Benchmarking Impact-T and SPACE in the CeC PAC Section

Kai Shih 03/10/2023 From Yichao's latest beam dynamics simulations: Slice 15

Beta function	:	4.85148 m	
Alpha function	:	-0.21765	
Gamma	:	28.4976	
N-emittance	:	1.723135 um	
Current	:	49.58 A	
Sol 1–7	:	58.77, -117.54, 120, -120, 120, -117.54, 58.77	А







- Slice analysis: ٠
- Central 47.5 % to 52.5 % in length ٠
- ٠

2.0

1.5

1.0

0.5

0.5 0.0 -0.5

-1.0

-1.5

-2.0

N-Emittance were calculated in diff. % ٠ of beam charge core



100% C core



Tring to answer these two question :

- 1. The increases of emittance after PCA
- 2. Why SPACE and Impact sow diff. result







- Maybe diff. comes from # of mesh and # of the sim. Particle
- Also may be due to diff. particle dynamics calculation after sol 3



Impact-T 6Mp

Core	δ n-emittance
60%	7.06 %
80%	10.85 %
90%	32.34 %
100%	106.93 %

SPACE	δ n-emittance
100%	140 %

From 18.45m to 30.20 m (first 6 Sol in PCA)



No Space-charge

Sol 1–7: 58.77, -117.54, 121.65, - 121.65, 121.65, -117.54, 58.77 A







03/31/2023 Updates





$$X_{env}(x\%) = [r(x\%) + r(x-1\%)]/2$$



