Matching MI8 line lattice function to the Main Injector

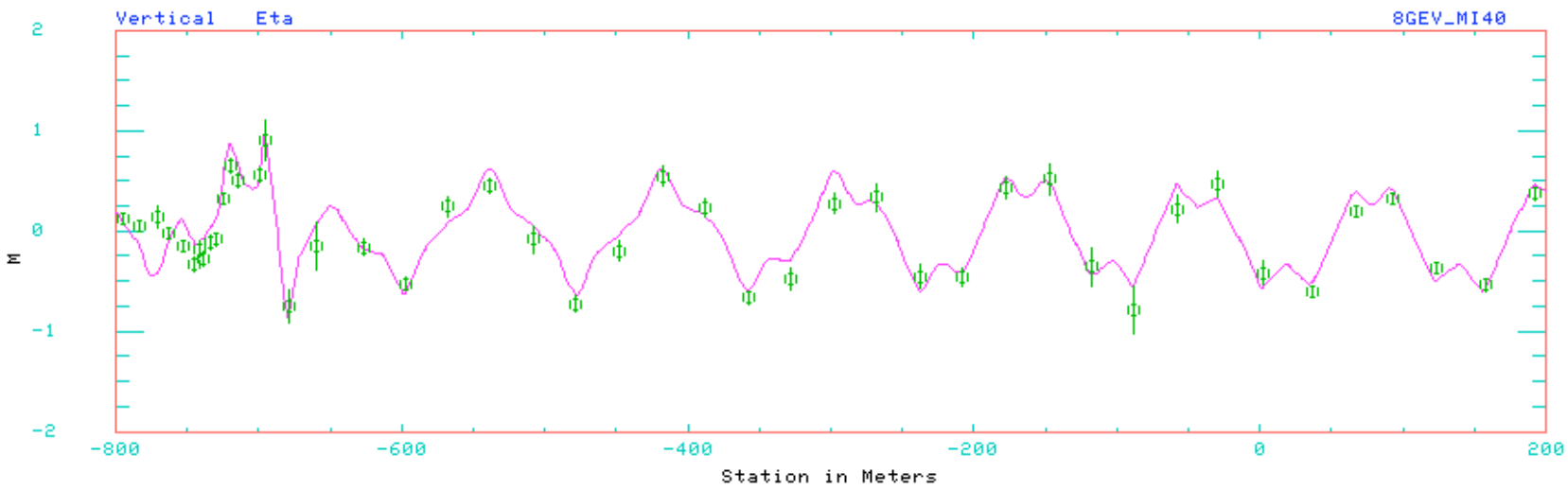
August 3, 2005

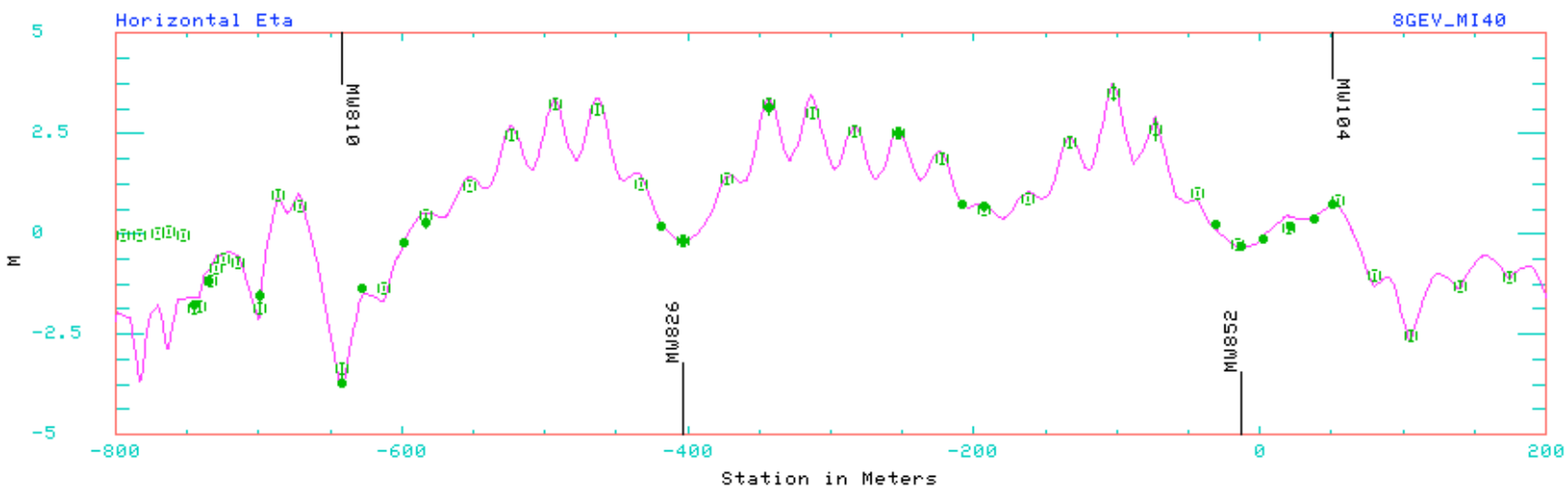
Ming-Jen Yang

The sequence of events

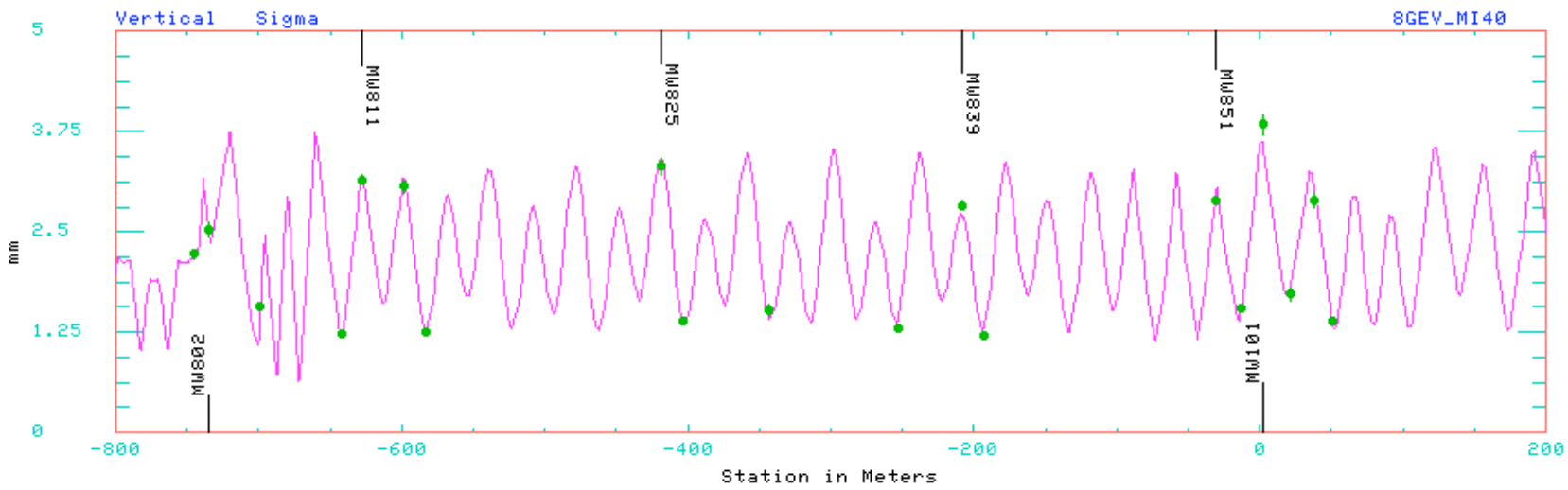
- July 8th, 2005
  - 1-bump orbit and dispersion function.
  - Lattice analysis.
    - Compare orbits from MWs and SWICs.
    - Look at the beam width sigma.
- August 3rd, 2005
  - Change quad current of Q803 and Q851.
  - Take multiwire beam profiles before and after.
  - Look at loss pattern around MI.

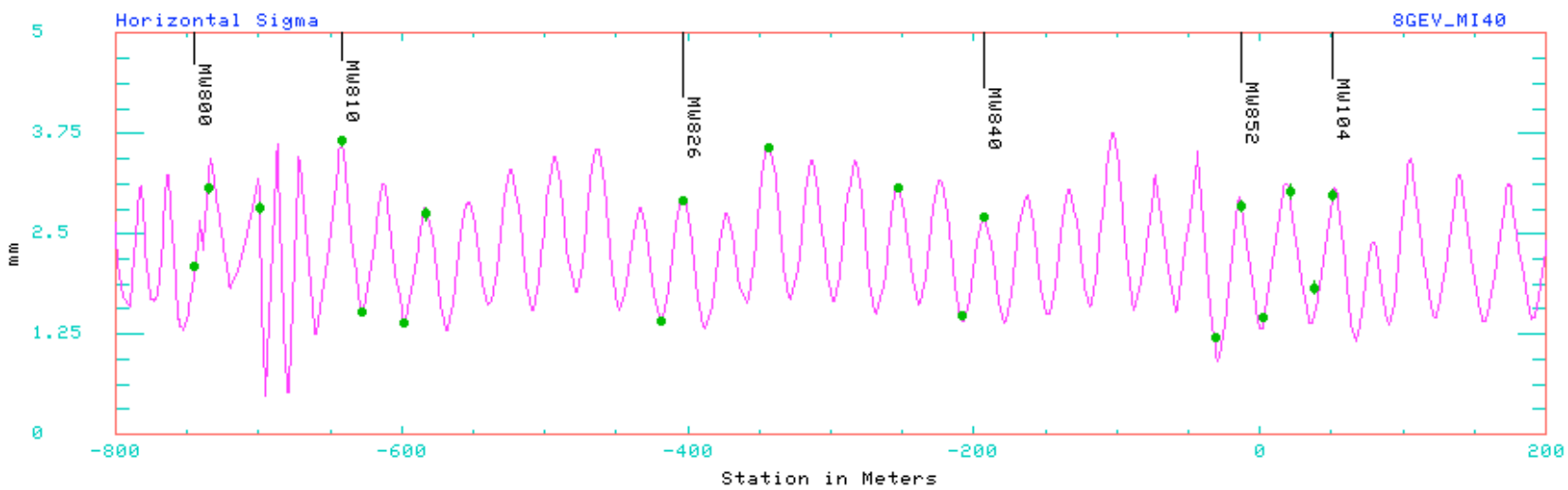
MI8 line dispersion function



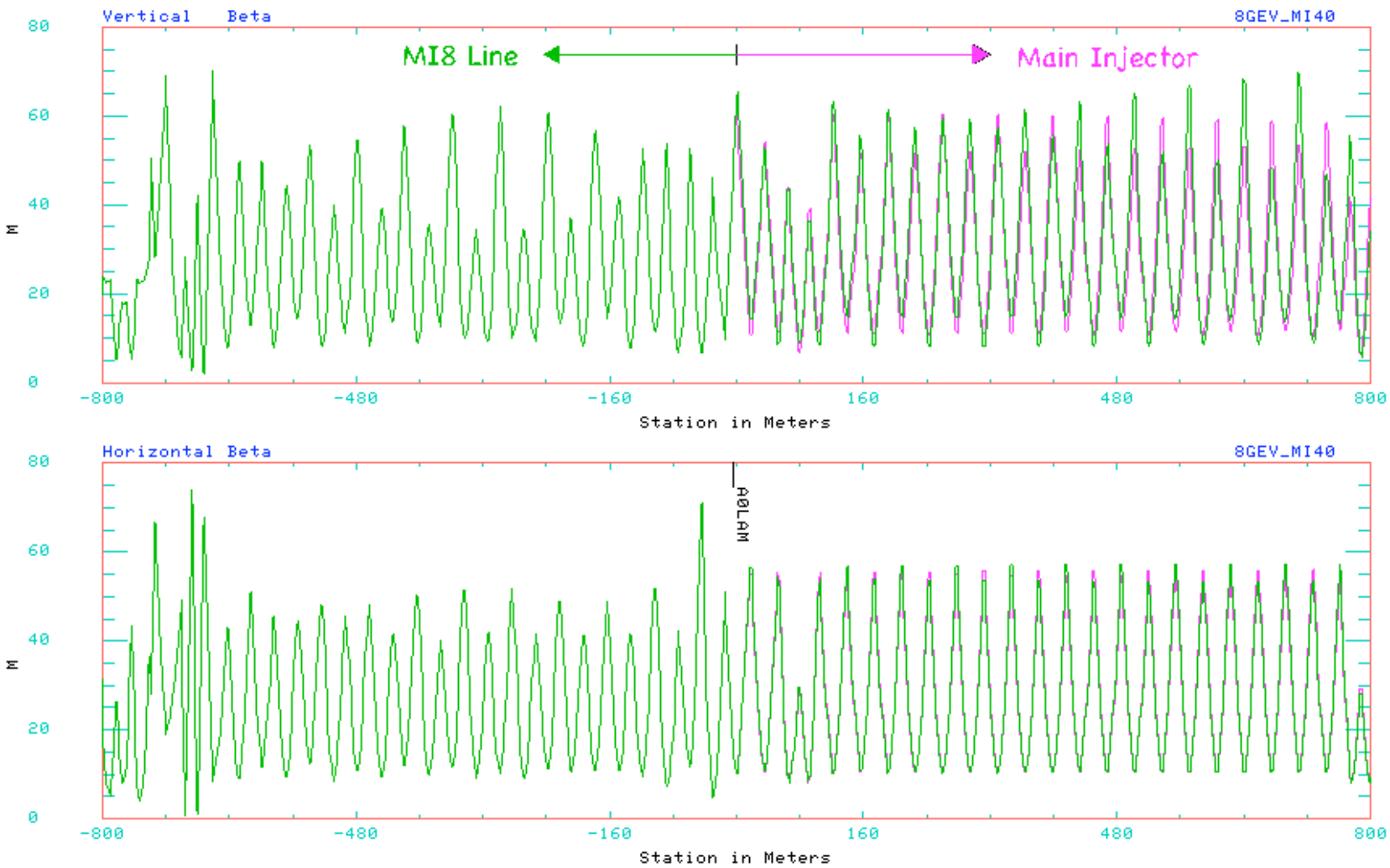


Fitting the profile sigma

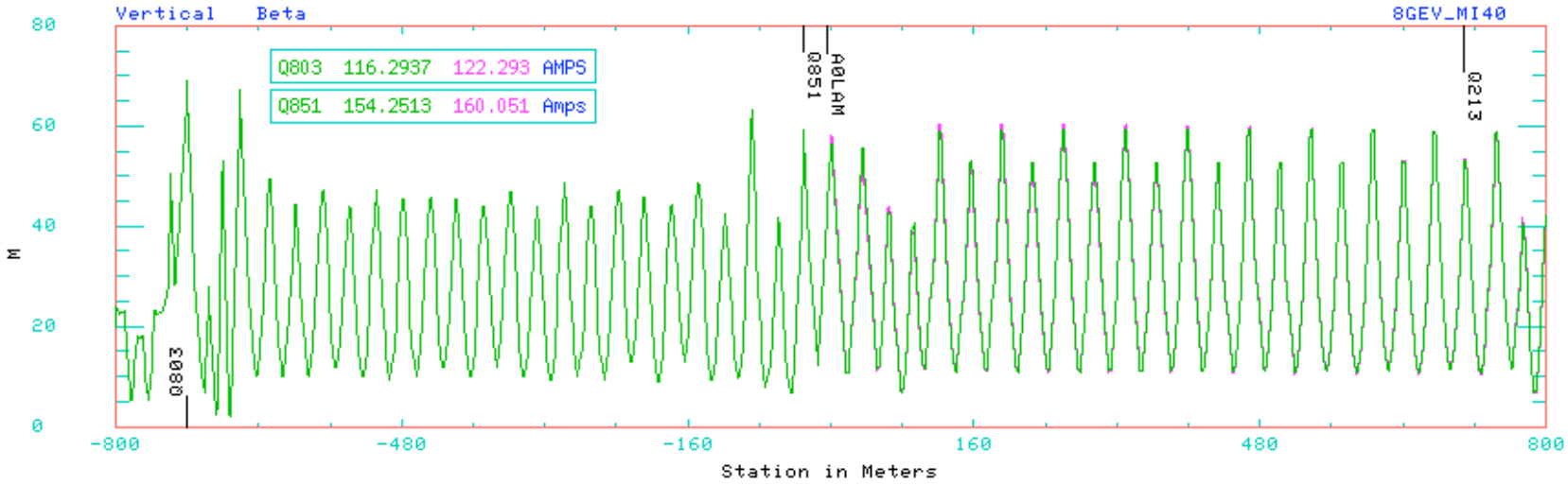


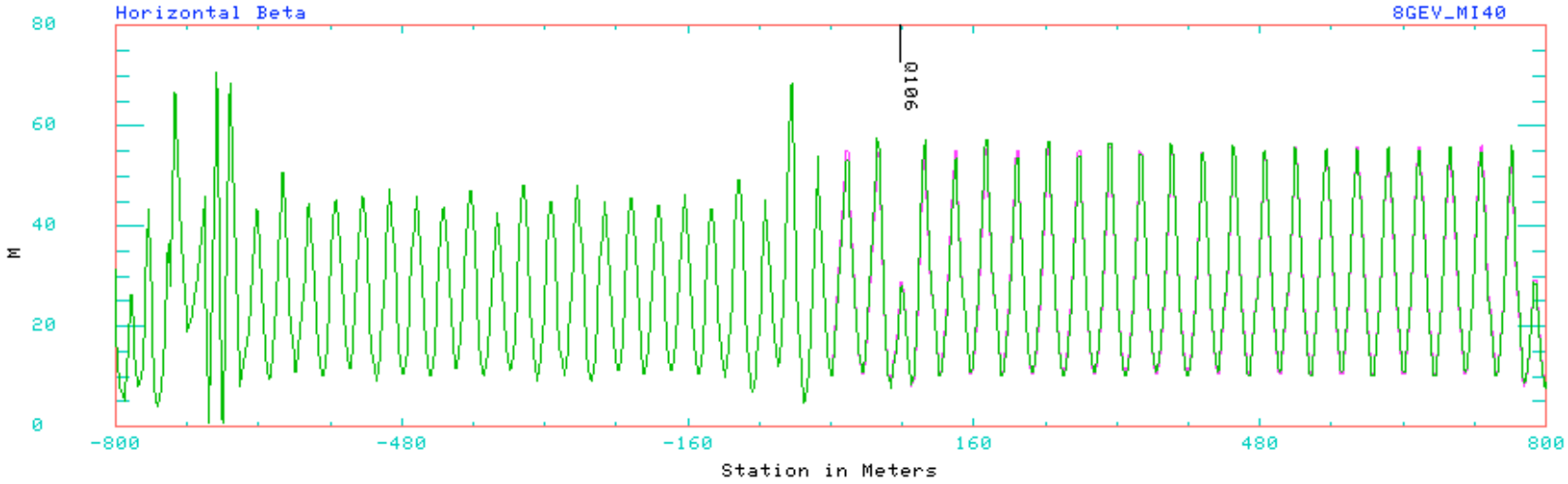


Expected MI injection beta function



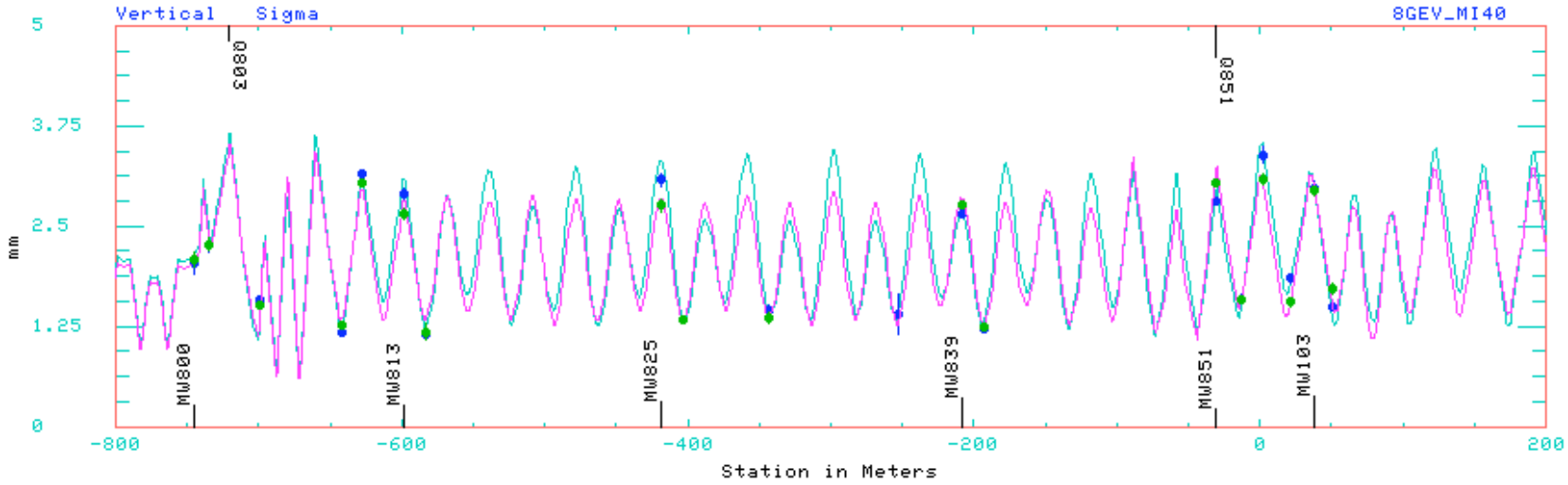
Beta function with proposed match

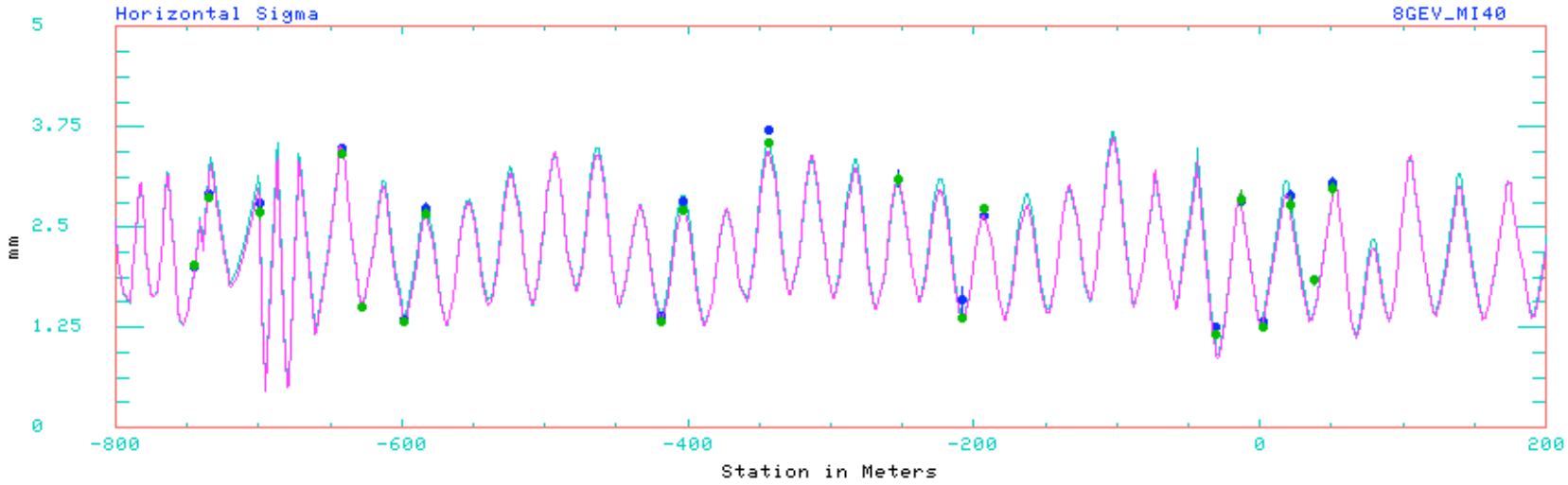




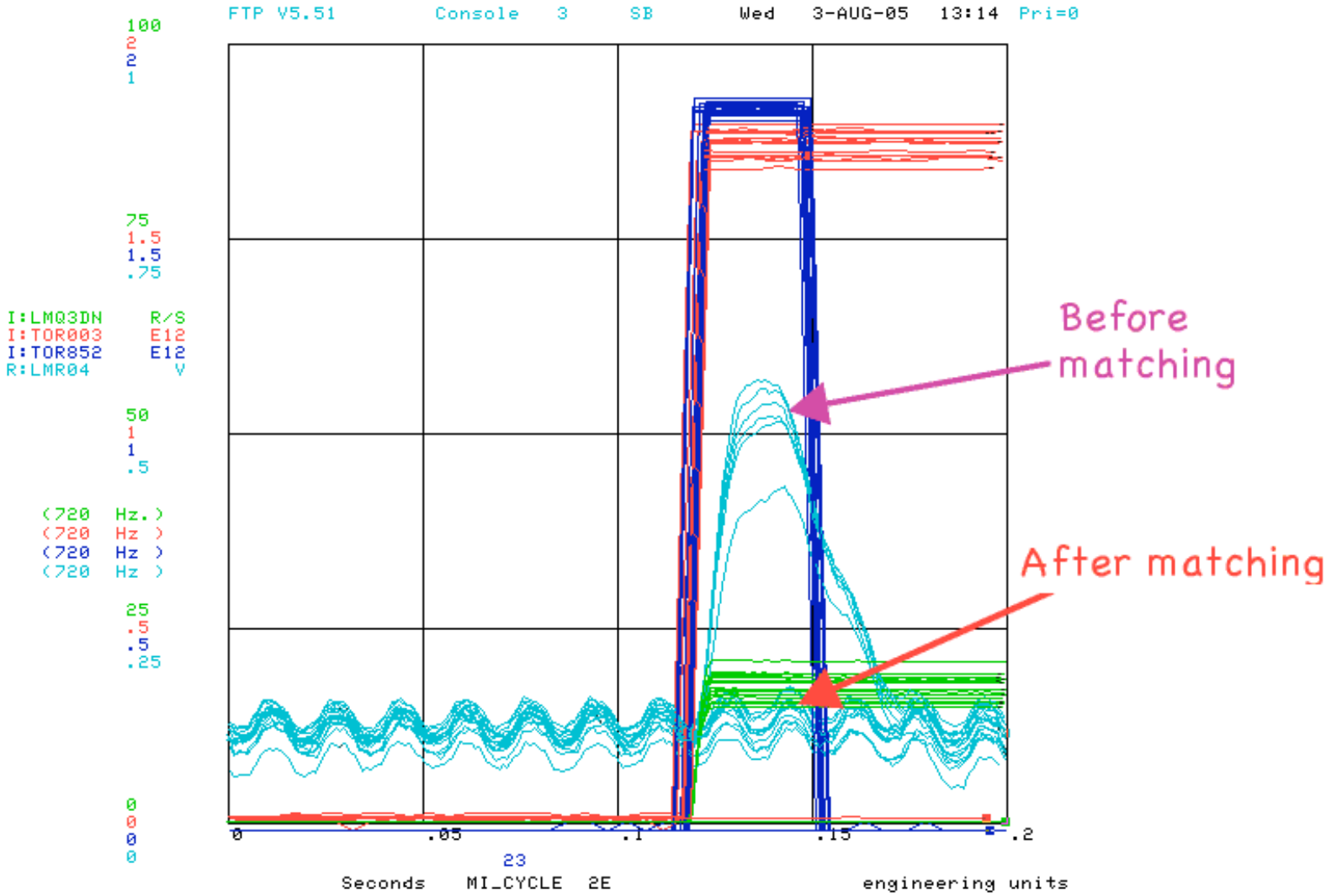
Profile sigma, measured

before & after modification



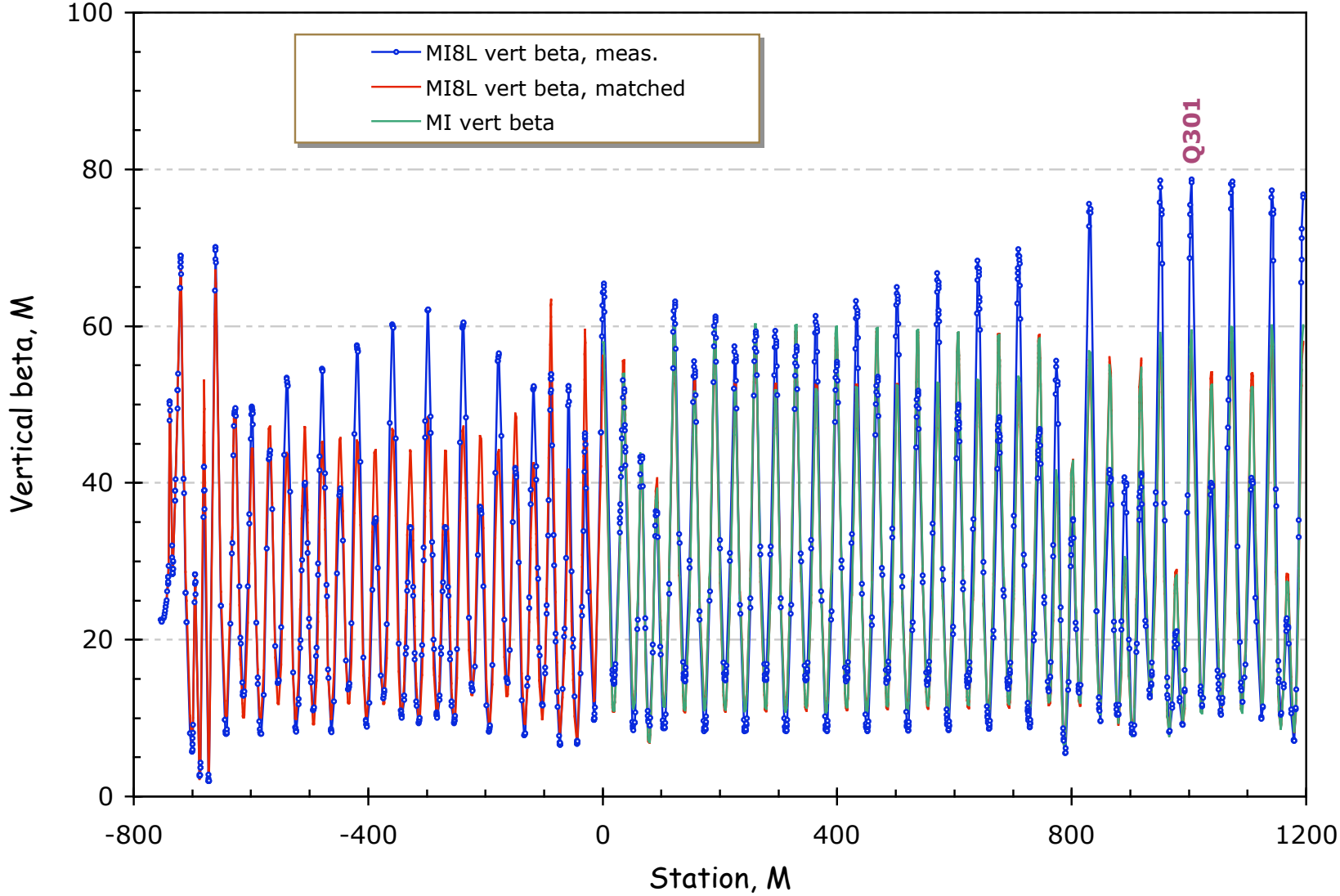


Changes in 1st-turn loss at MI301



Compare vertical plane beta function

from MI8 line to MI30



Summary on lattice matching

- Profile sigma, before and after
  - Difference in profiles is as expected.
- First turn loss
  - At 301 location
    - Loss is reduced to zero after matching.
    - A positive sort of confirmation.
  - Ring wide
    - Data got messed up due to Tclk setup error.
- Emittance in MI
  - Vertical flying wire is out of commission.