Astra bunch orientation.

Issues on finding head and tail of assymmetrical bunches

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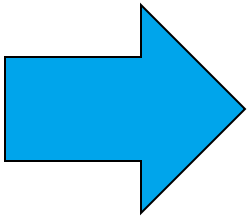
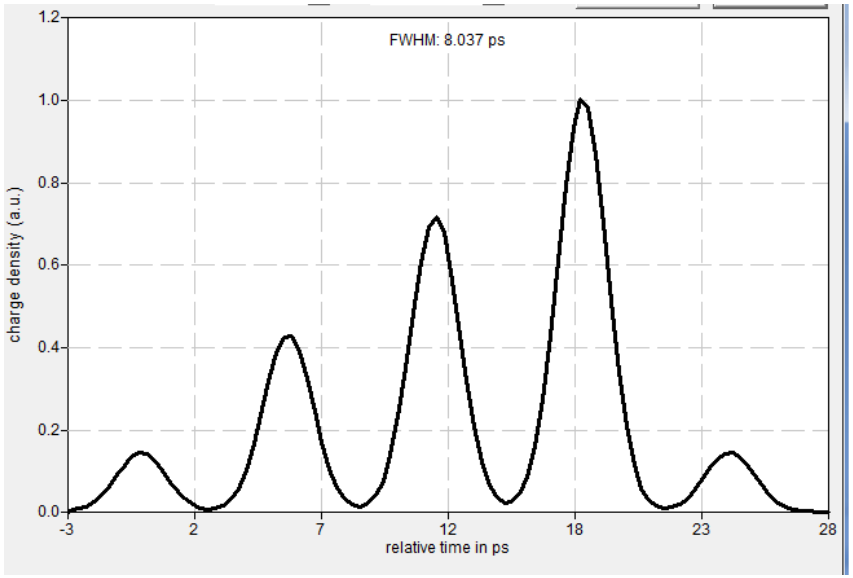
DESY

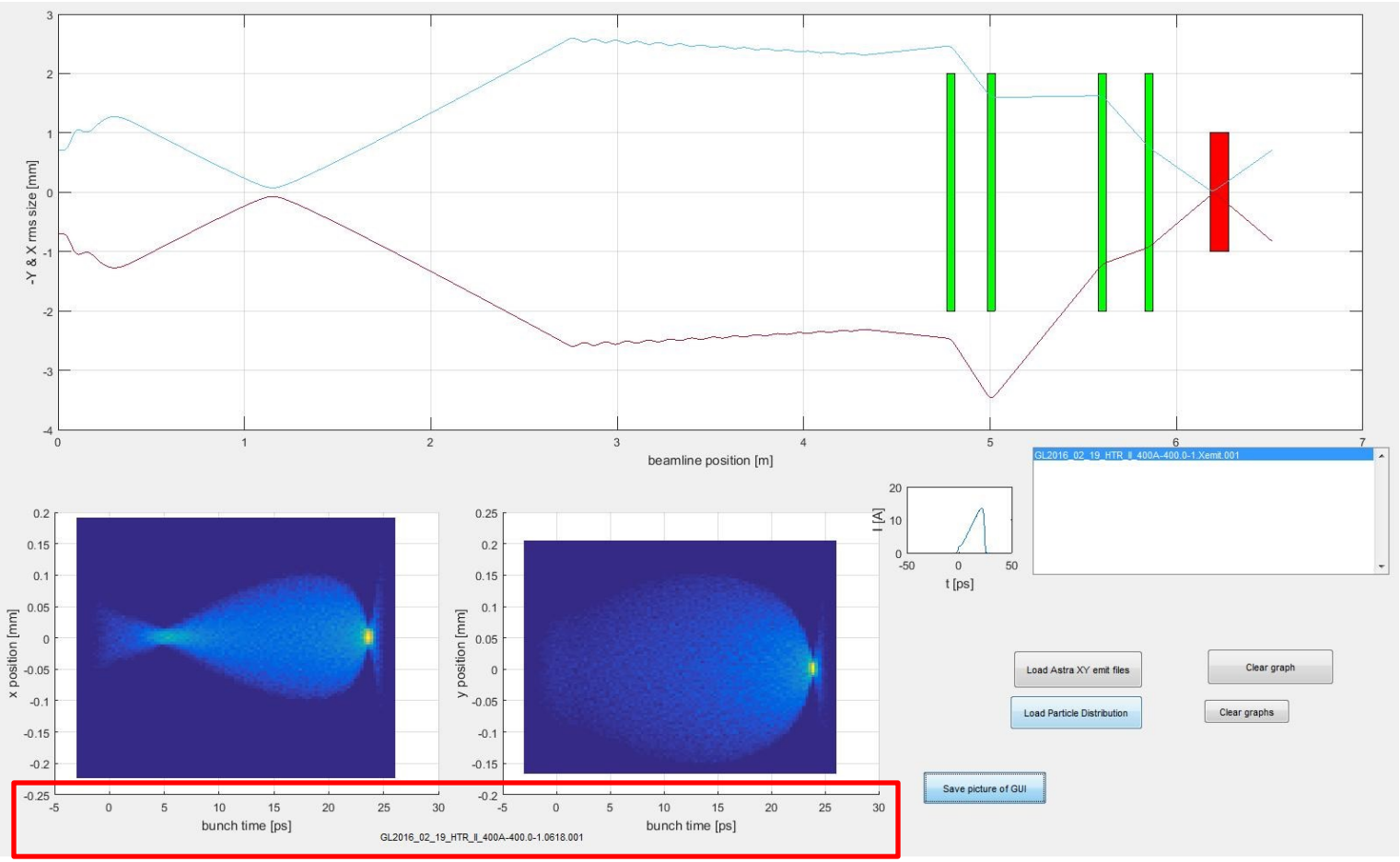
Original input files as used in bunch compressor studies

```
  N_add=5

  IPart=1176
  Species='electrons'
  High_res=.T.
  Probe=.True.
  Noise_reduc=.T.
  Cathode=.T.
  Q_total=0.05882
  Ref_zpos=0.0E0
  Ref_clock=0.0E0
  Ref_Ekin=0.0E0
  Dist_z='g',
  Dist_pz='i',
  sig_Ekin=0.0E0,
  emit_z=0.00E0 ,
  cor_Ekin=0.E0,
  sig_clock=1.0E-3
  LE=0.00055
  Dist_x='r',
  sig_x=0.15
  Dist_y='r',
  sig_y=0.15
  Dist_px='r',
  Nemit_x=0.0E0,
  cor_px=0.0E0
  /

&INPUT
  IPart=3529
  Species='electrons'
  High_res=.T.
  Probe=.True.
  Noise_reduc=.T.
  Cathode=.T.
  Q_total=0.17647
  Ref_zpos=0.0E0
  Ref_clock=6.0E-3,
  Ref_Ekin=0.0E0
  Dist_z='g',
  Dist_pz='i',
  sig_Ekin=0.0E0,
  emit_z=0.00E0 ,
  cor_Ekin=0.E0,
  sig_clock=1.0E-3
  Le=0.00055
  Dist_x='r',
  sig_x=0.15
  Dist_y='r',
  sig_y=0.15
  Dist_px='r',
  Nemit_x=0.0E0,
  cor_px=0.0E0
```





Using the similar timing I get this from the simulations

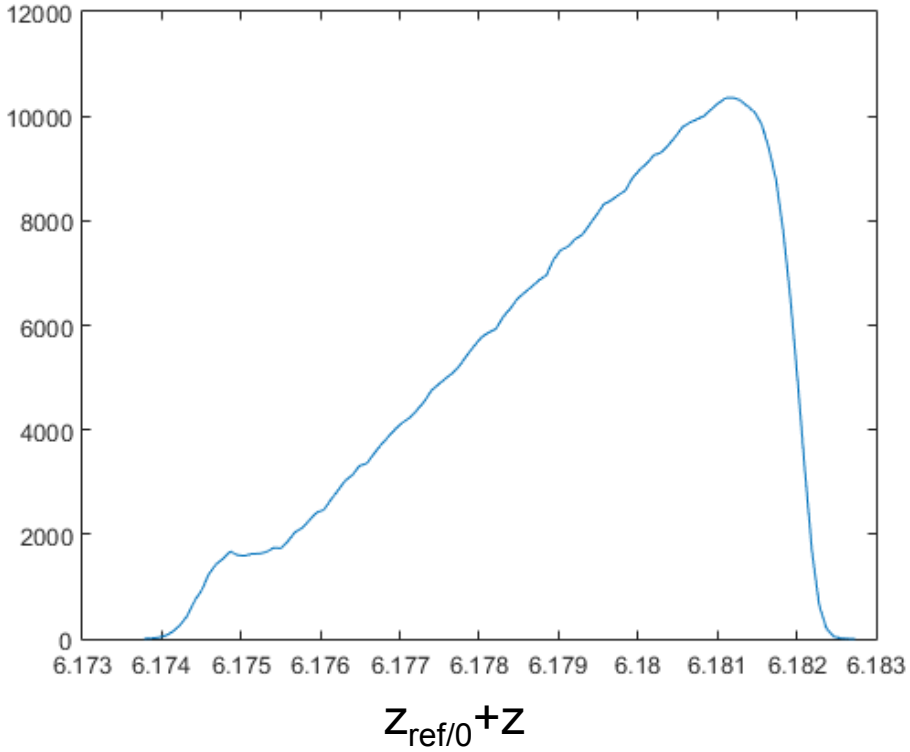


This time is directly calculated by z/c !!!

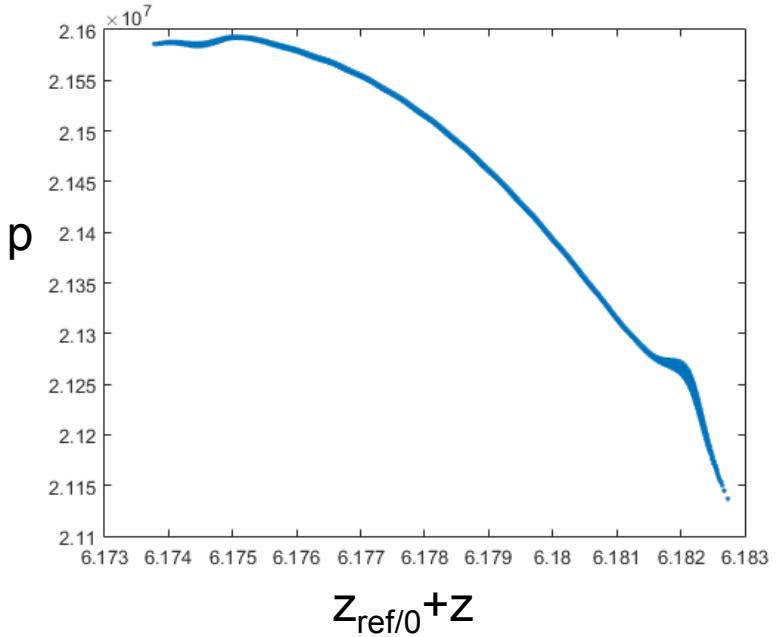
If the absolute z-position is $z_{ref/0}$+z, than the particles with larger z are ahead.

Larger ref_clock means bunch comes earlier!? Time of flight like..

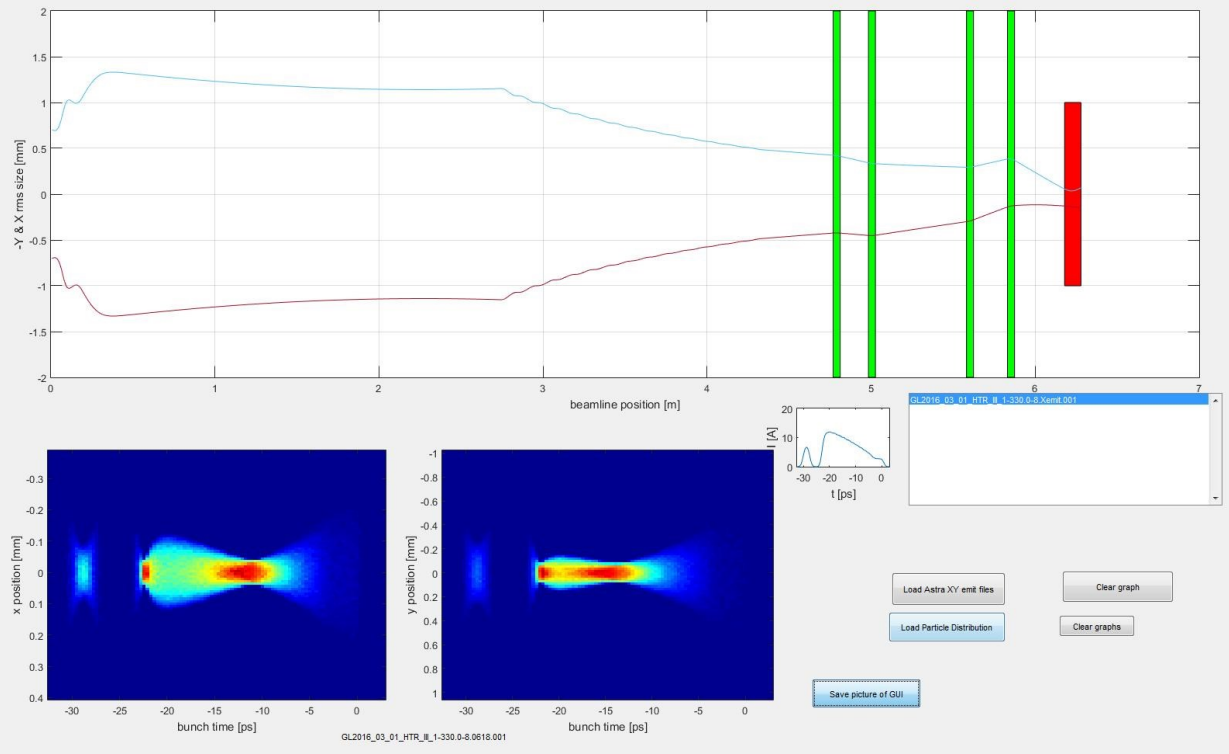
Plotting absolute particle position of the shown case…



Just for reference: phase was adjusted to have higher energy in the tail…



I meanwhile turned the reference clock settings after discussion with GV



Orientation looks more reasonable to me…
Still:

- What does ref_clock mean?
- Where does Astra put the reference particle when I give the first bunch a ref_clock?
- Do we agree on this interpretation of head and tail?

Thanks!