CeC Physics

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- Calculate beam parameters using 100% beam.

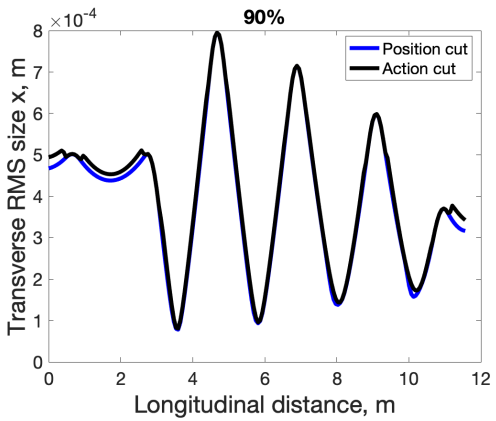
$$\begin{aligned} < x'^2 >< x^2 > - < xx' >^2 &= \varepsilon^2 \\ < x^2 > &= \beta\varepsilon \\ < xx' > &= -\alpha\varepsilon \\ < x'^2 > &= \gamma\varepsilon \end{aligned}$$

- Calculate individual particle's action

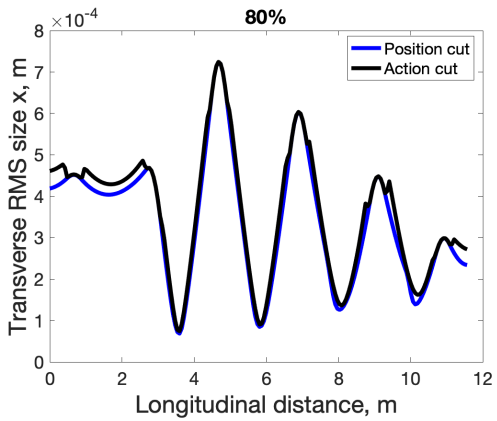
$$\begin{aligned} P_x &= \beta x' + \alpha x \\ x^2 + P_x^2 &= 2\beta J_x \end{aligned}$$

- Sort particles with $J = \sqrt{J_x^2 + J_y^2}$ and choose beam core.
- Compare with position cut.

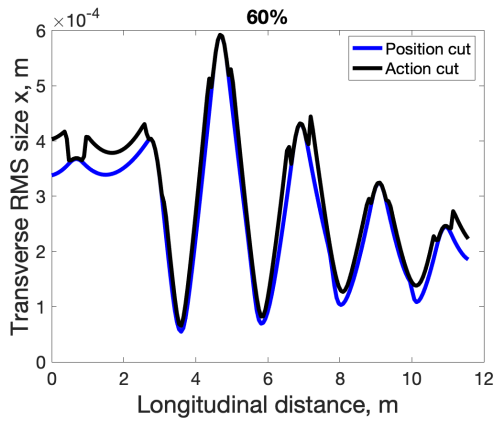
Comparison of beam size



(a)

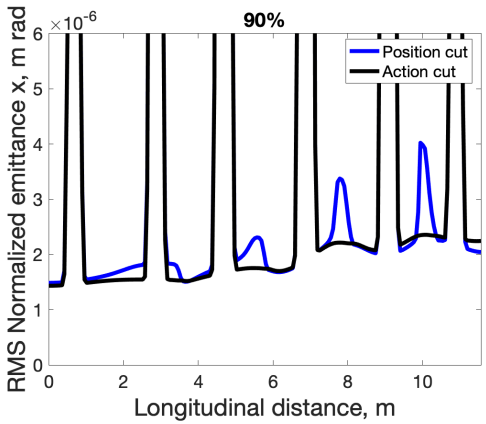


(b)

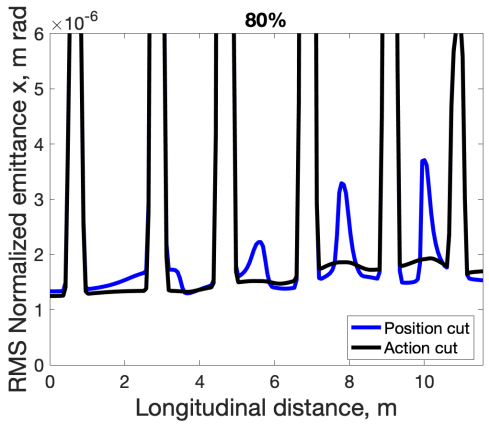


(c)

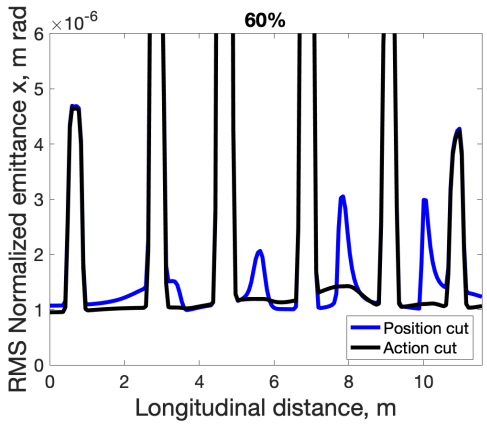
Comparison of emittance



(a)

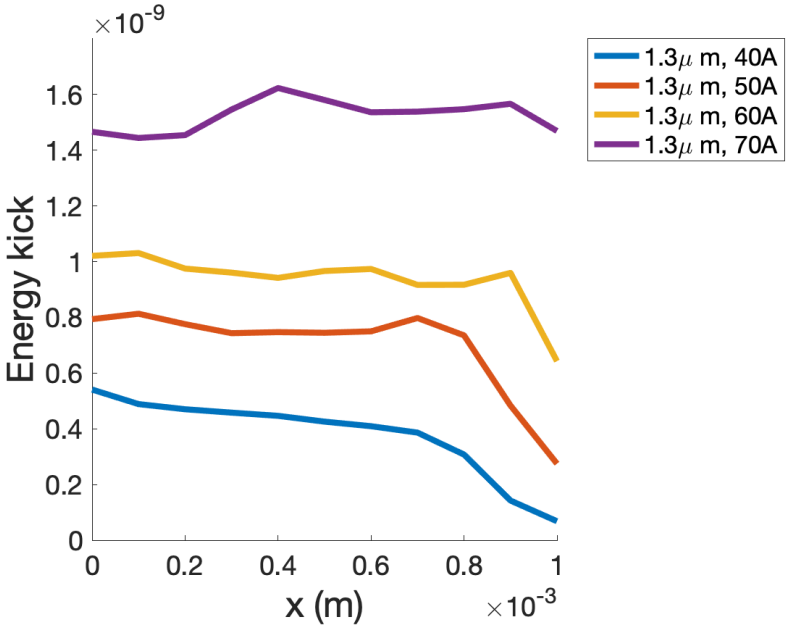


(b)

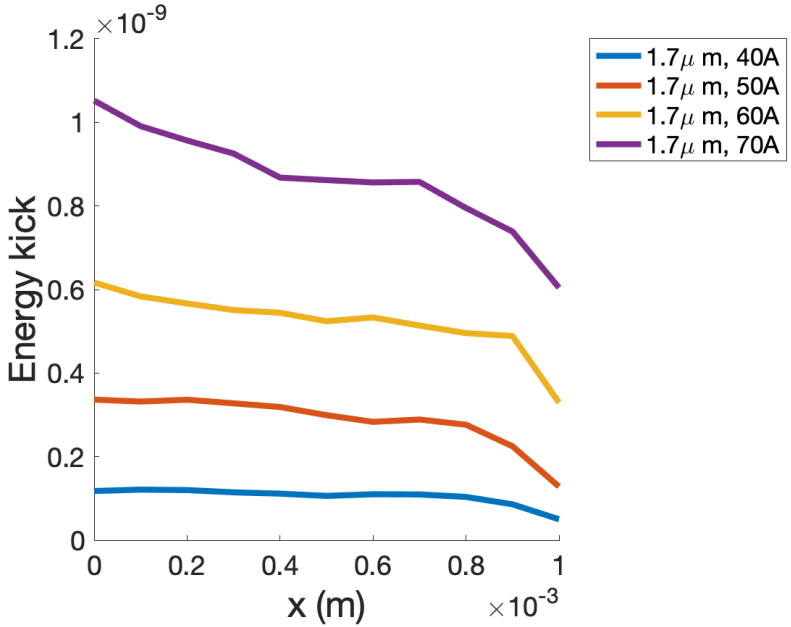


(c)

- Sensitivity study of cooling performance on beam current and emittance.
- Plan to complete 2D map of current 40A to 70A with 10A step and emittance 1.3 μm to 1.7 μm with step 0.1 μm.
- Complete 1.3 μm and 1.7 μm.



(a) 1.3 μm



(b) 1.7 μm