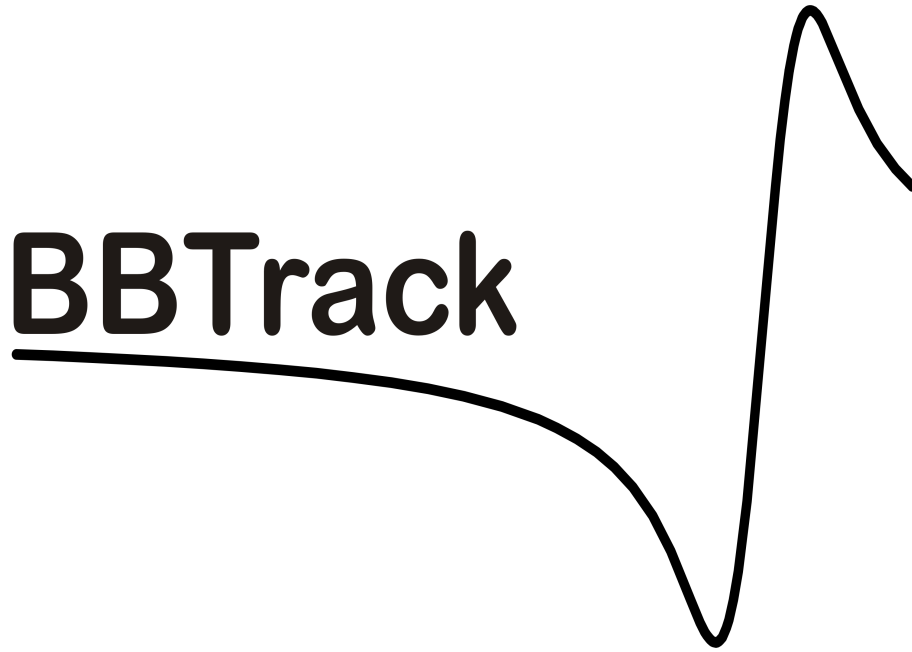


BBTrack



Ideas & Modifications on BBTrack for Space charge calculations

Current status

Transversal (round and elliptic) SC

it is implemented to deal with

- transversal dimensions: constant (less numeric noise) or recomputed every time
- longitudinal density variations: constant, Gaussian or from file,

Electron lens

- noiseless, round

Currently in the testing phase

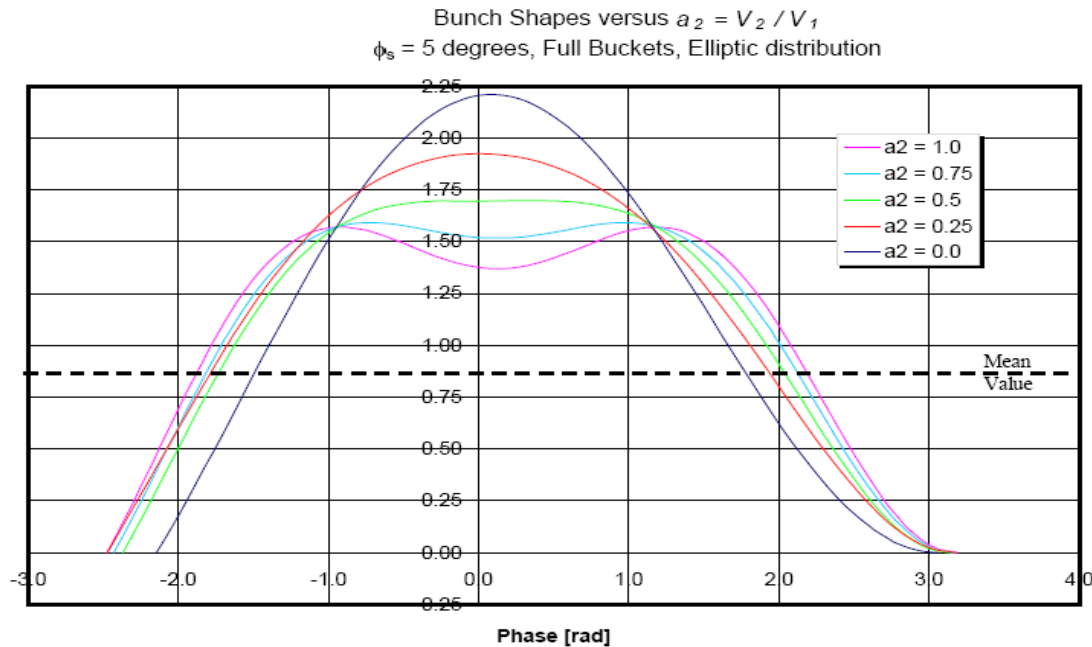
My ideas about the PSB and the resulting problems in simulations

- The space charge effect is different for different longitudinal positions
- a DC electron lens cannot compensate all perfectly.
- either an pulsed system (additional noise, technical feasibility?)
or some intermediate DC level must be found

→ the longitudinal dynamics is crucial

The longitudinal dynamics is a bit more complicated as the PSB uses bunch flattening RF to reduce the SC effect.

The PSB uses a RF Voltage - ratio of >0.5



Pedersen - dual harmonic RF operation in the cern PSB

Idea - two step simulation:

- 1) start with uniform distribution and track with Rf (without SC) to find a stable longitudinal distribution
- 2) take the obtained distribution as starting positions and density distribution for the real tracking.

→ Does it make sense to include a time dependent RF to include this bunching process into the simulation?

Future Ideas:

- 1) Test, test ,test
- 2) use proper PSB - MADX files: just released (today 13:47), currently fighting with it.
- 3) Ideas for further code modifications:
 - get a self calculating longitudinal distribution:
sort particles in bins and compute their relative density.
 - Implement Noise in the electron lens (position, shape, current density)