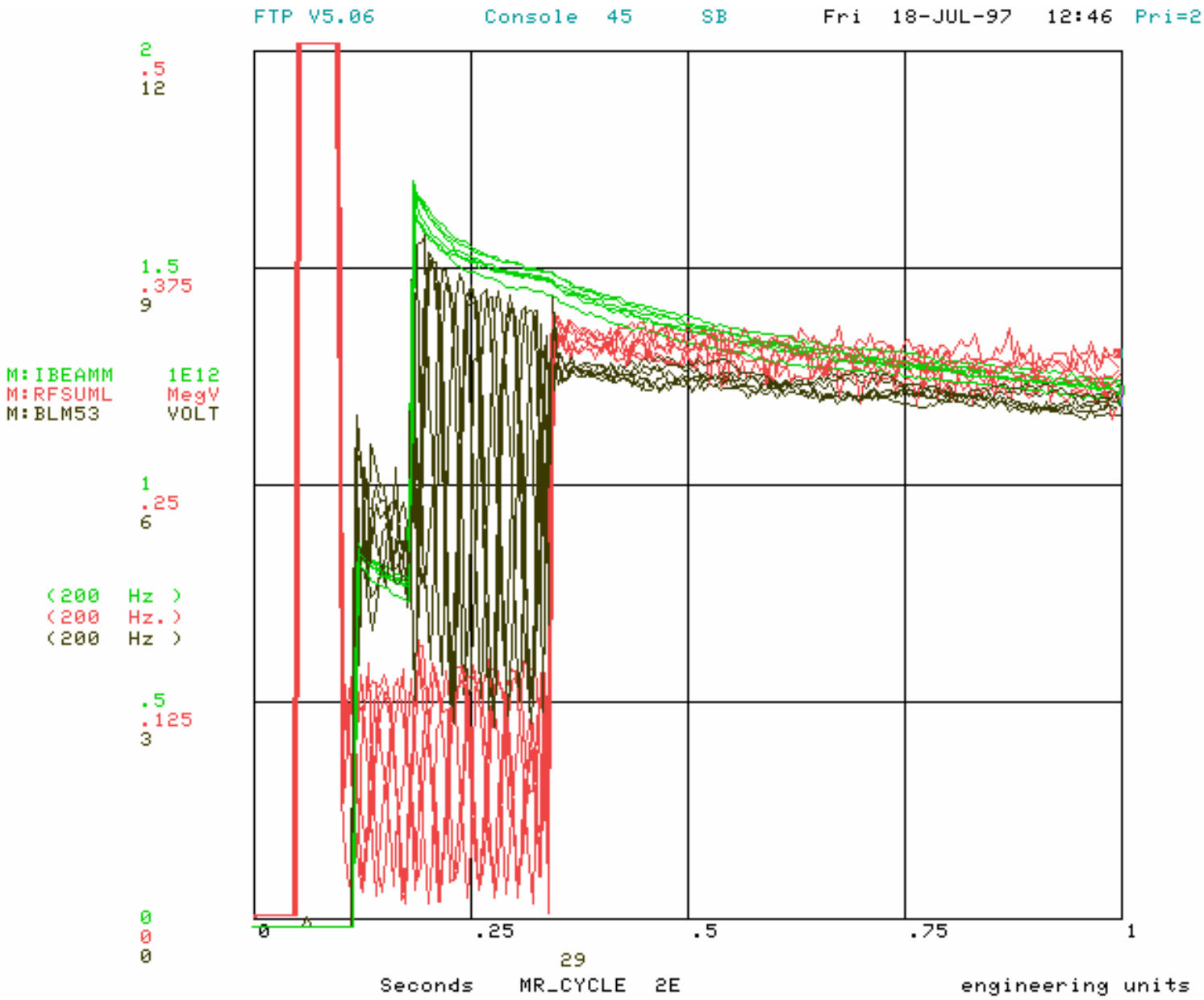


Coalescing




RF Program
1200
1000
800
600
400
200
0
-200
-400
-600
-800
-1000
KV/deltaHz
0
0.02
0.04
0.06
0.08
0.1
Time
Disable 16 Stations
Deceleration
Inject 1st batch
S&H Cavity Errors
A Freq
B Freq
RF Amp


RF Program
1200
1000
800
600
400
200
0
-200
-400
-600
-800
-1000
KV/deltaHz
0
0.1
0.2
0.3
0.4
0.5
0.6
Time
Injection
of 2nd batch
Slipping
Inject 1st batch
Coalescing
A Freq
B Freq
RF Amp


FTP V5.06
Console 45
SB
Fri 18-JUL-97 12:46 Pri=2
2
.5
12
1.5
.375
9
M:IBEAMM 1E12
M:RFSUML MegV
M:BLM53 VOLT
1
.25
6
(200 Hz)
(200 Hz.)
(200 Hz)
.5
.125
3
0
0
0
0
.25
.5
.75
1
29
Seconds MR_CYCLE 2E
engineering units

Goal of Slip Stacking

- Increase beam intensity on target by 75% leading to a 50% improvement in stacking rate over single batch stacking.

Major Questions on Slip Stacking

- Can we do it without major RF power amp and cavity modifications?
- What are the beam loading compensation specifications?
- Can we get through transition?
- Can we maintain a small enough pulse width within the debuncher/accumulator acceptance?

Run IIb Beam Loading Compensation

- Need slip stacking specifications.
- Need 7.5MHz operational specifications.
- Need 7.5MHz cavity specifications.

Booster Extraction

- Bunch Rotation (Pellico, Webber)
- Extraction Gap Cogging (Pellico, Webber, Chase, Meisner)
- Phase Lock to MI offset orbit (Pellico, Webber)

Main Injector LLRF

- Generate the two frequency programs necessary for slip stacking.
- Generate the revolution markers necessary for proper transfers and instrumentation.
- Provide necessary reference frequencies to Booster LLRF.
- Chase, Meisner, Berenc

High Level RF

- Provide necessary controls to high level system to implement slip stacking.
- Design, build, and commission all beam loading compensation schemes necessary for practical slip stacking.
- Dey, Reid, Berenc, Steimel

Effect of Beam Loading on Slip Stacking

- Calculate/Simulate breakdown of slip stacking as a function of beam intensity and frequency separation (booster emmitance?)
- Determine beam studies and instrumentation required to gather parameters and prove calculations.
- Specify beam loading compensation parameters. (Ioanis, Kiyomi)

Slip Stacking Capture Options

- Benefits of bucket shaping through AM of RF.
- Specify frequency & modulation parameters necessary for testing.
- Jim MacLachlan

Acceleration

- RF power required?
- Can we get through transition?
- Emmitance and bunch length contraints for pbar target. (with Steve Werkema)
- Ioanis, Kiyomi

Goal of Beam Loading Compensation

- Provide all beam loading compensation systems required to support slip stacking and 132ns bunch spacing in TeV for Run IIb. (7.5 MHz cavities)

7.5 MHz Beam Loading

- 7.5 MHz operational specs S. Mishra
- 7.5 MHz cavity specs D. Wildman