Phase Advance in Quads with Space Charge

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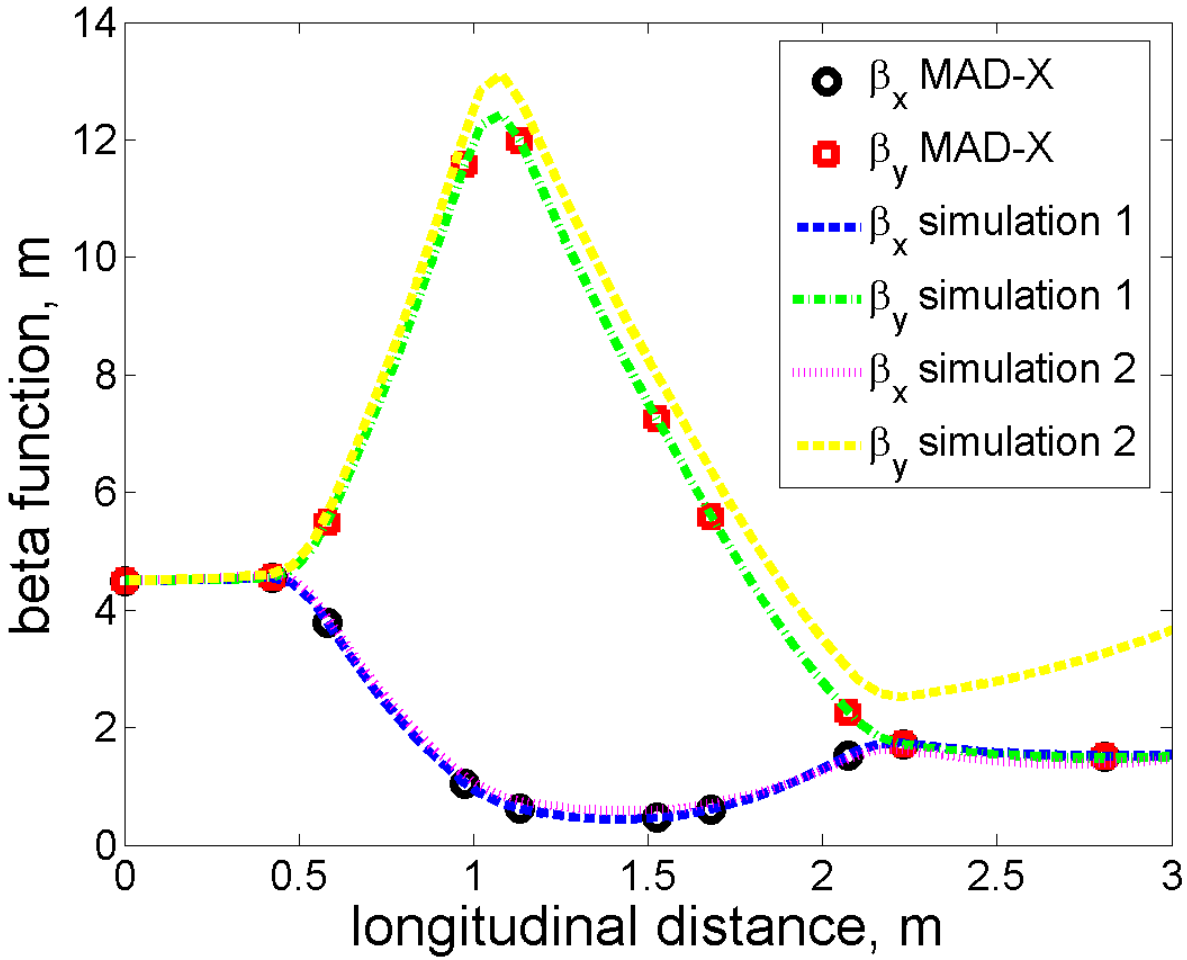
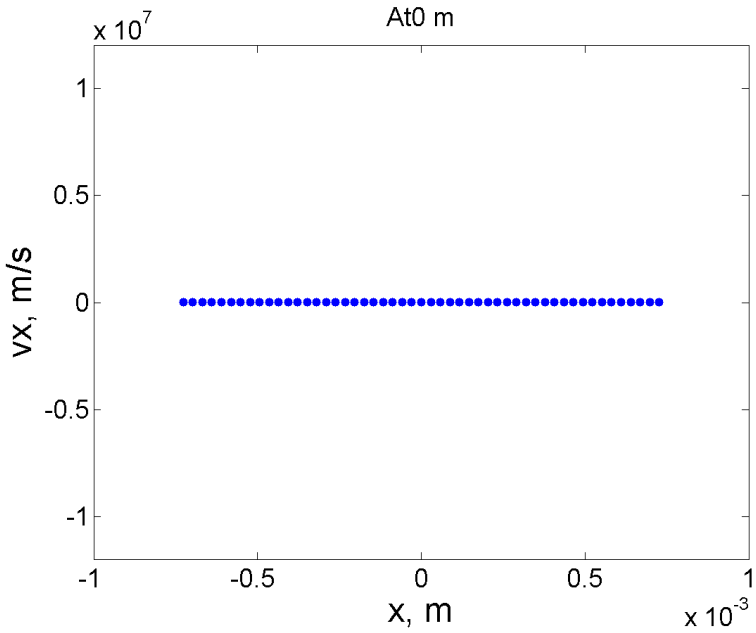
β change in quads

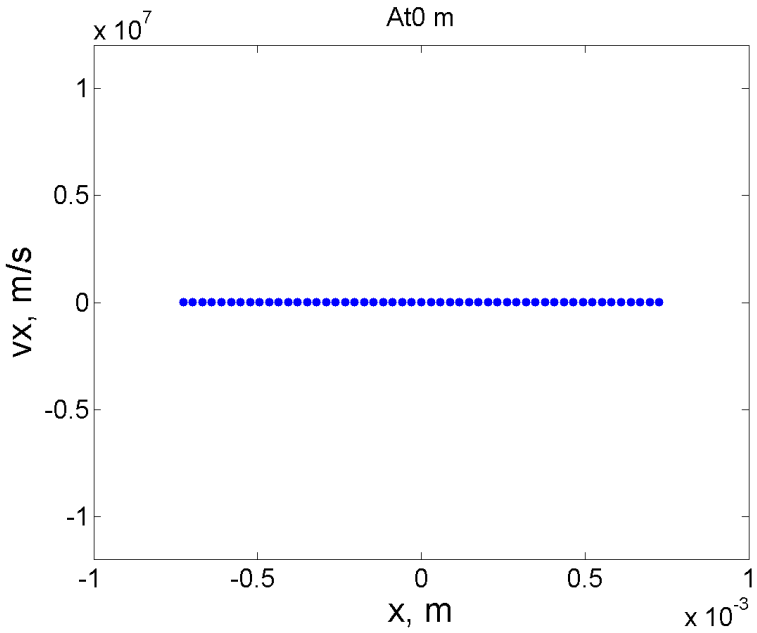


- Track transverse phase advance of a line of particles.
- Only consider the $x - v_x$ phase space.
- $y = 0, 0.5\sigma, 1\sigma$.
- With / without space charge effect from whole electron beam.

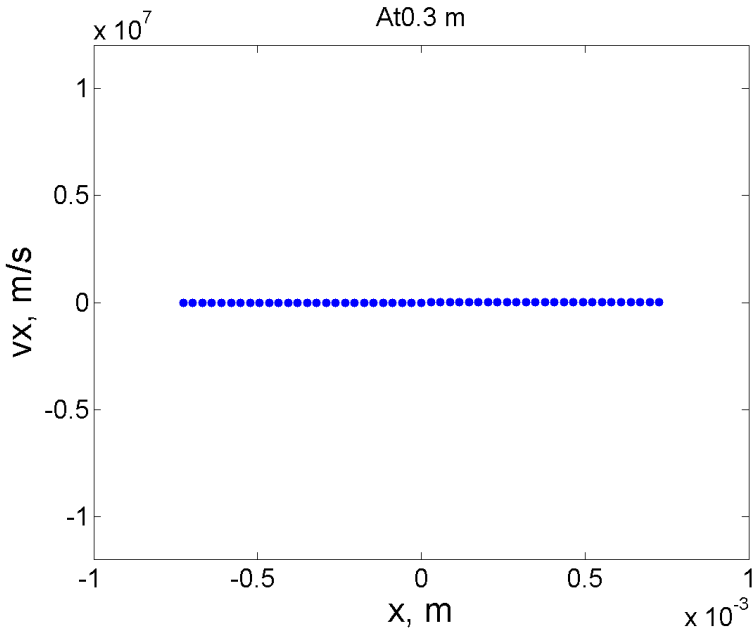
- $y = 0$.
- With / without space charge effect from whole electron beam.



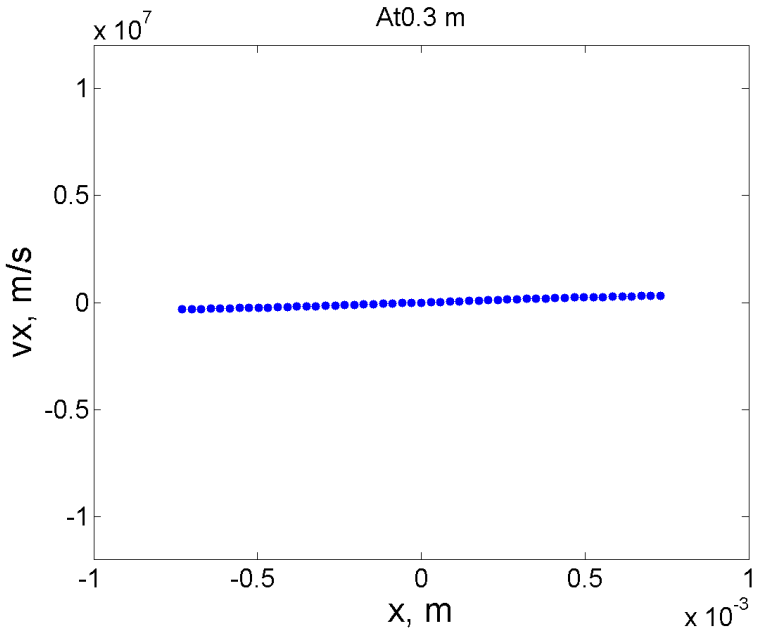
(a) Without SC



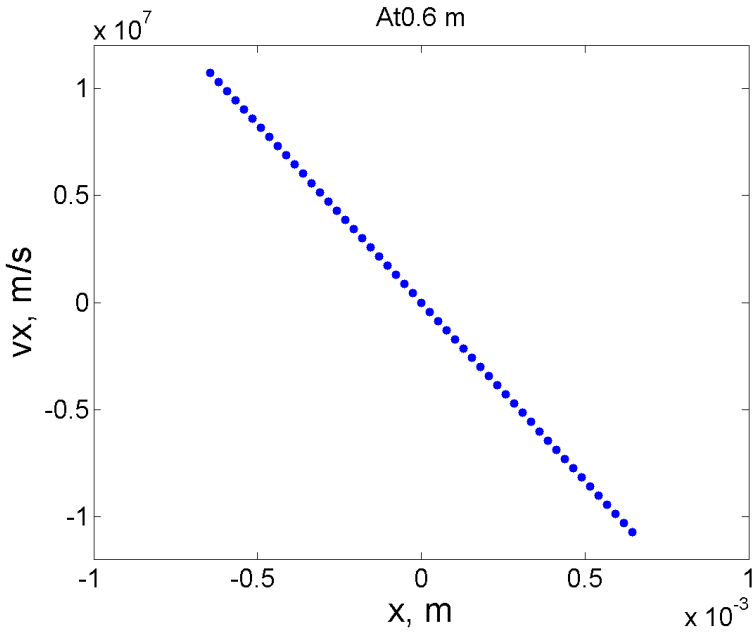
(b) With SC



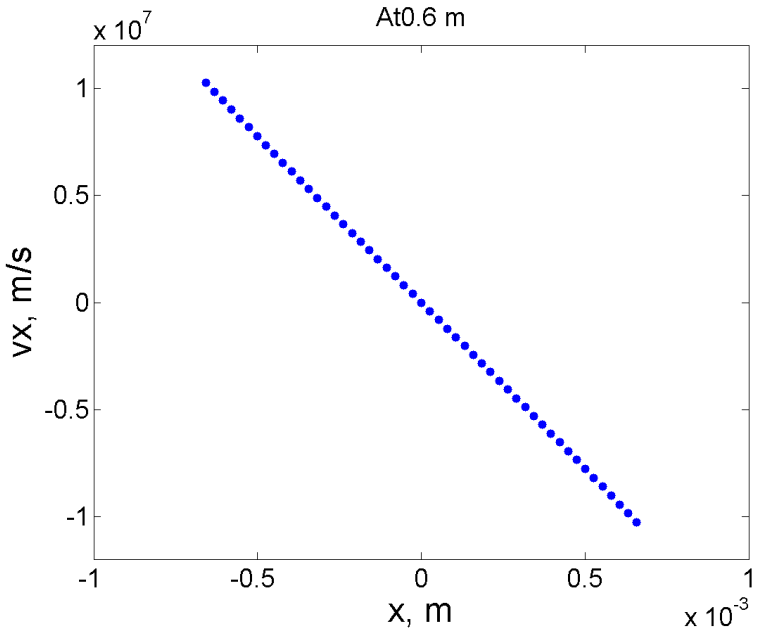
(a) Without SC



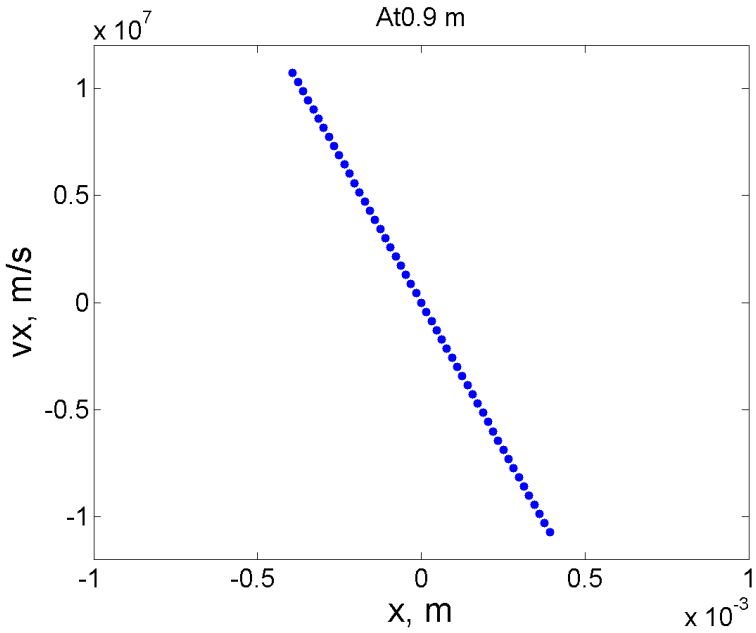
(b) With SC



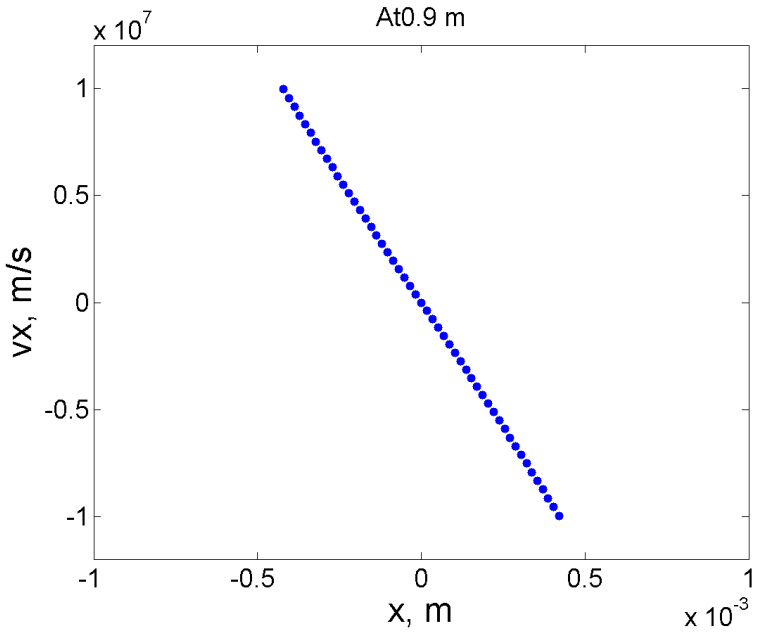
(a) Without SC



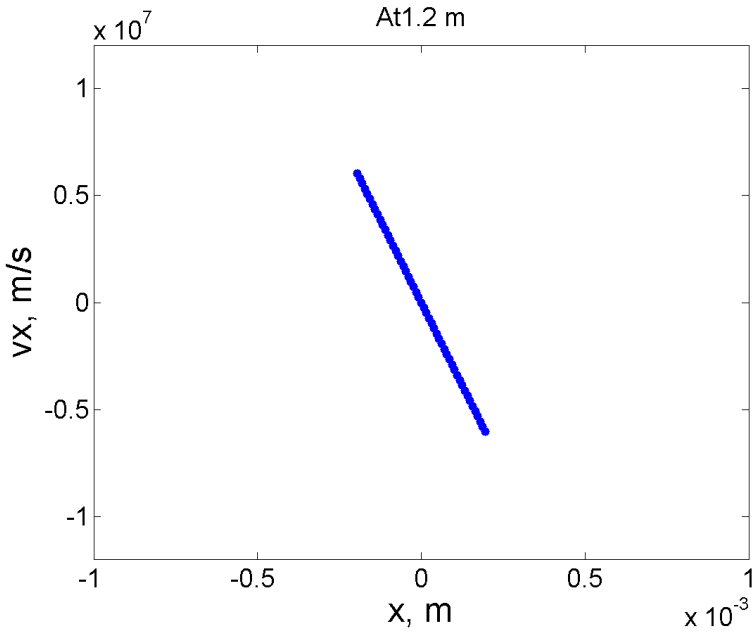
(b) With SC



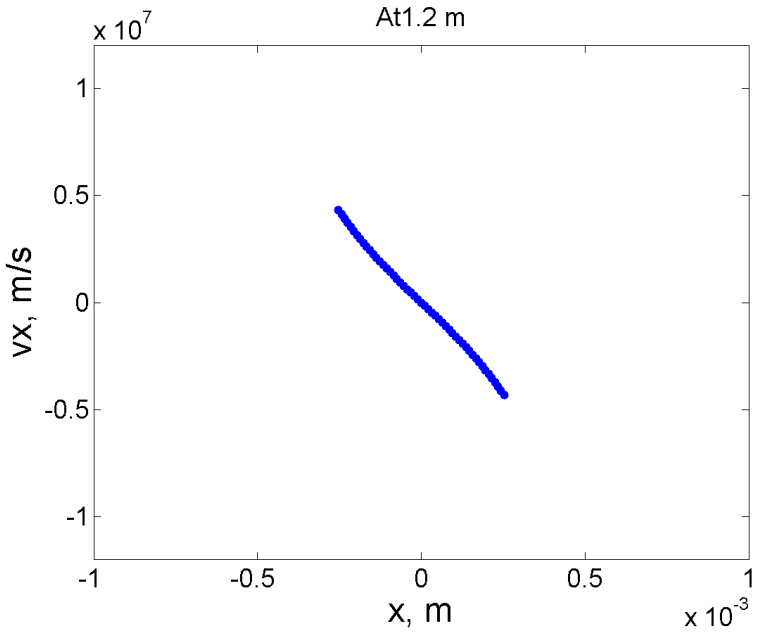
(a) Without SC



(b) With SC



(a) Without SC



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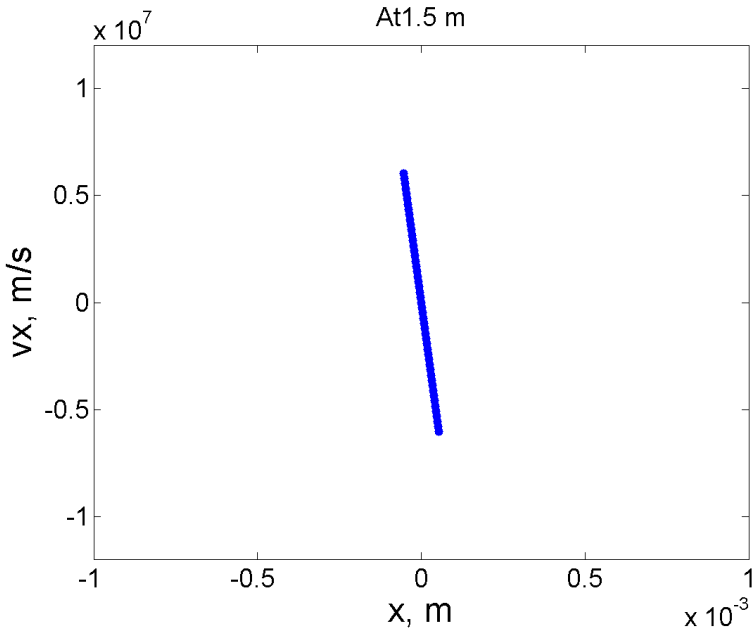
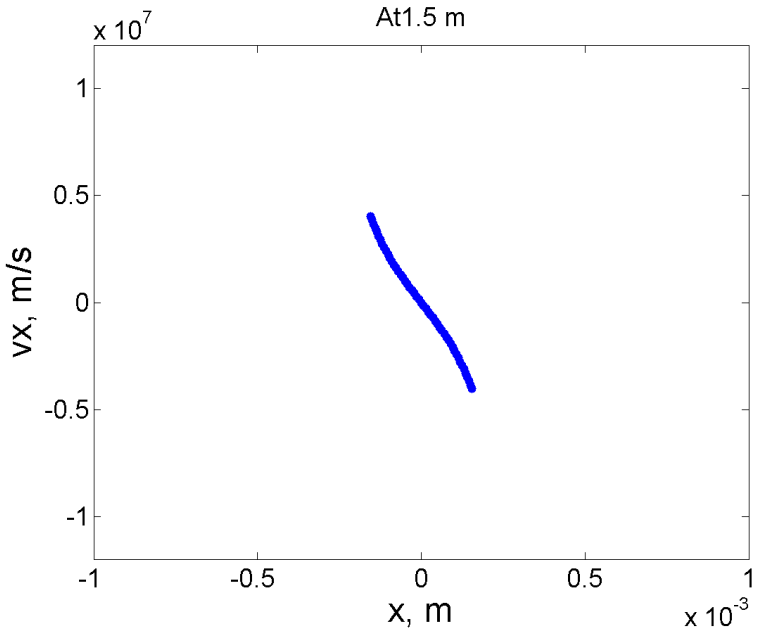


(a) Without SC



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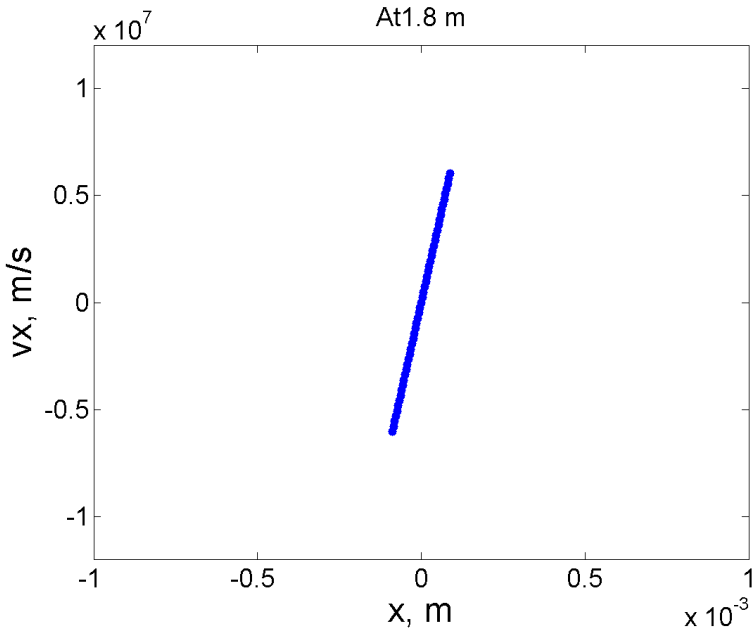
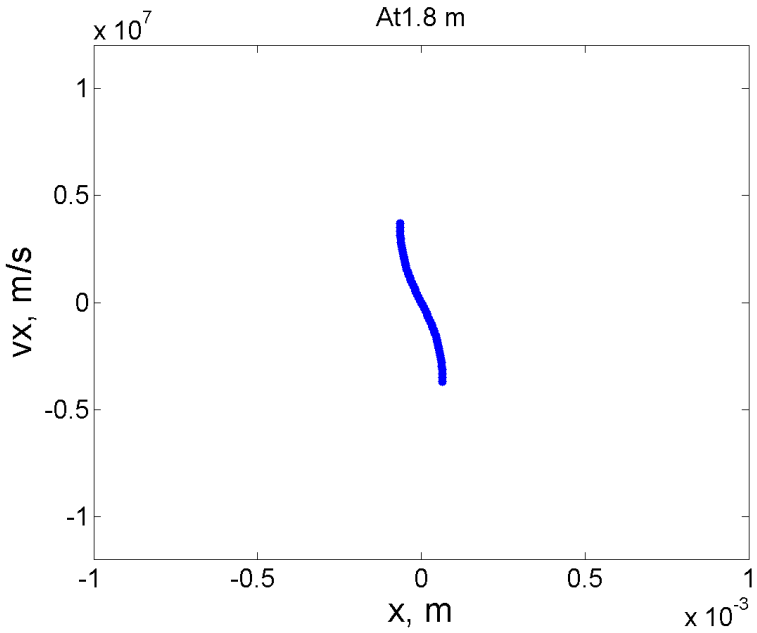
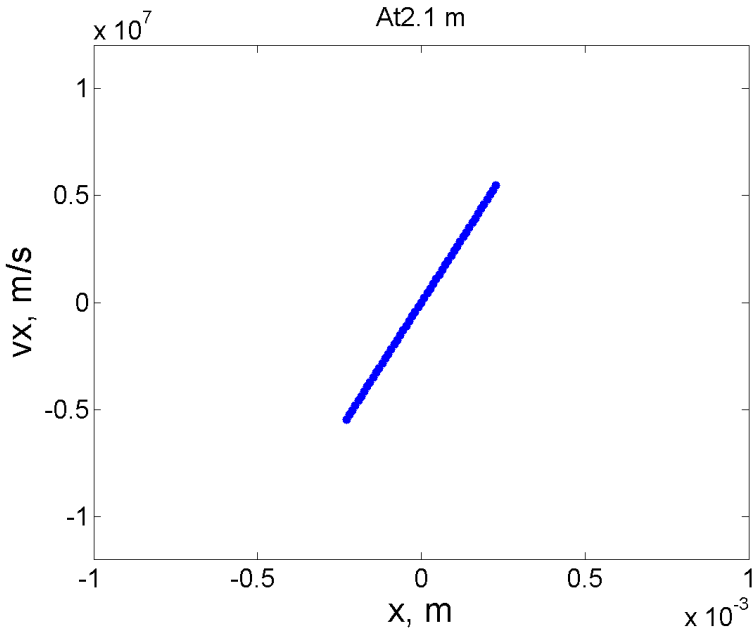


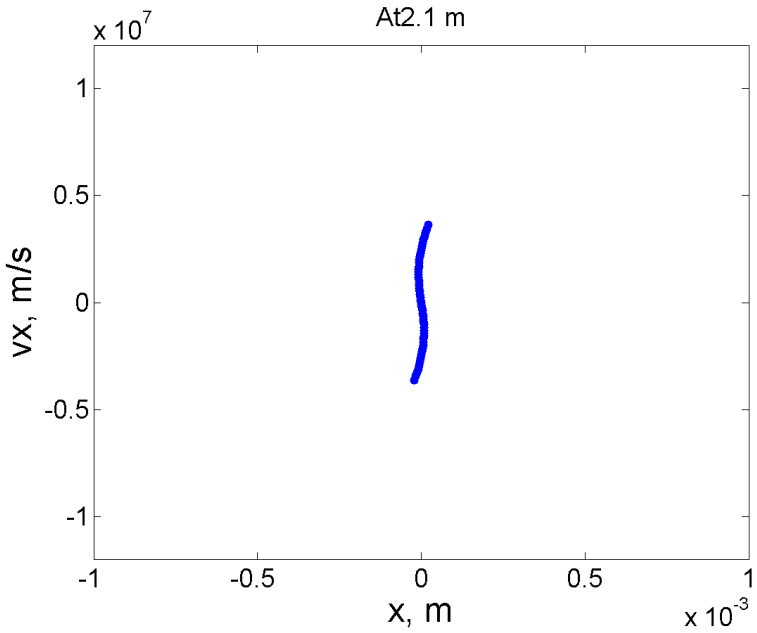
(a) Without SC



(b) With SC



(a) Without SC



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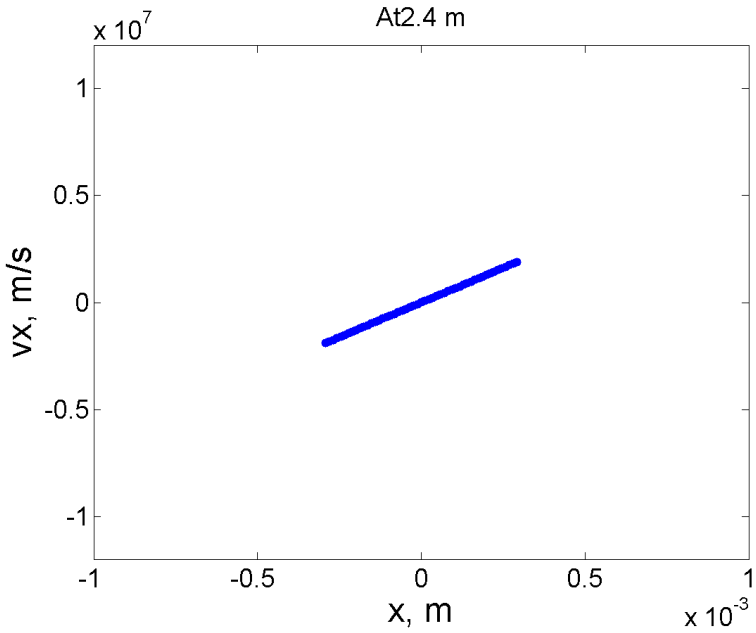

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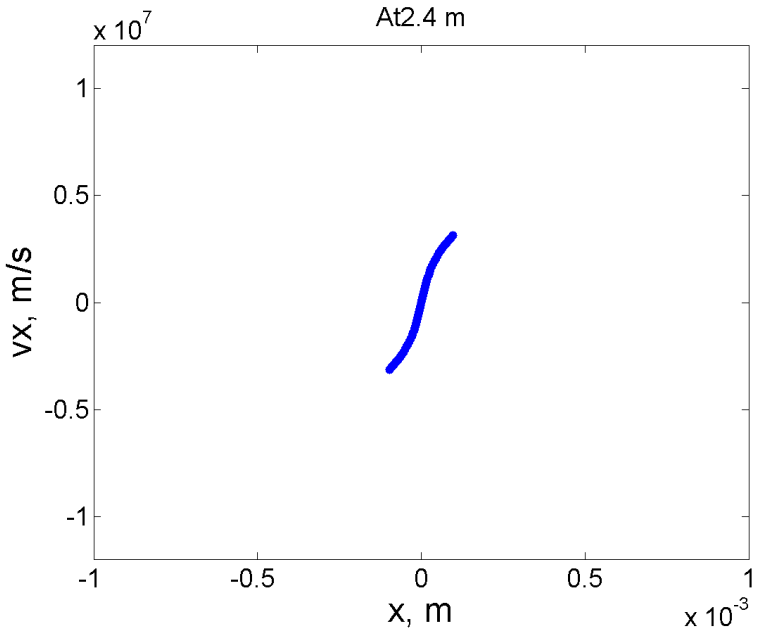

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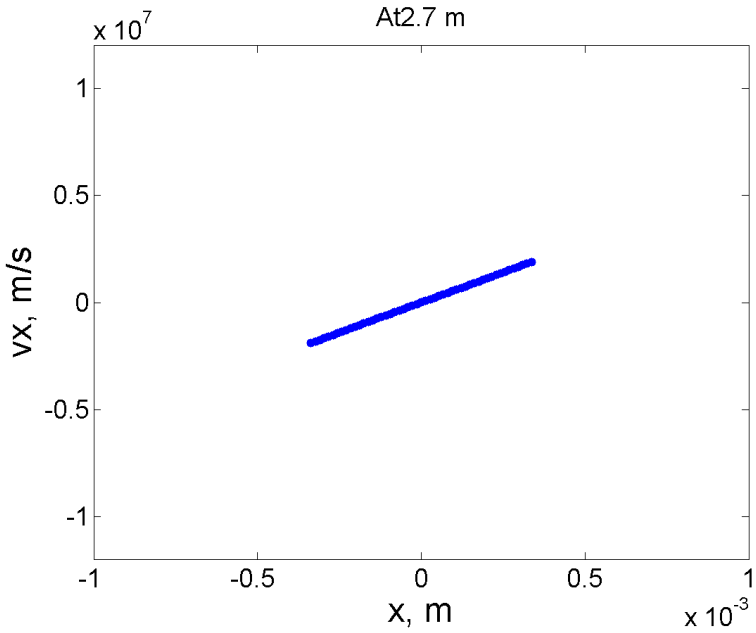

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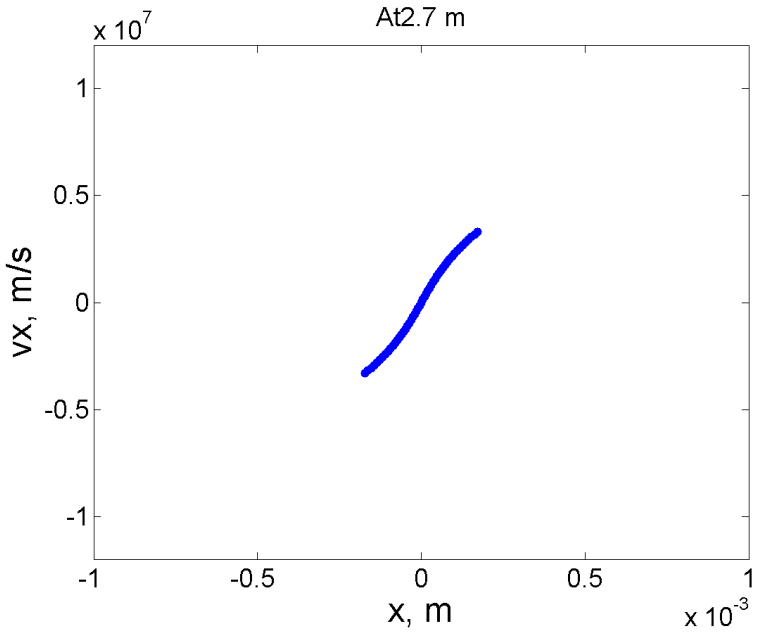

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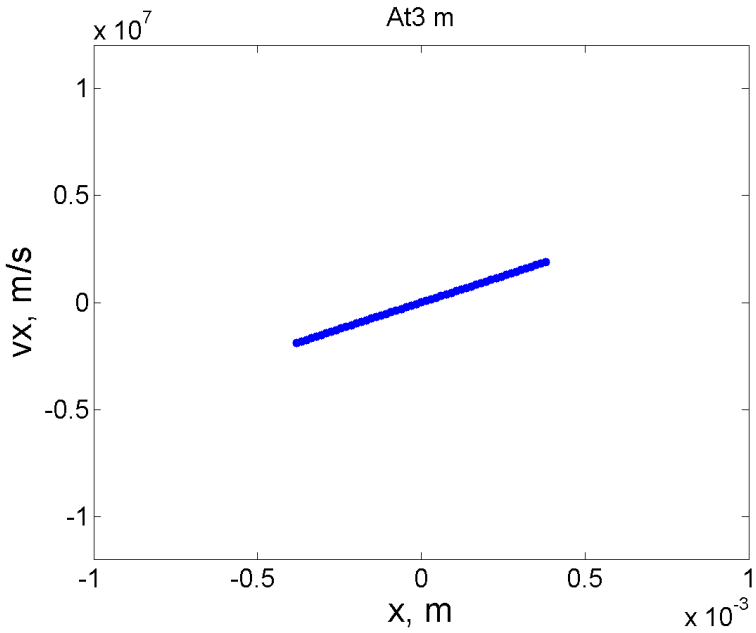

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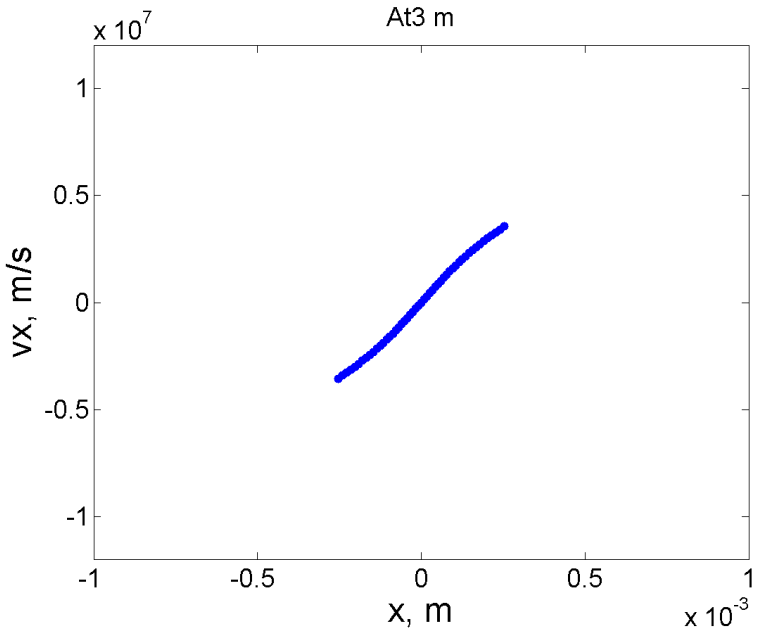
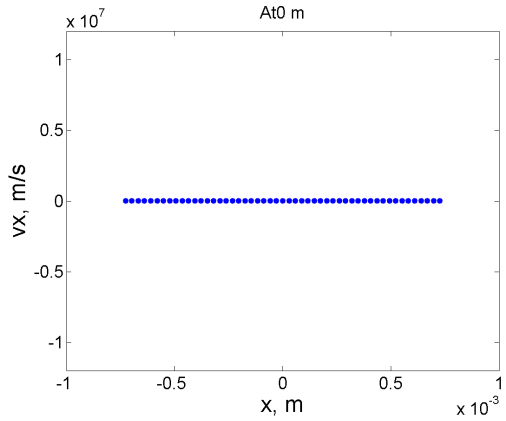
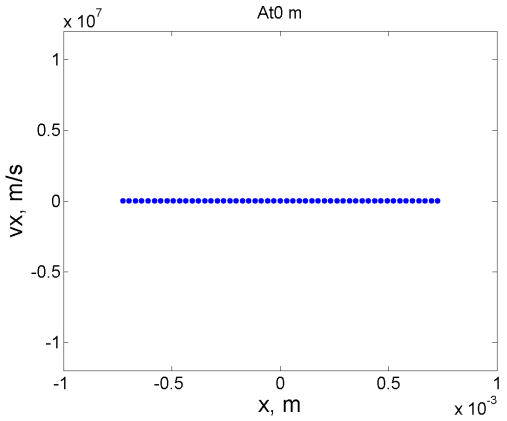


(b) With SC

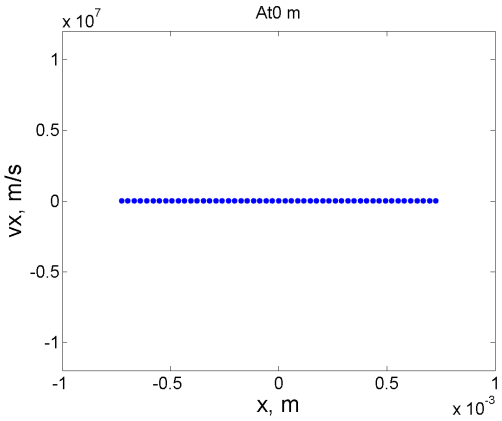
- $y = 0, 0.5\sigma, 1\sigma$.
- With space charge effect from whole electron beam.



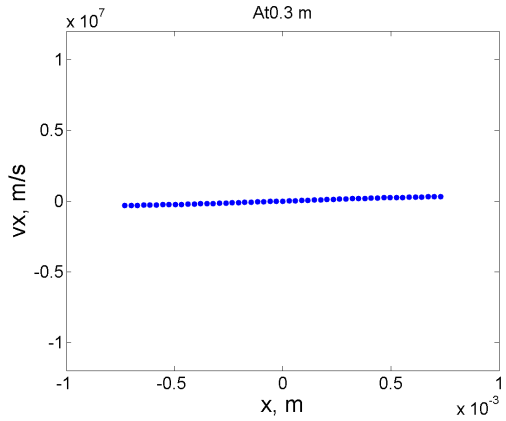
(a) $y = 0$



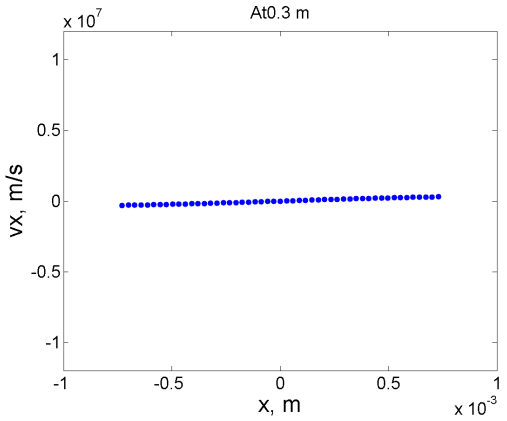
(b) $y = 0.5\sigma$



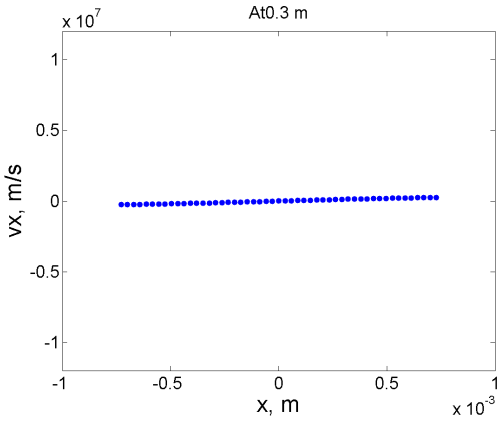
(c) $y = 1\sigma$



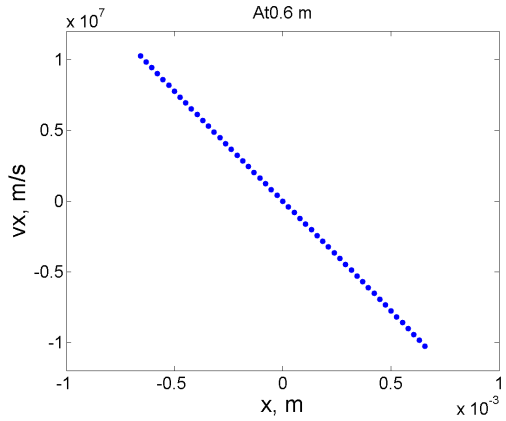
(a) $y = 0$



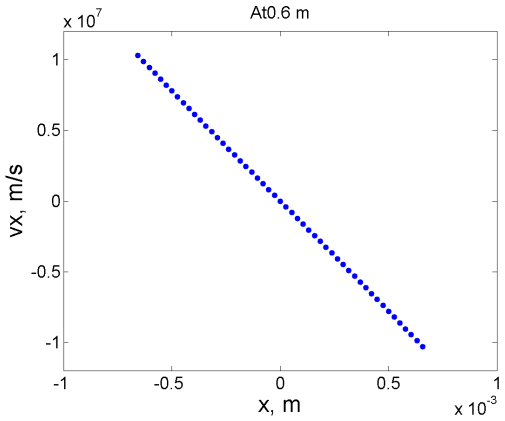
(b) $y = 0.5\sigma$



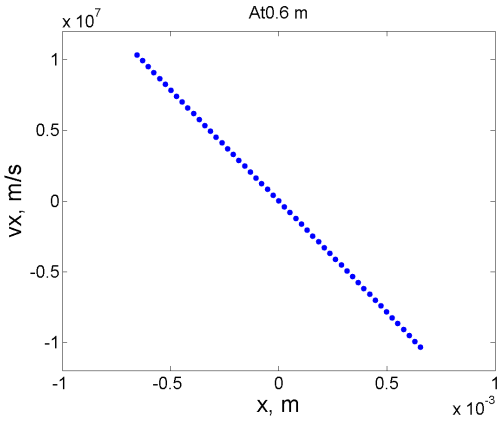
(c) $y = 1\sigma$



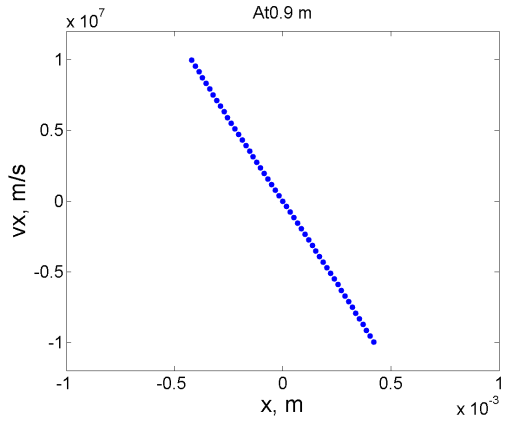
(a) $y = 0$



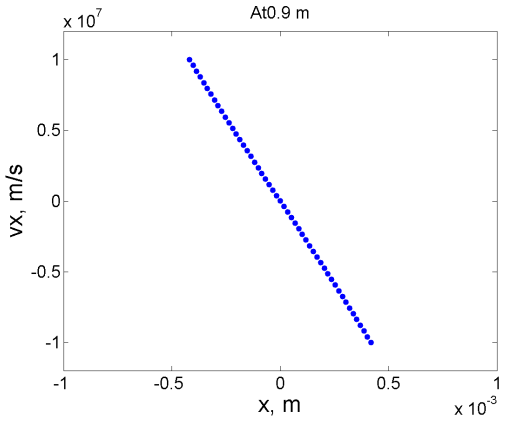
(b) $y = 0.5\sigma$



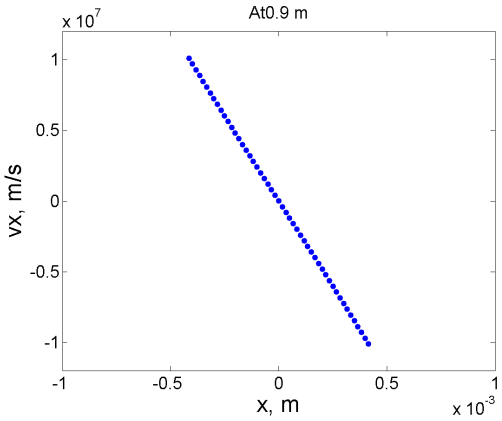
(c) $y = 1\sigma$



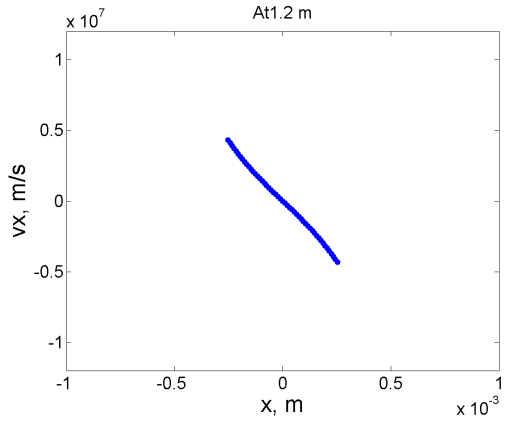
(a) $y = 0$



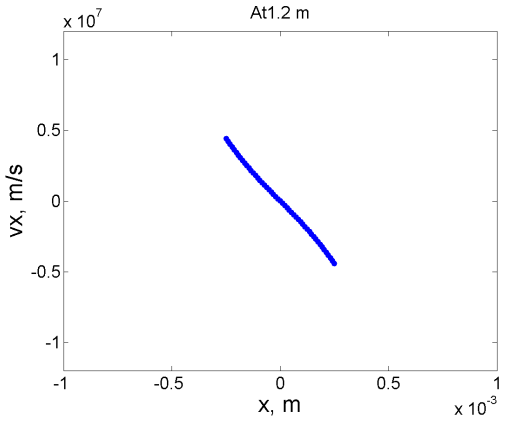
(b) $y = 0.5\sigma$



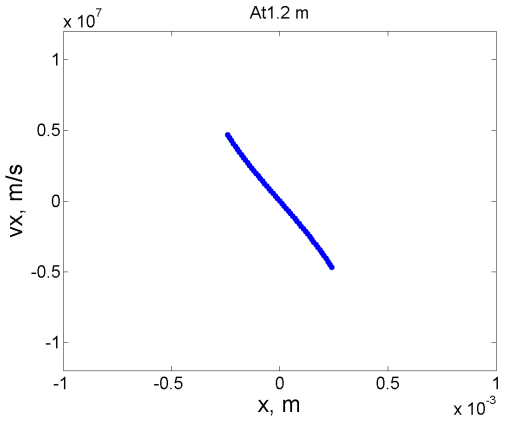
(c) $y = 1\sigma$



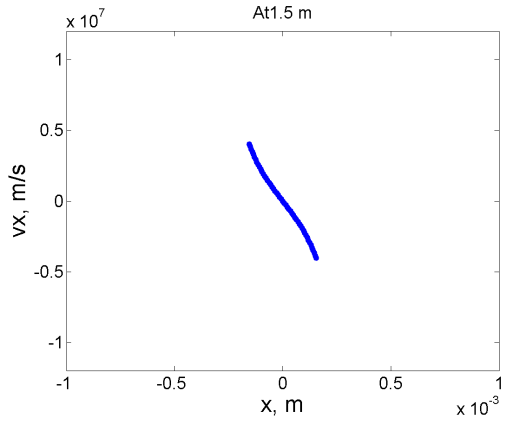
(a) $y = 0$



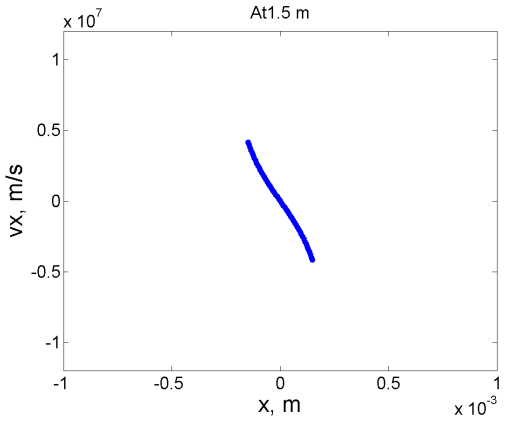
(b) $y = 0.5\sigma$



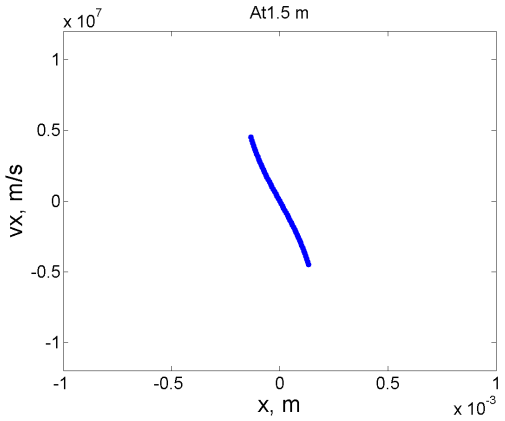
(c) $y = 1\sigma$



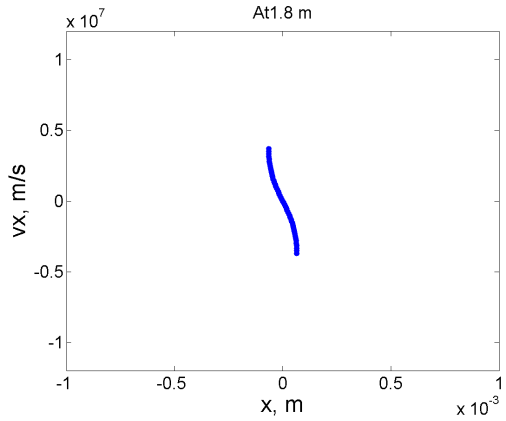
(a) $y = 0$



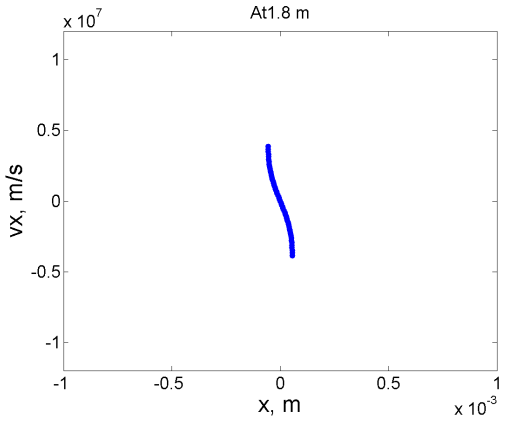
(b) $y = 0.5\sigma$



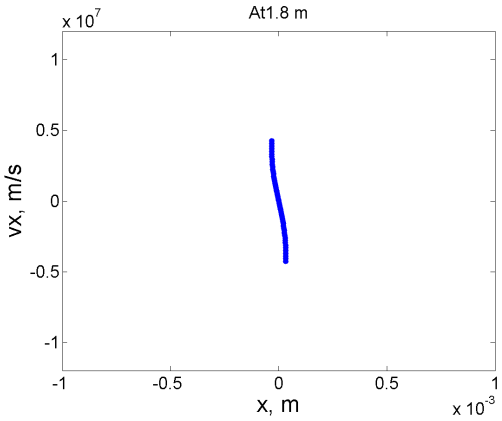
(c) $y = 1\sigma$



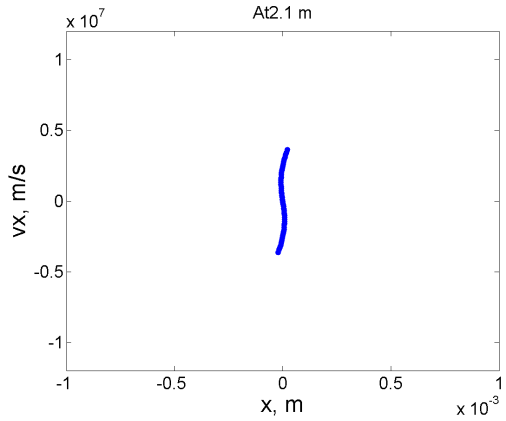
(a) $y = 0$



(b) $y = 0.5\sigma$



(c) $y = 1\sigma$



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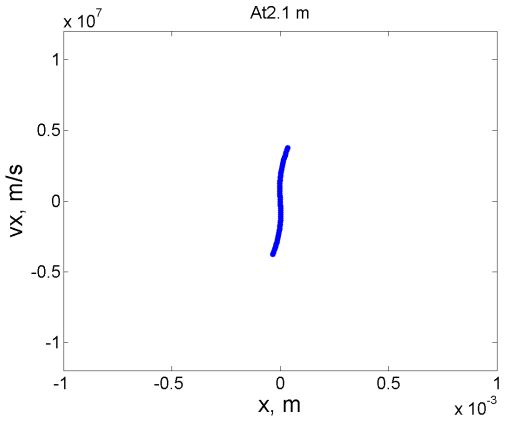
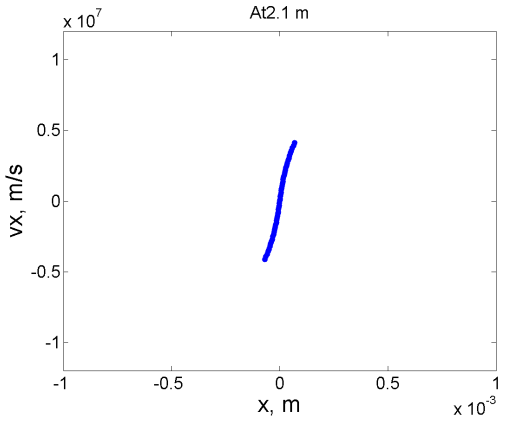
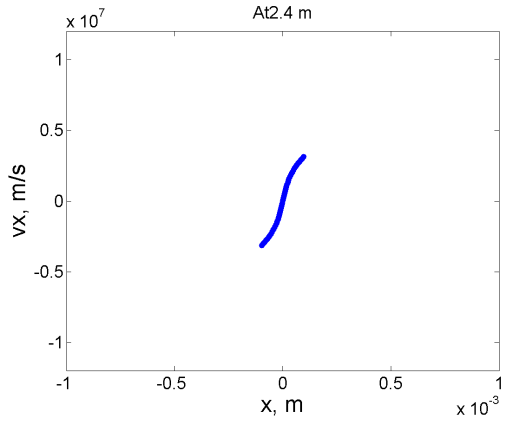


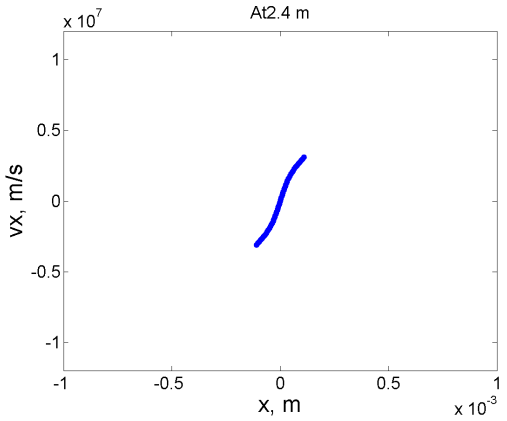
(b) $y = 0.5\sigma$



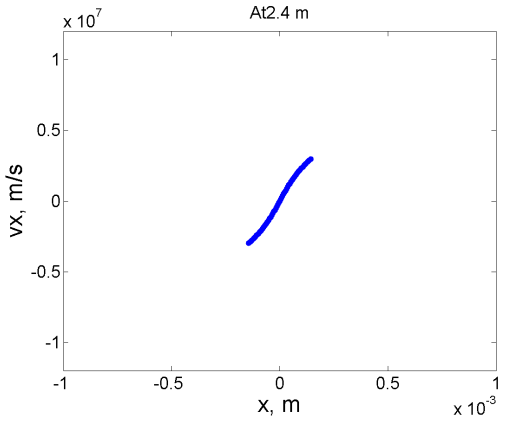
(c) $y = 1\sigma$



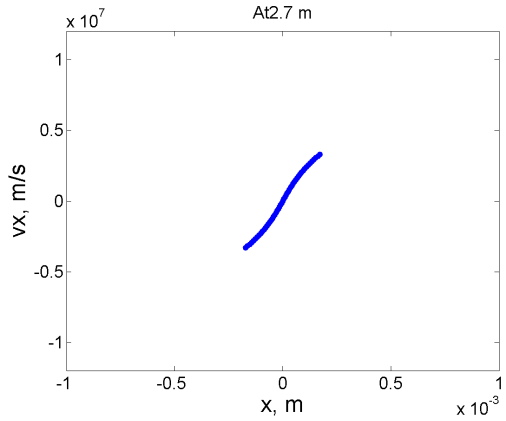
(a) $y = 0$



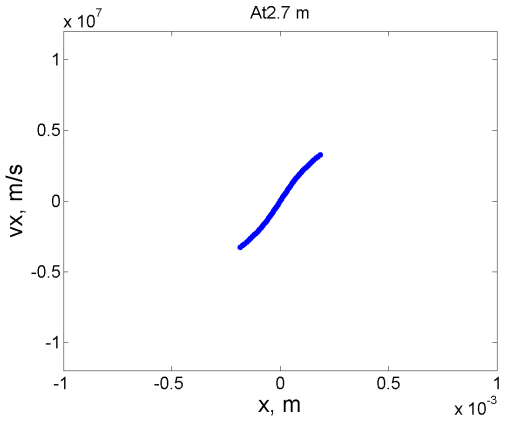
(b) $y = 0.5\sigma$



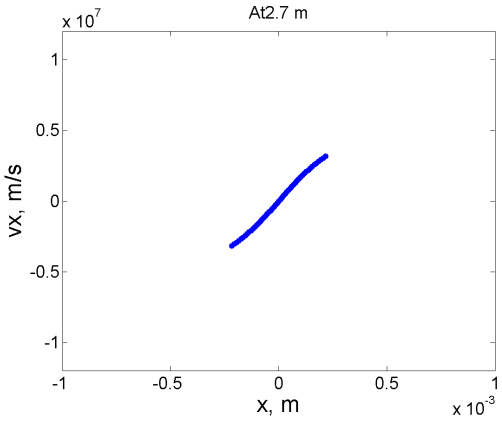
(c) $y = 1\sigma$



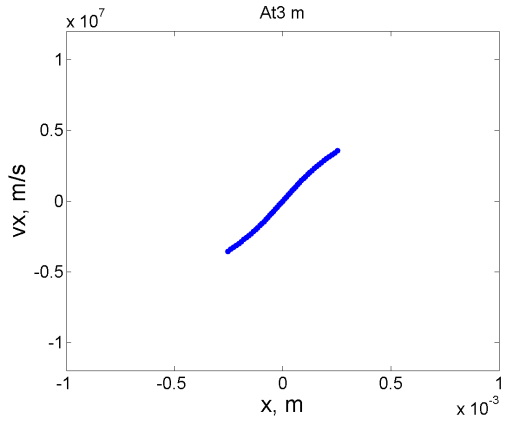
(a) $y = 0$



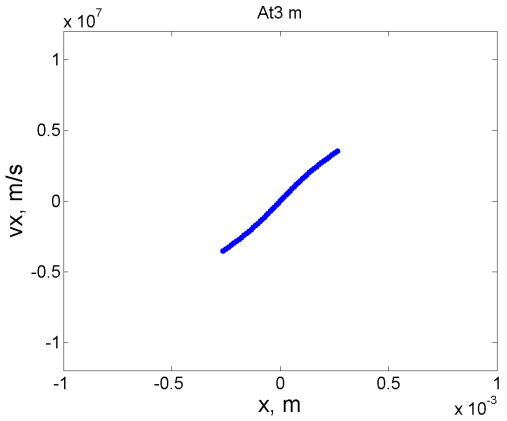
(b) $y = 0.5\sigma$



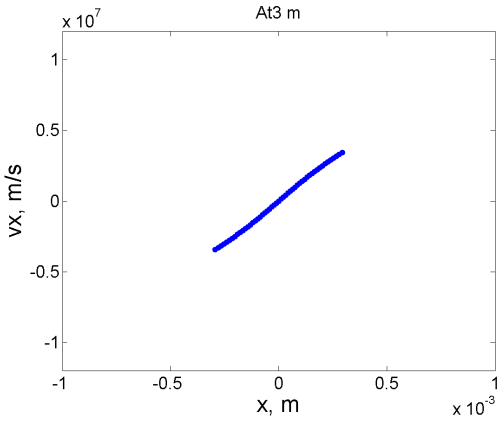
(c) $y = 1\sigma$



(a) $y = 0$



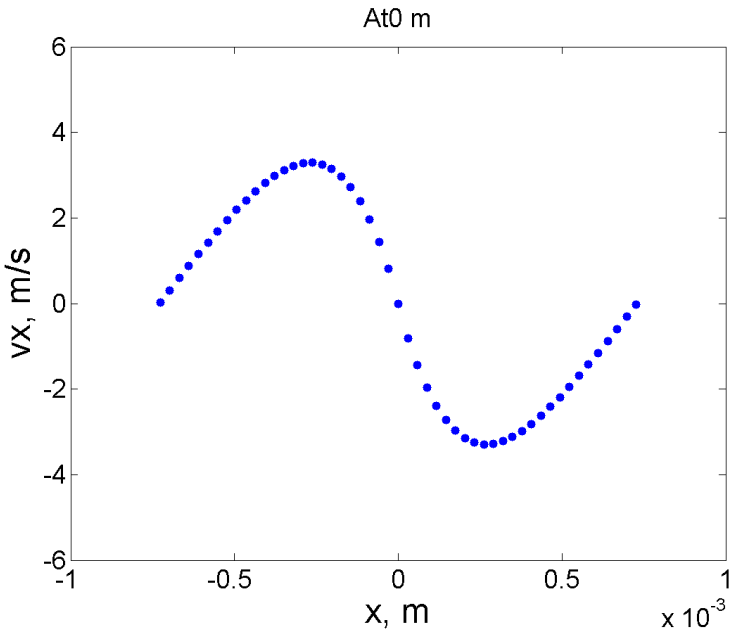
(b) $y = 0.5\sigma$



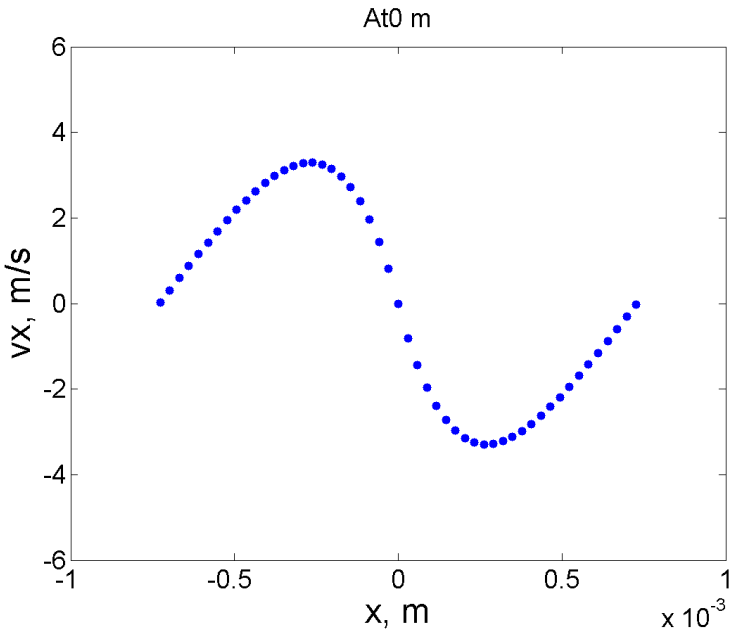
(c) $y = 1\sigma$

- Initial kick.
- No ion.

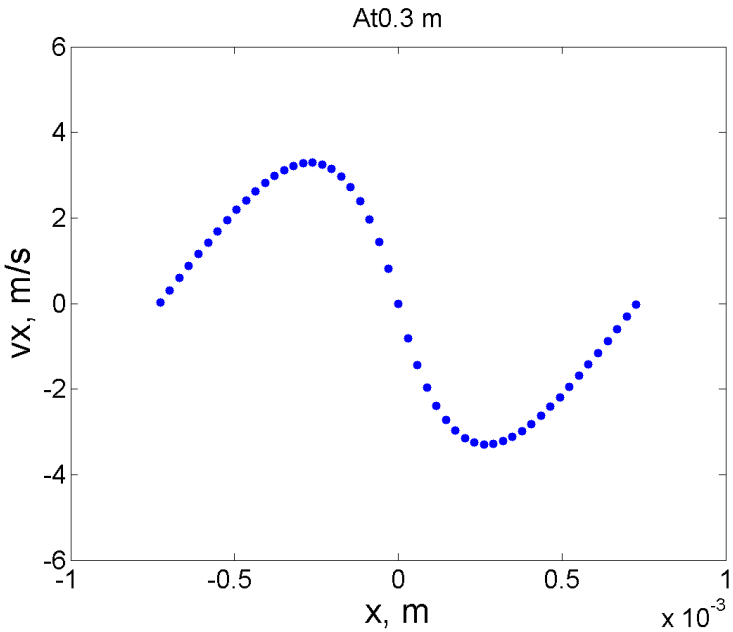
- $y = 0$.
- With / without space charge effect from whole electron beam.



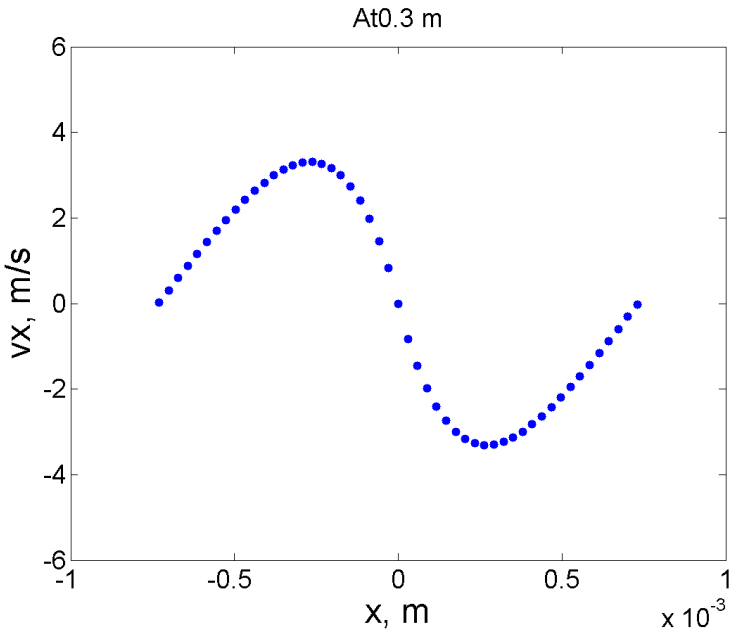
(a) Without SC



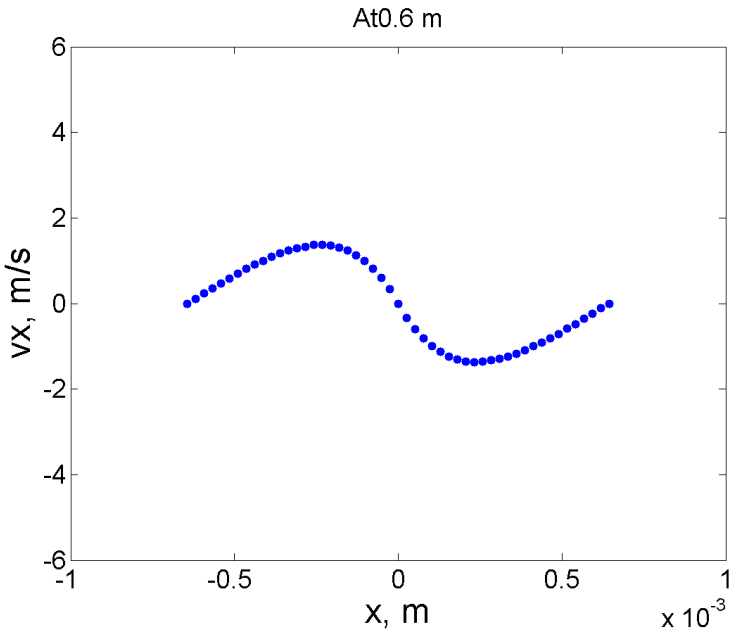
(b) With SC



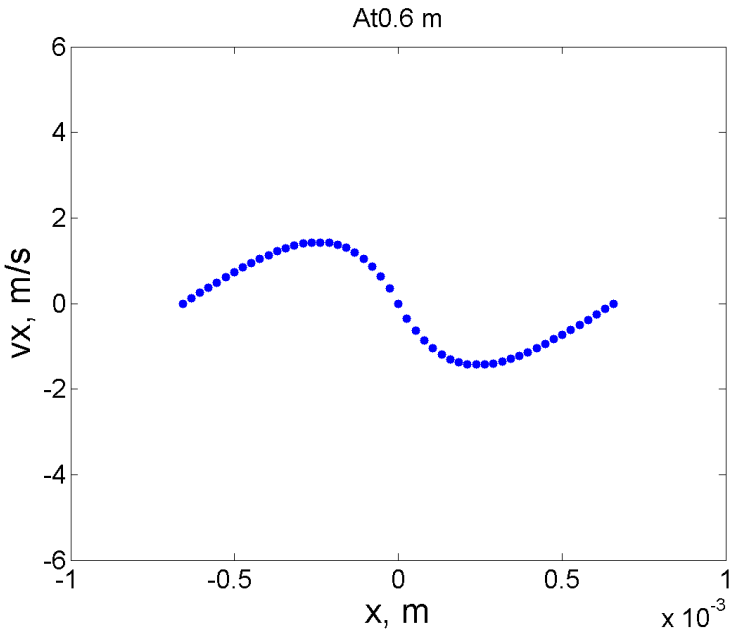
(a) Without SC



(b) With SC



(a) Without SC



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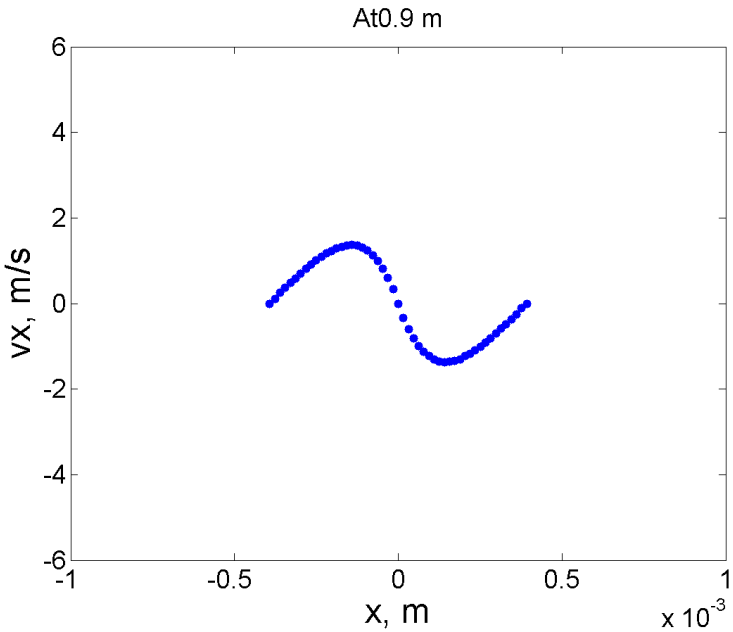
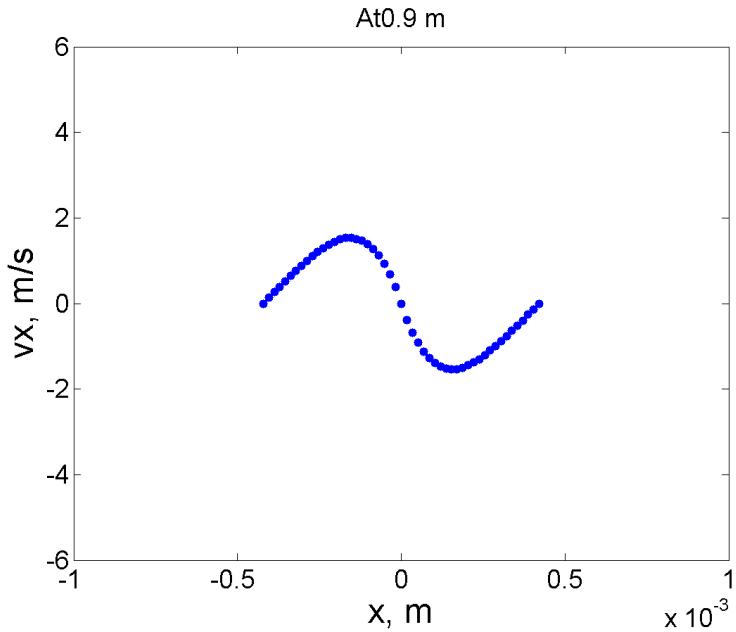
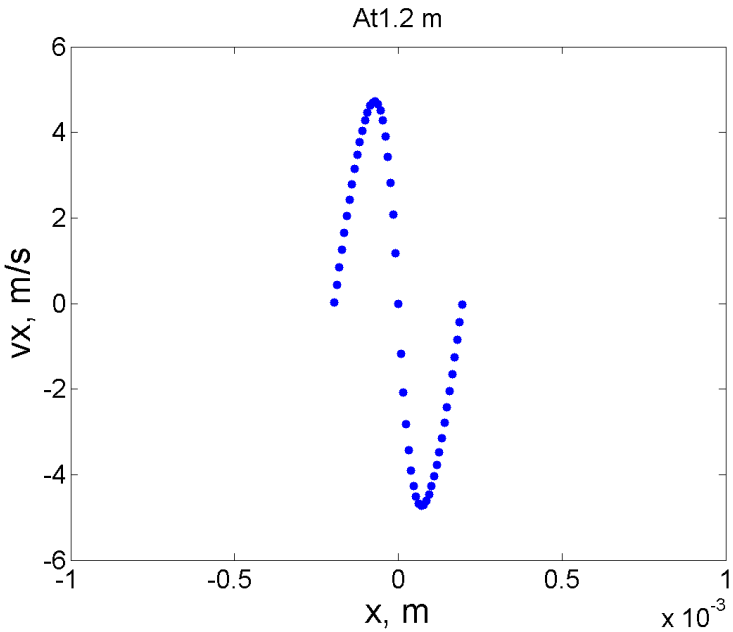


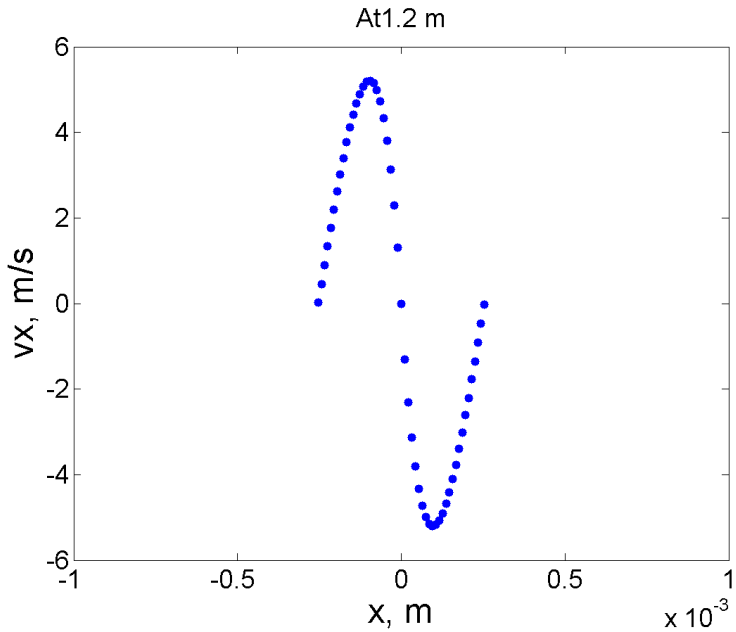
(a) Without SC



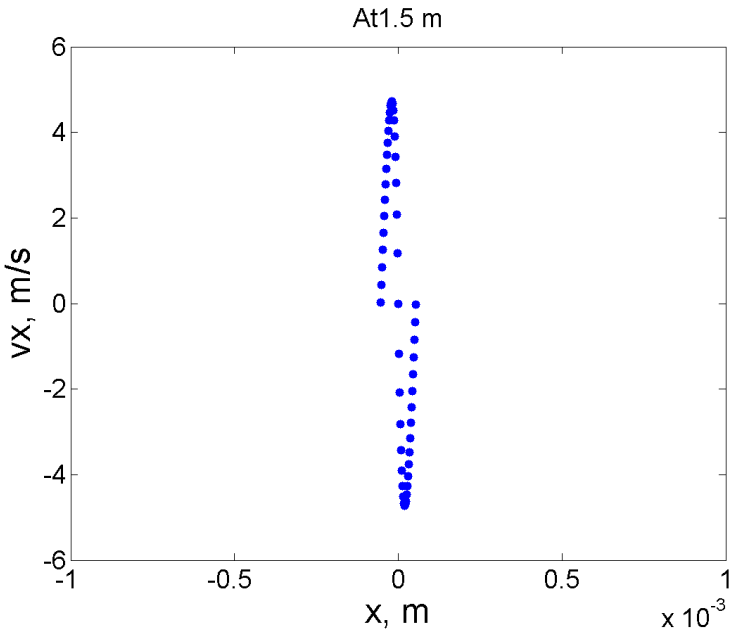
(b) With SC



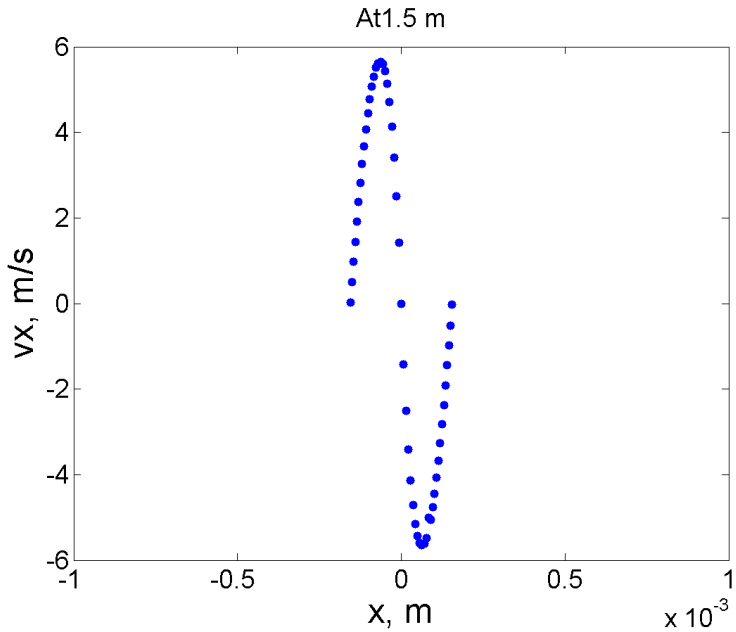
(a) Without SC



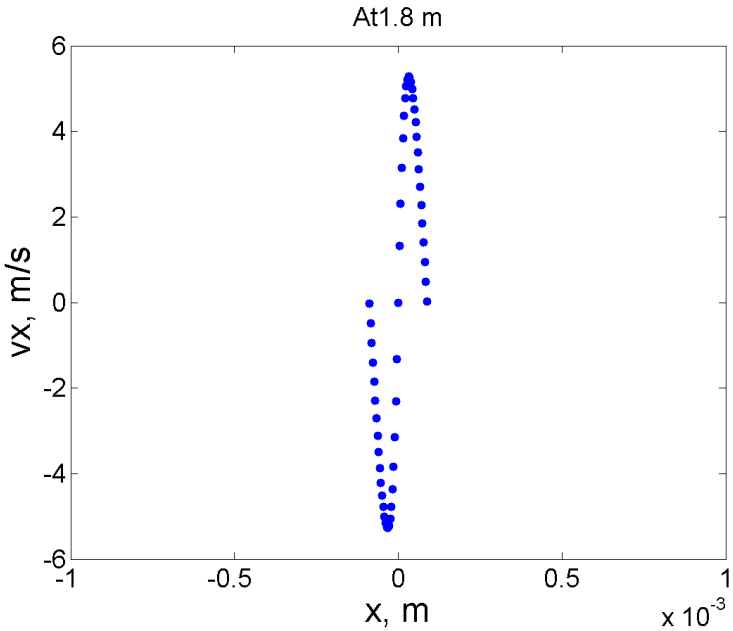
(b) With SC



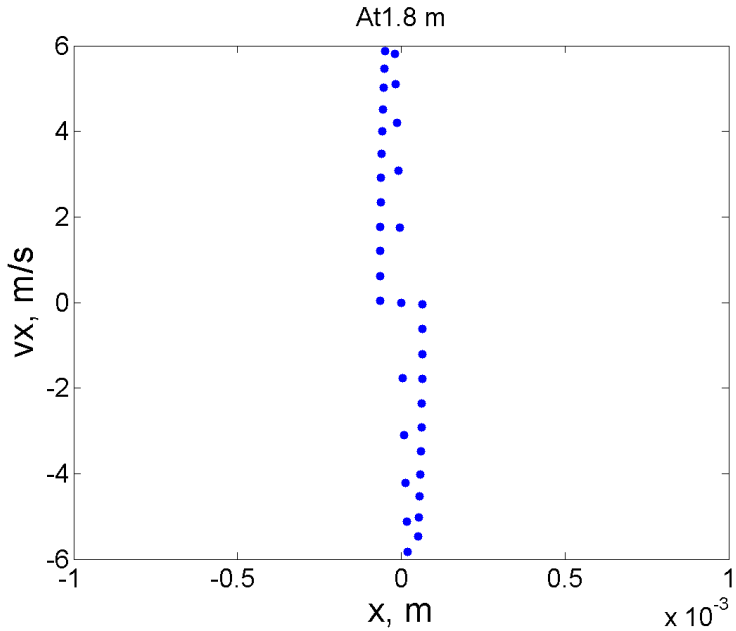
(a) Without SC



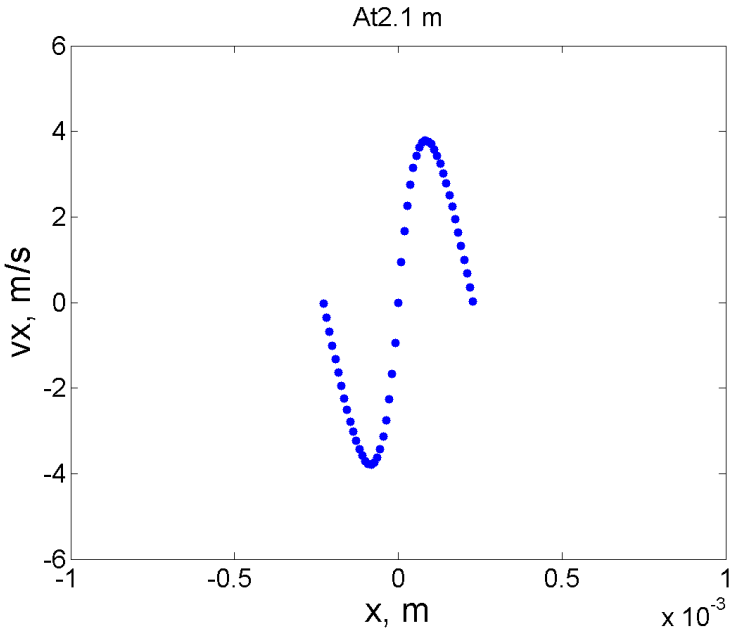
(b) With SC



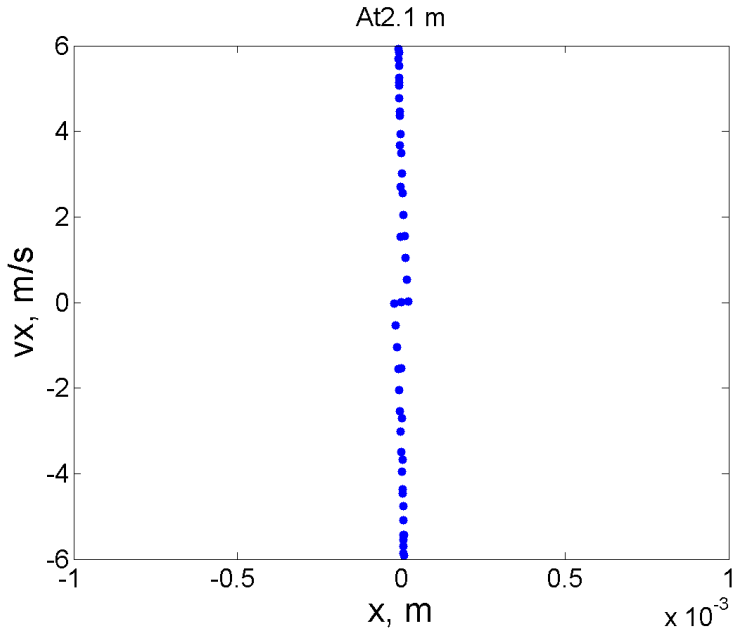
(a) Without SC



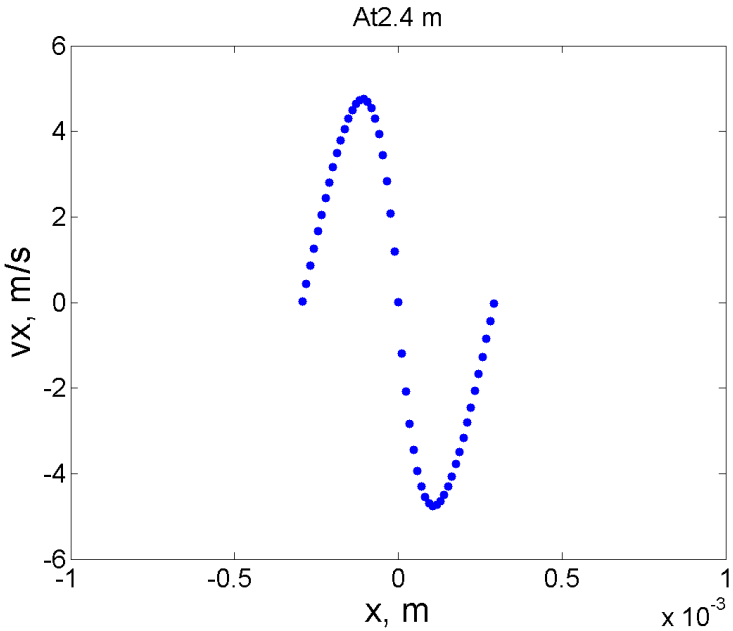
(b) With SC



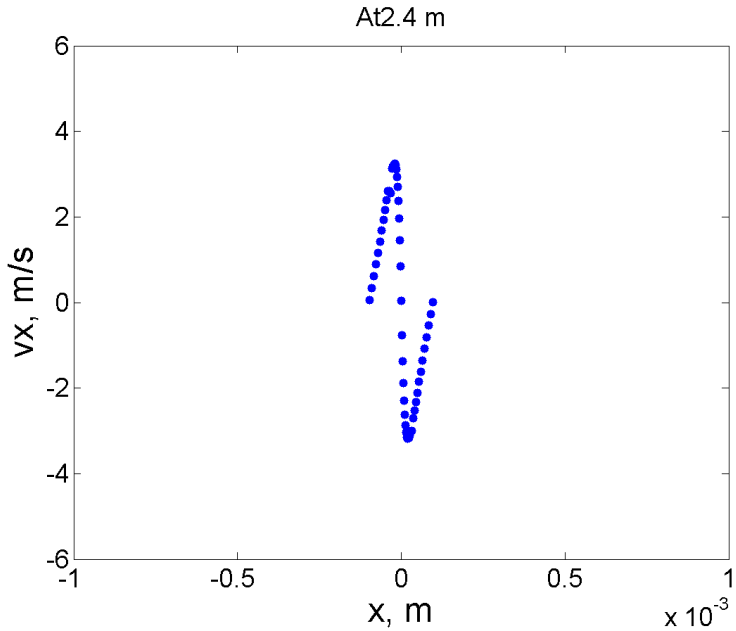
(a) Without SC



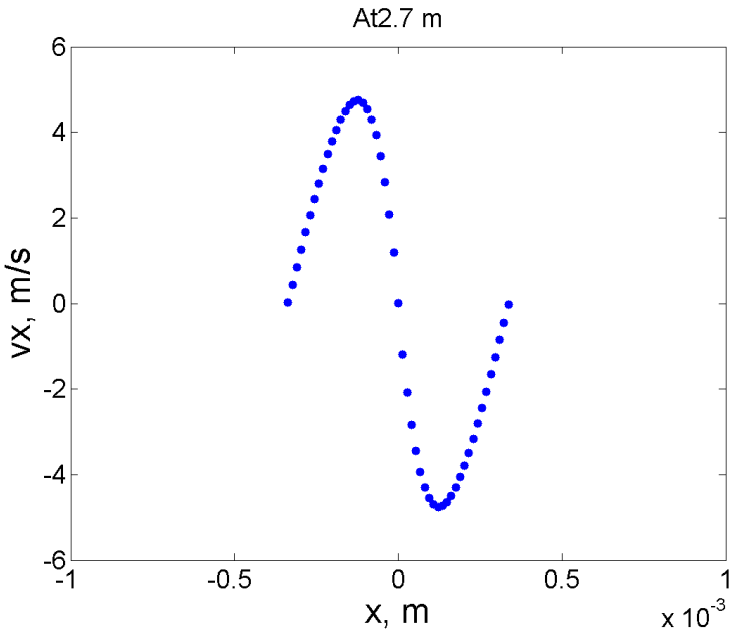
(b) With SC



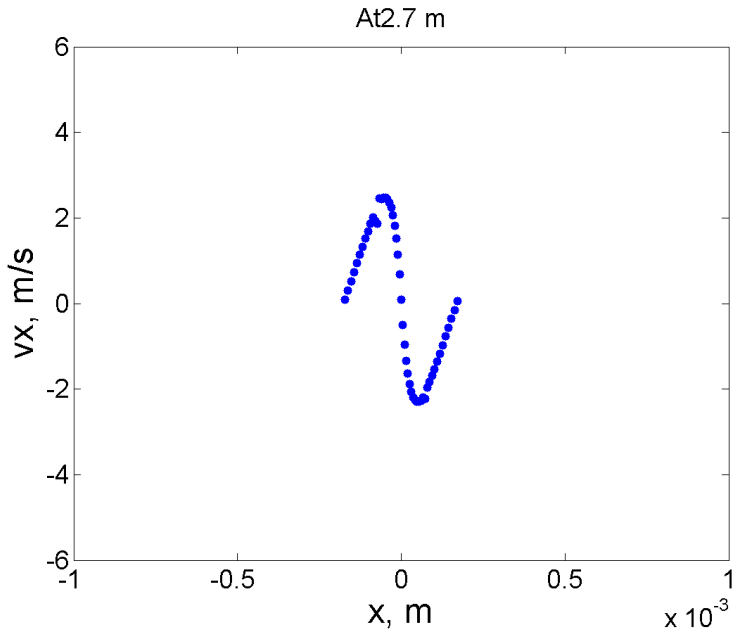
(a) Without SC



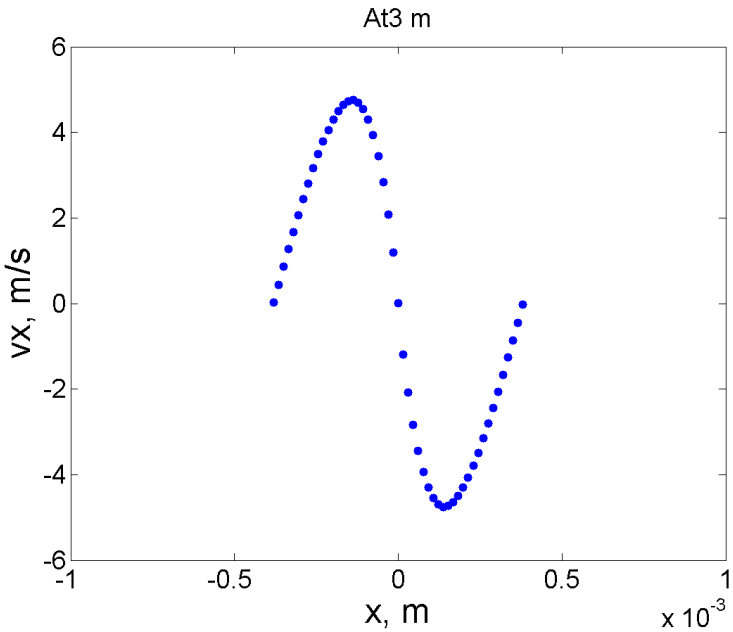
(b) With SC



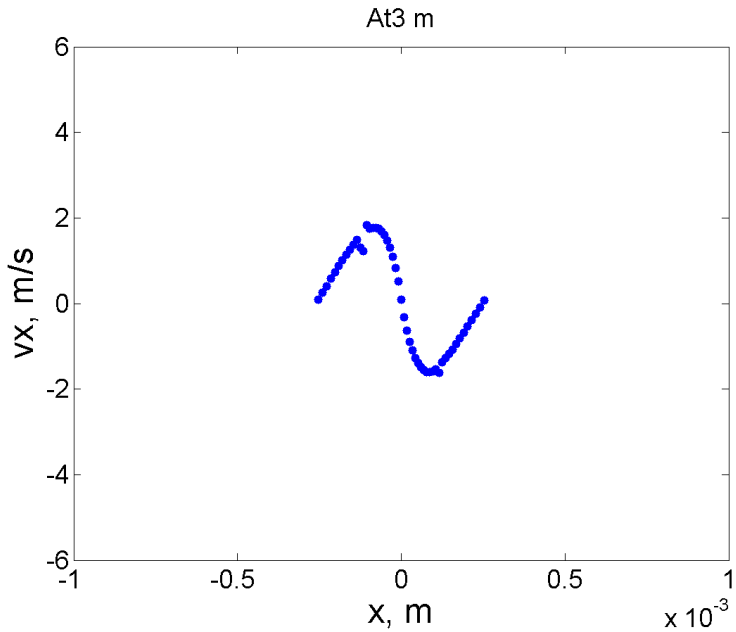
(a) Without SC



(b) With SC

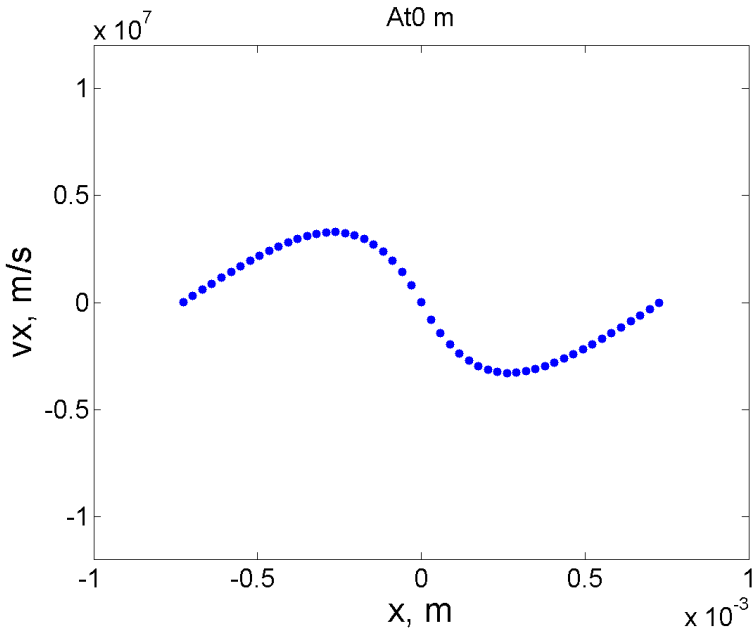


(a) Without SC

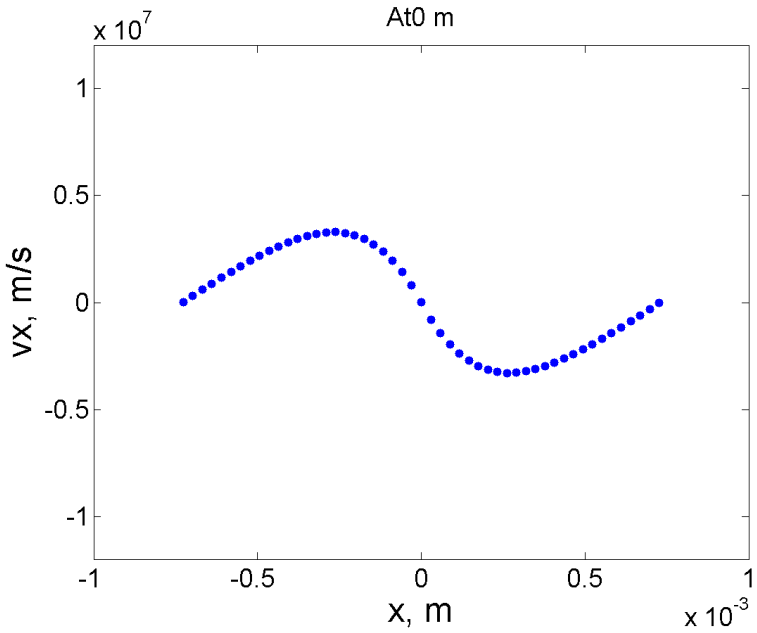


(b) With SC

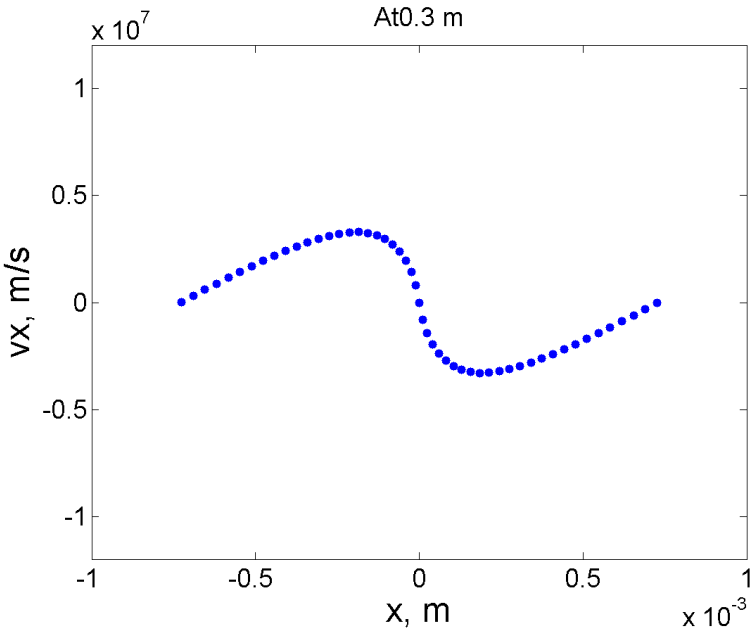
- Signal is amplified by $1e+6$.
- $y = 0$.
- With / without space charge effect from whole electron beam.



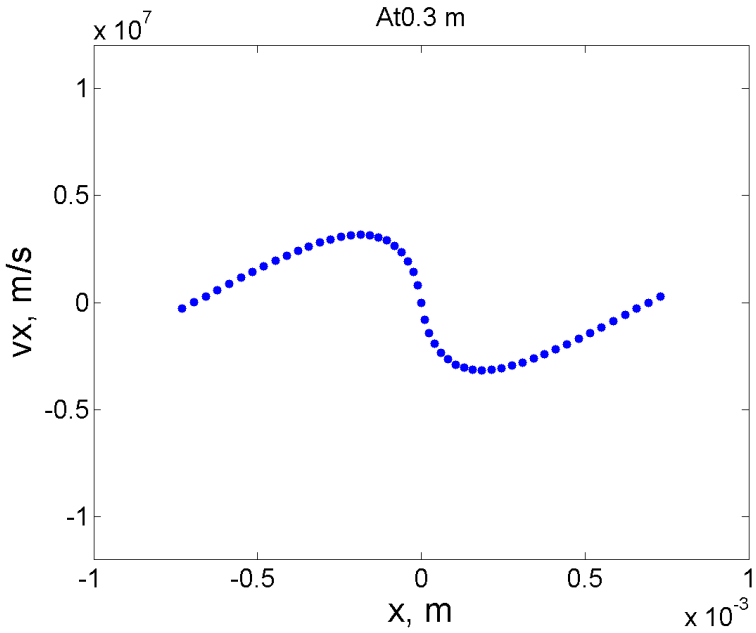
(a) Without SC



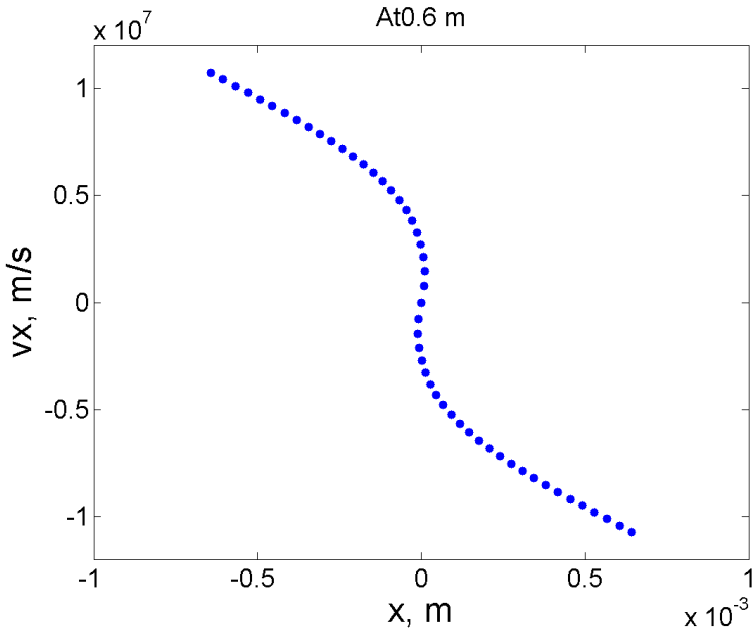
(b) With SC



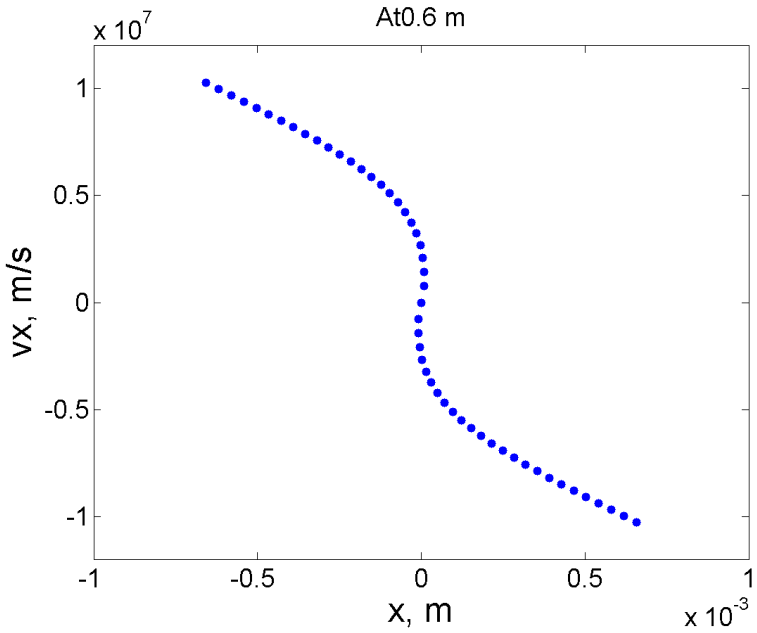
(a) Without SC



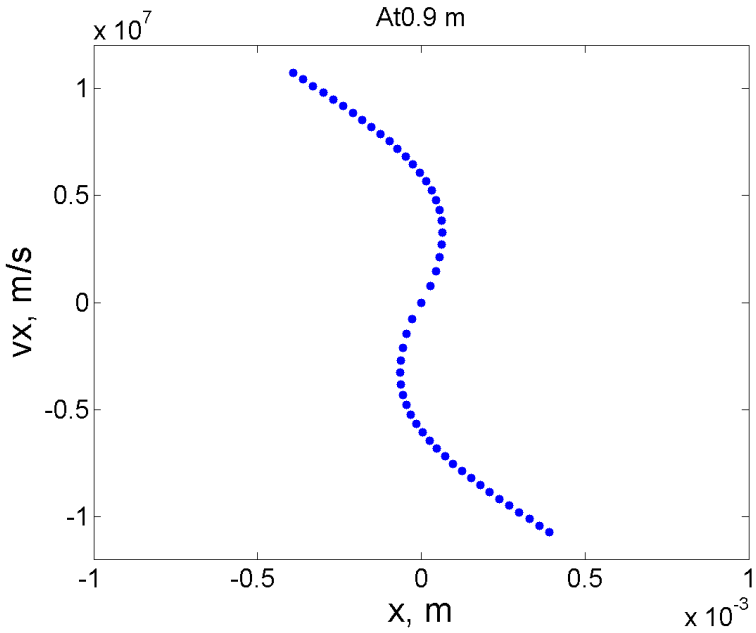
(b) With SC



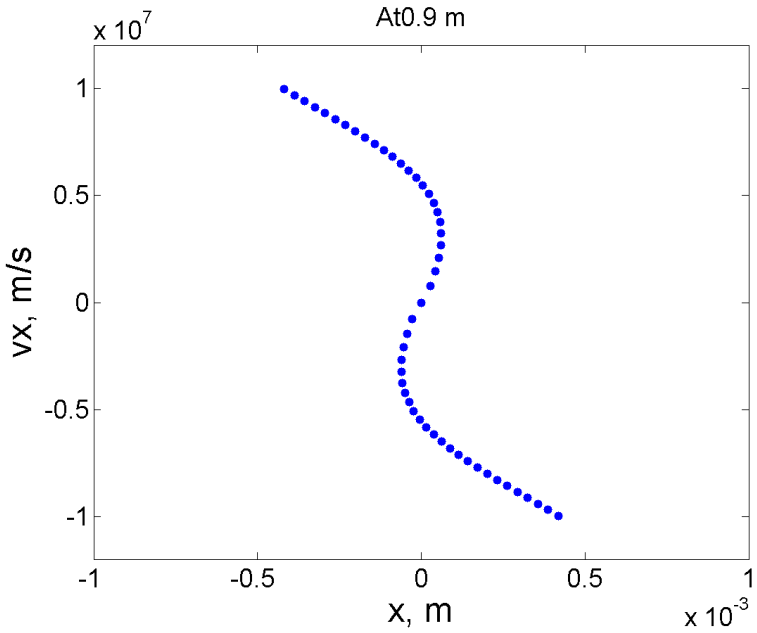
(a) Without SC



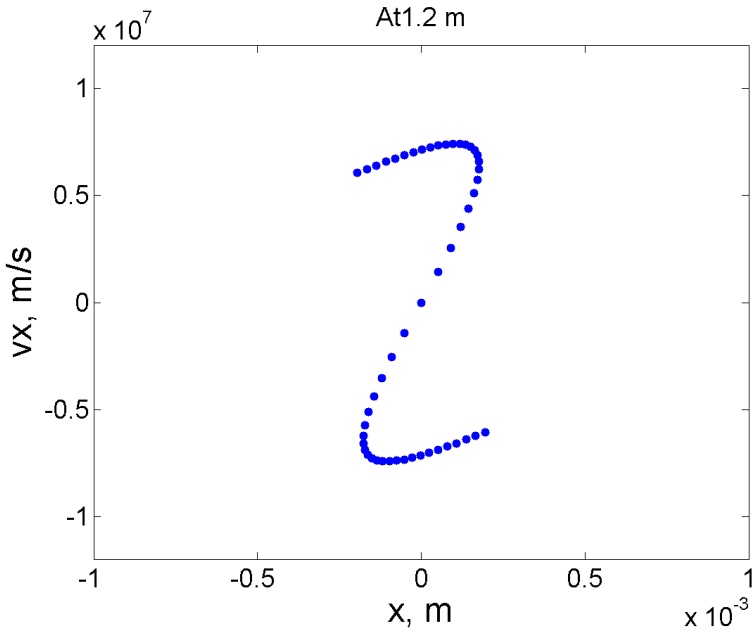
(b) With SC



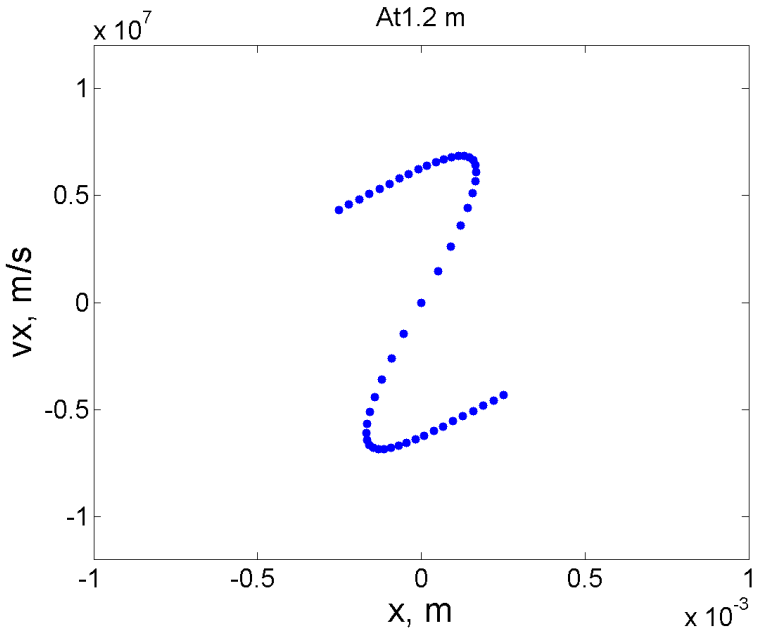
(a) Without SC



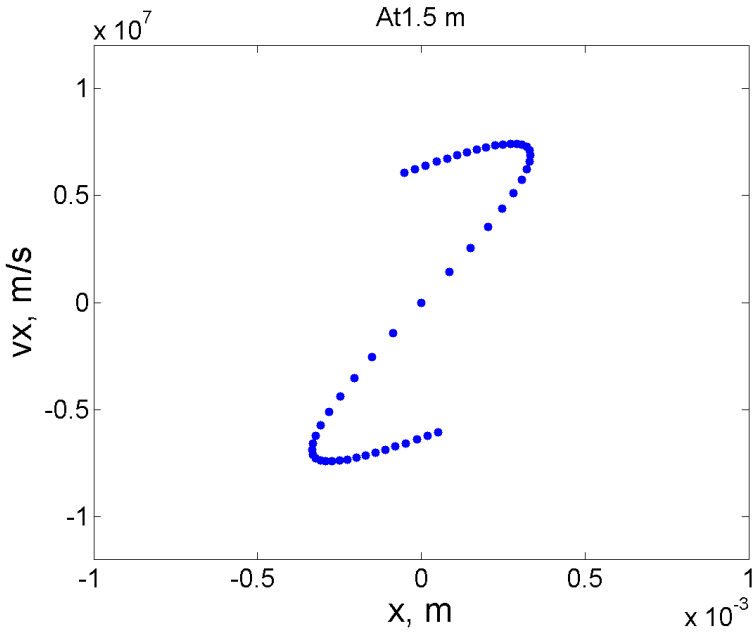
(b) With SC



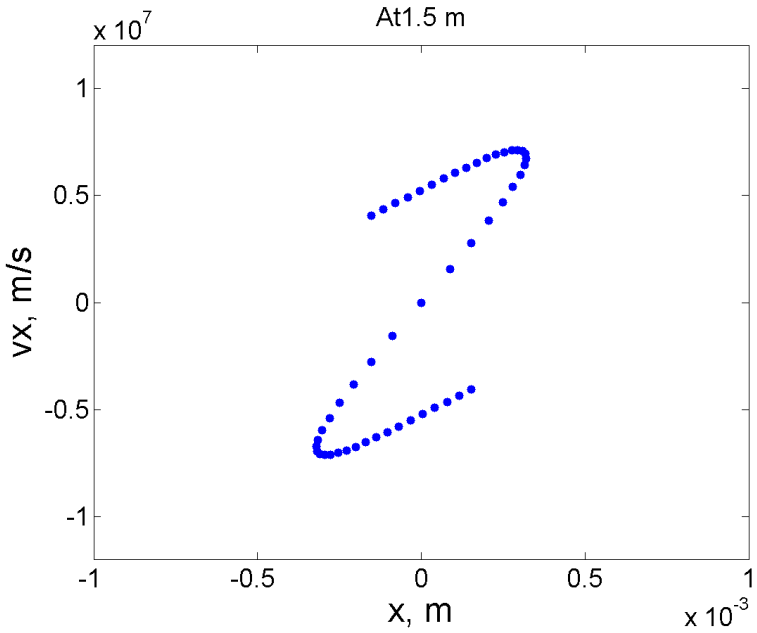
(a) Without SC



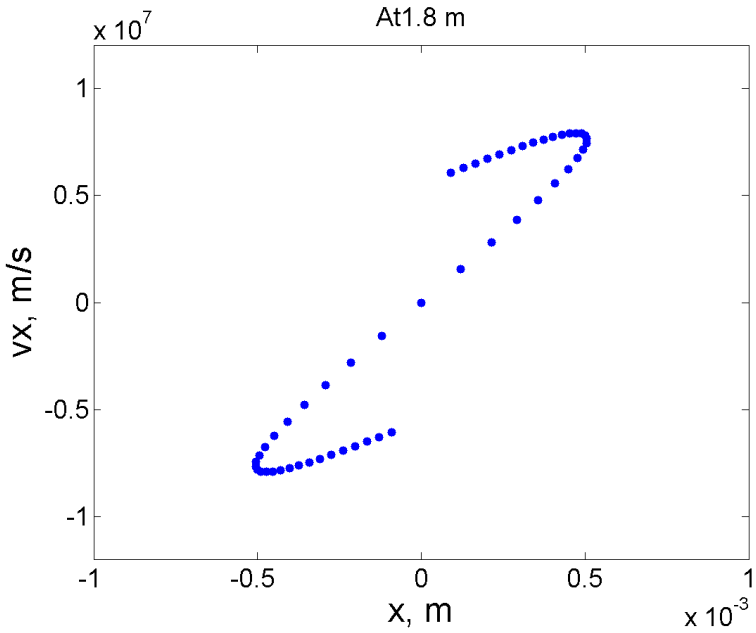
(b) With SC



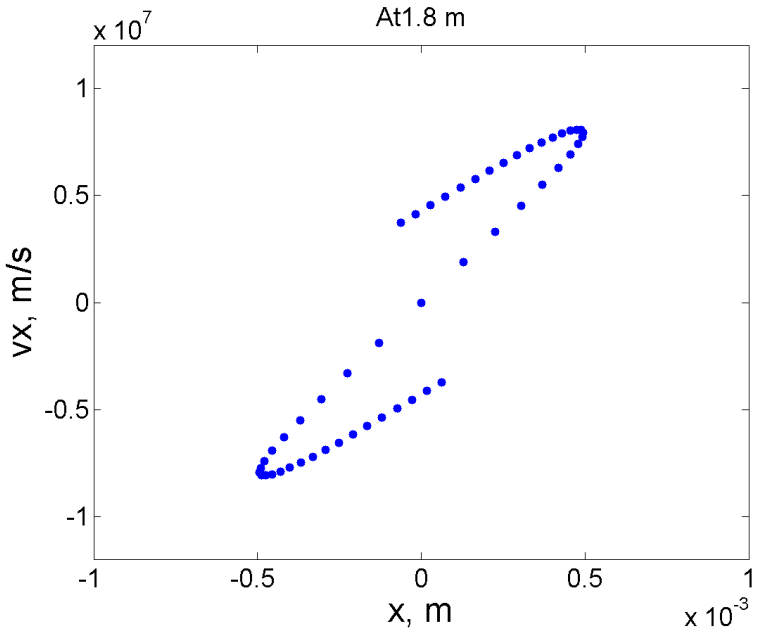
(a) Without SC



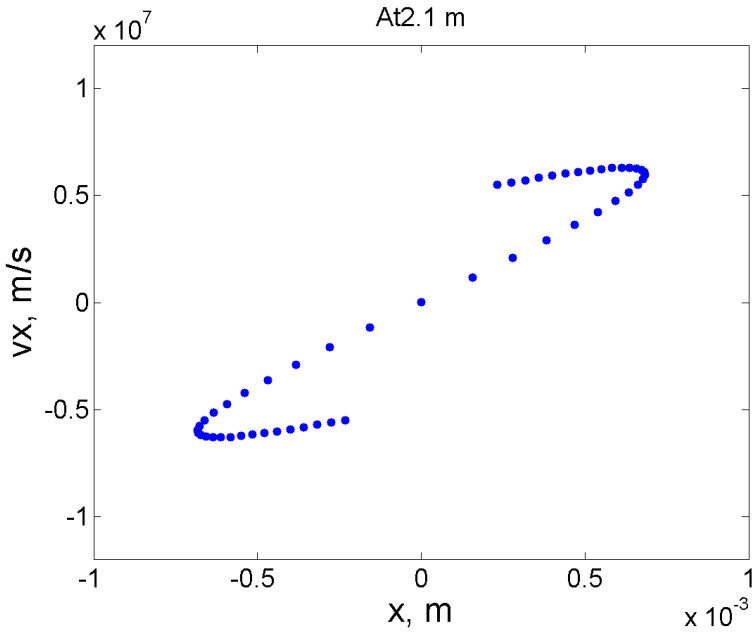
(b) With SC



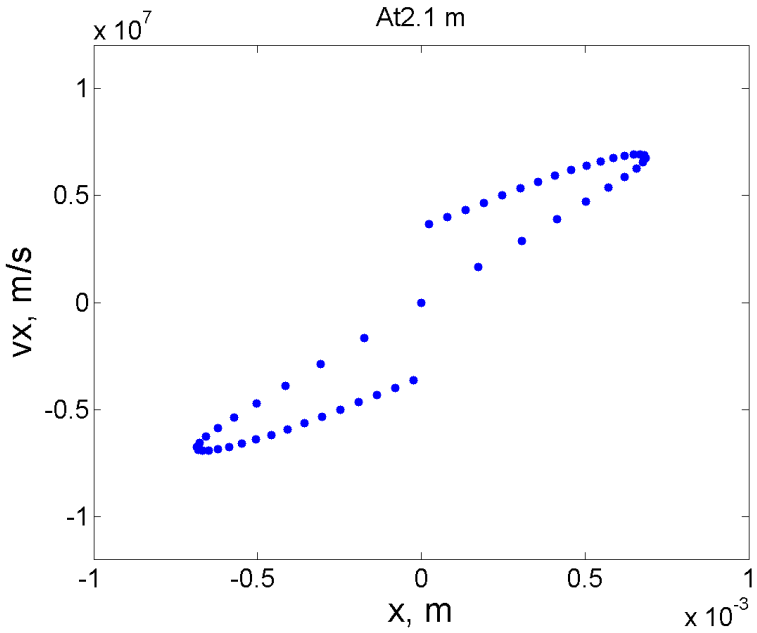
(a) Without SC



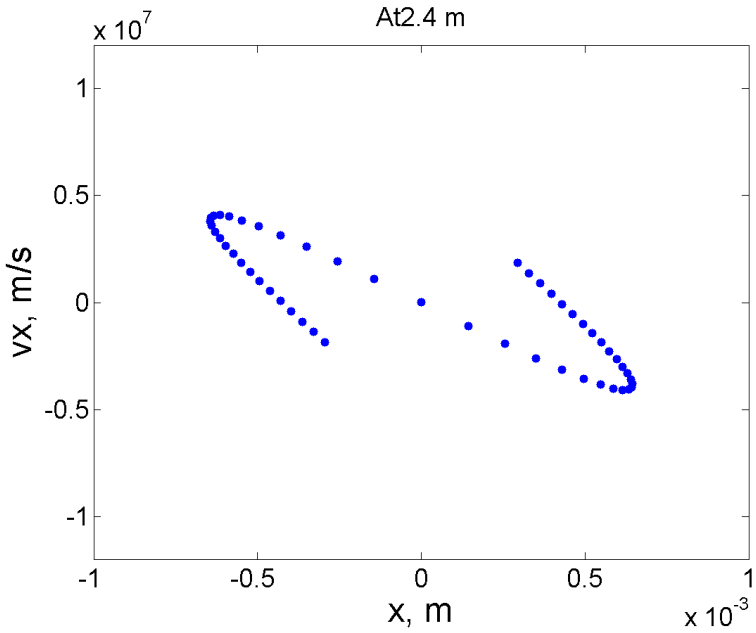
(b) With SC



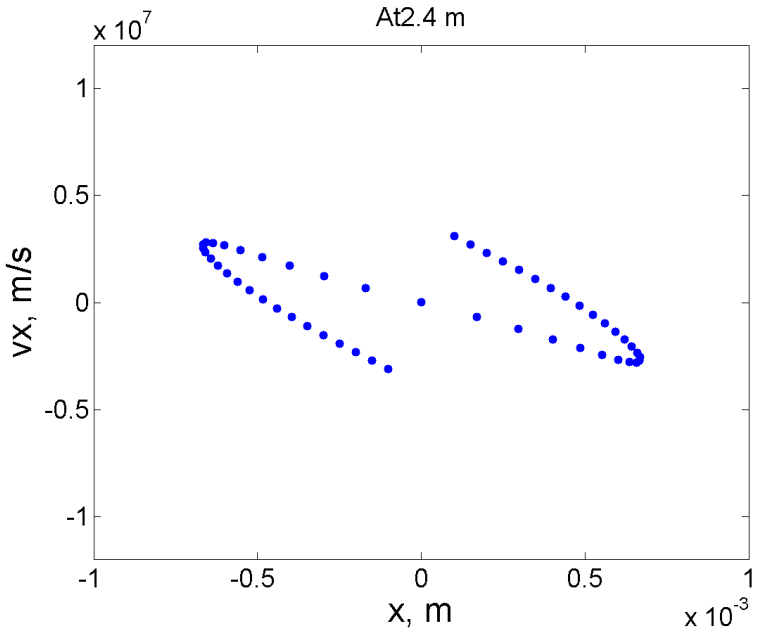
(a) Without SC



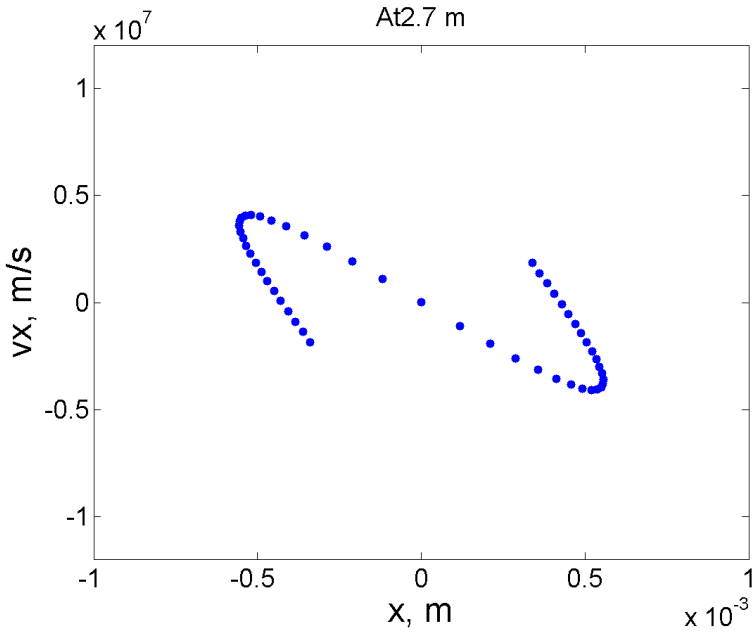
(b) With SC



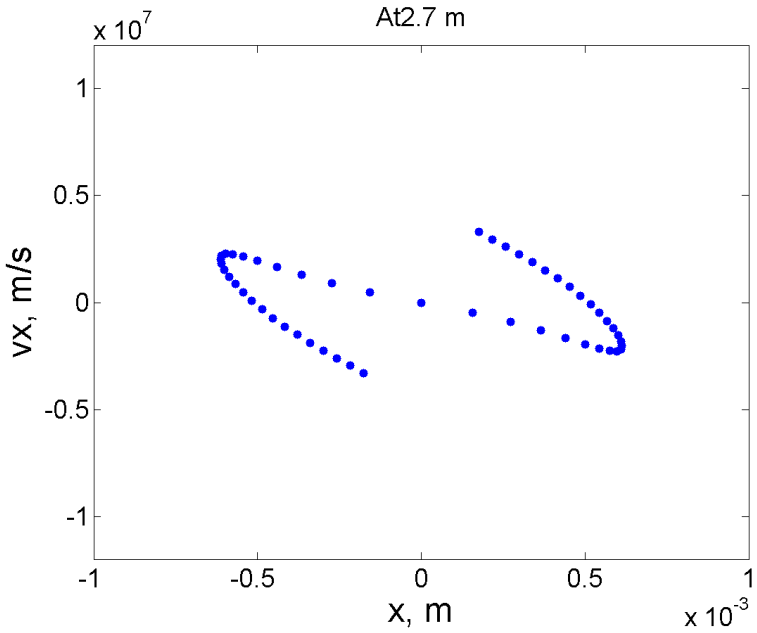
(a) Without SC



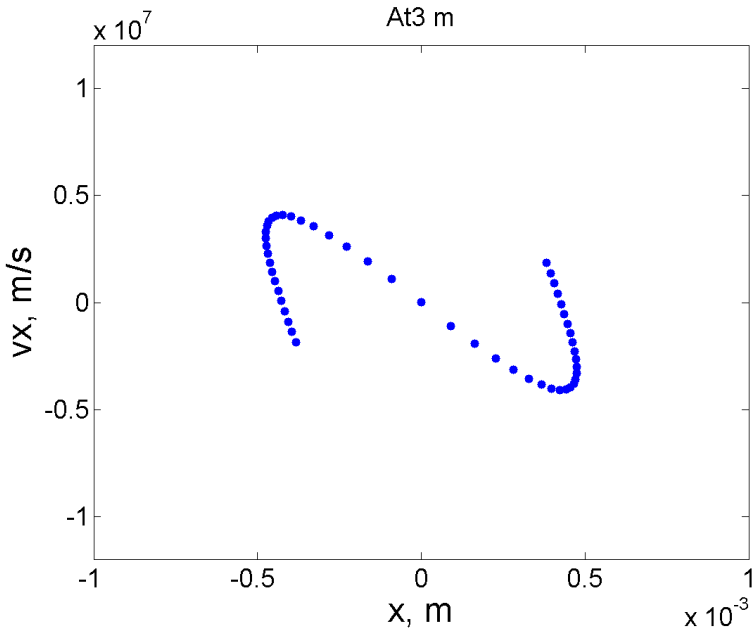
(b) With SC



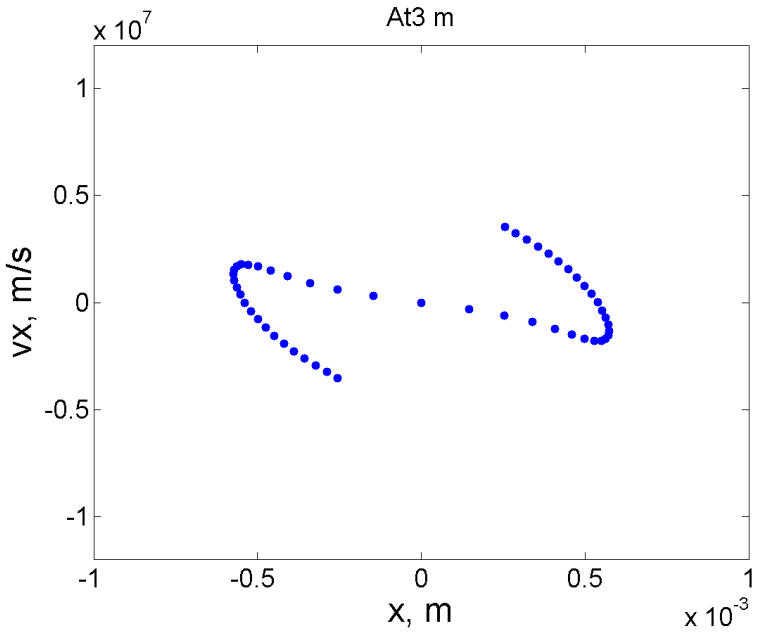
(a) Without SC



(b) With SC

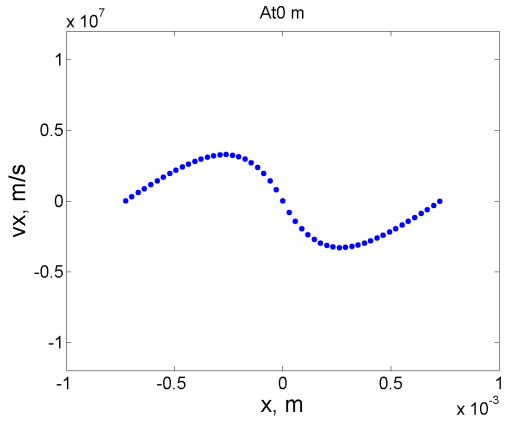


(a) Without SC

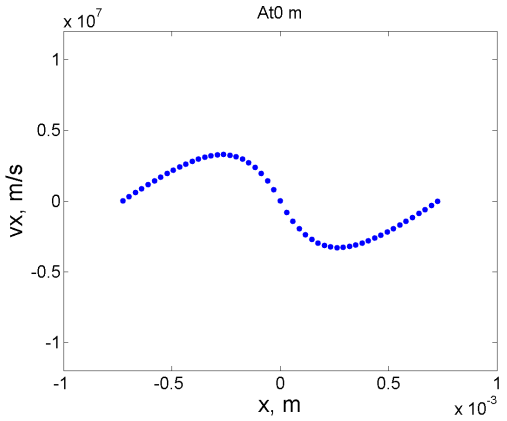


(b) With SC

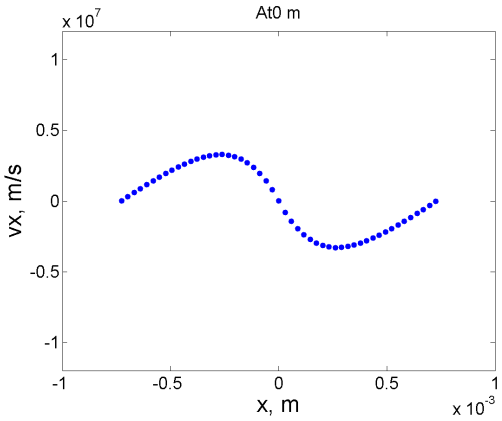
- Signal is amplified by $1e+6$.
- $y = 0, 0.5\sigma, 1\sigma$.
- With space charge effect from whole electron beam.



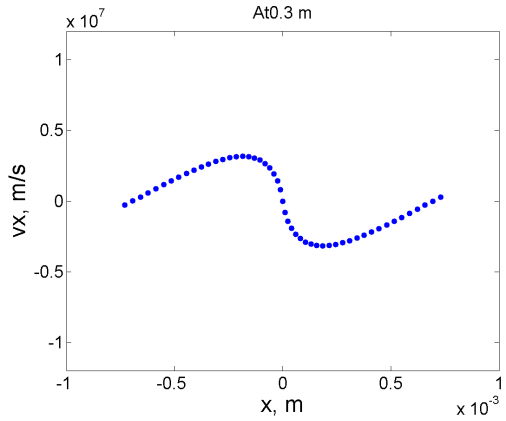
(a) $y = 0$



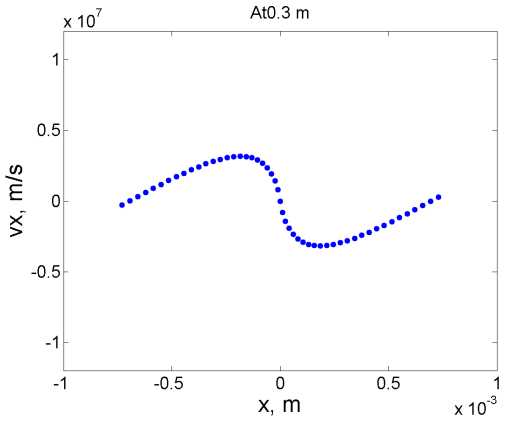
(b) $y = 0.5\sigma$



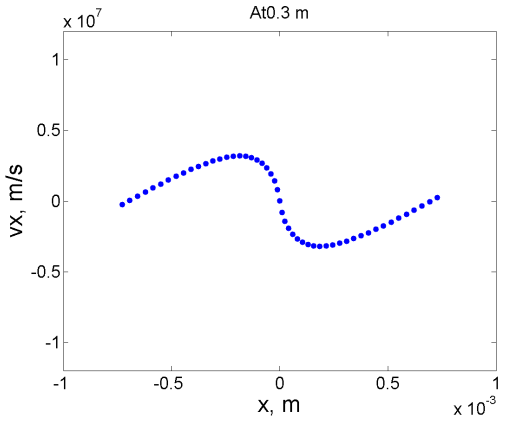
(c) $y = 1\sigma$



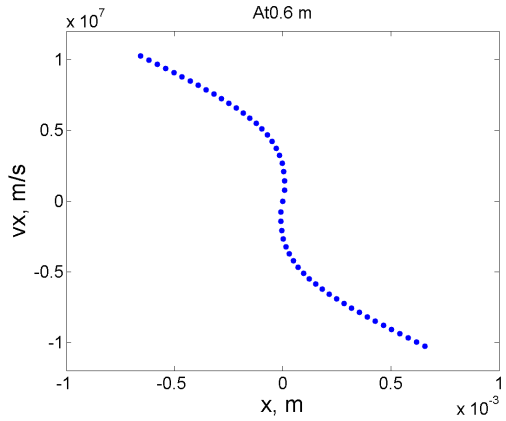
(a) $y = 0$



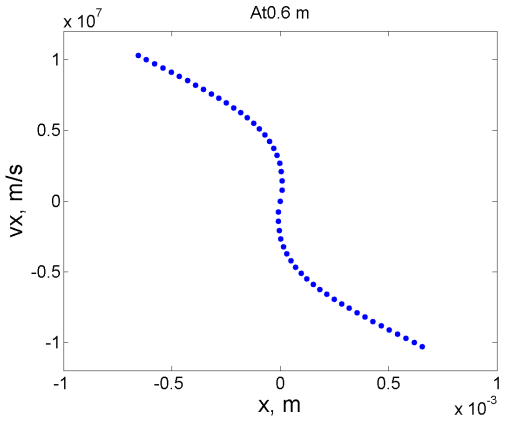
(b) $y = 0.5\sigma$



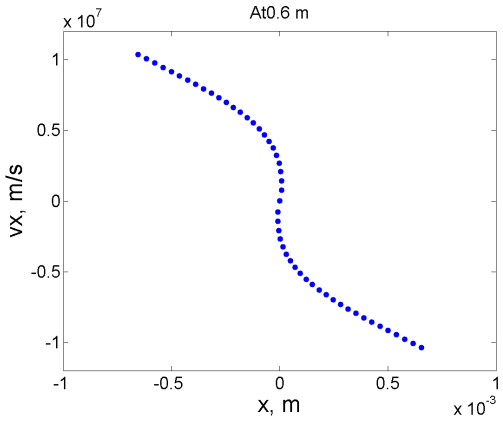
(c) $y = 1\sigma$



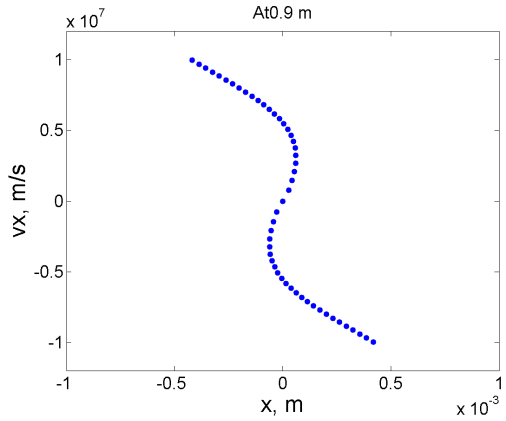
(a) $y = 0$



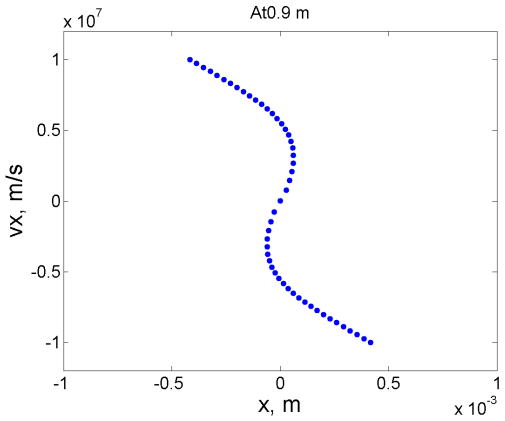
(b) $y = 0.5\sigma$



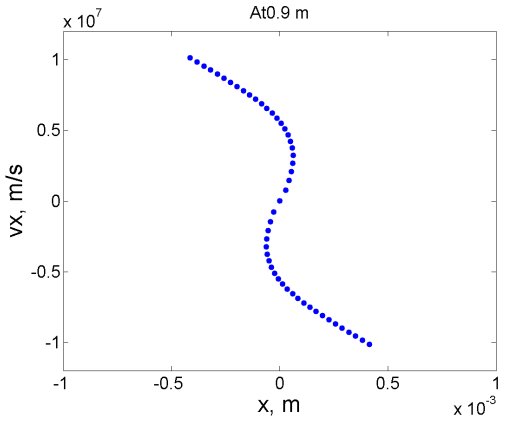
(c) $y = 1\sigma$



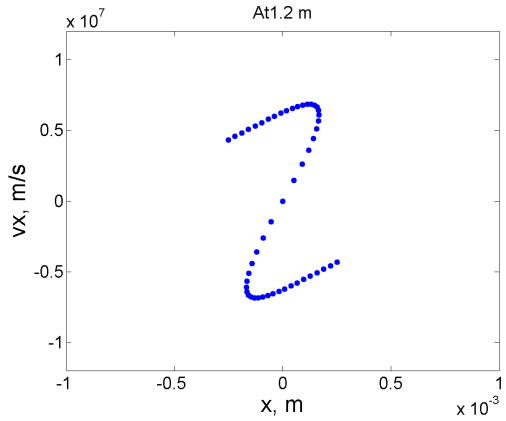
(a) $y = 0$



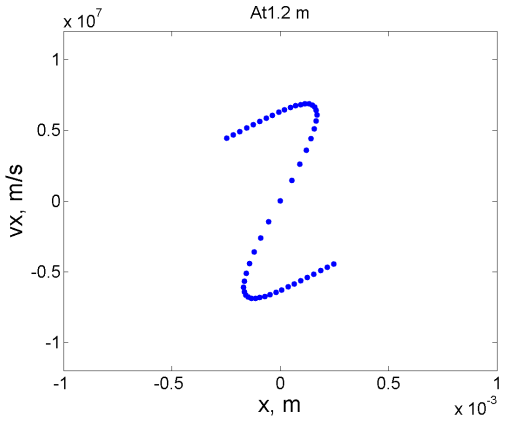
(b) $y = 0.5\sigma$



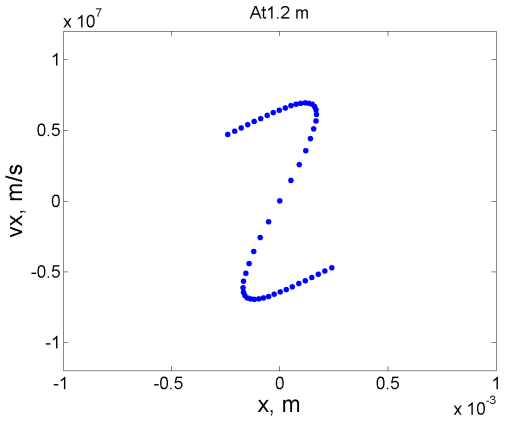
(c) $y = 1\sigma$



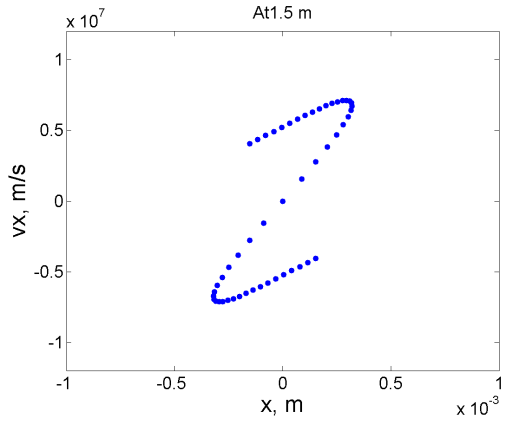
(a) $y = 0$



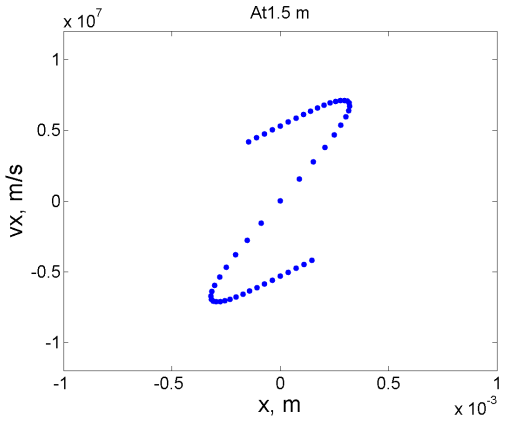
(b) $y = 0.5\sigma$



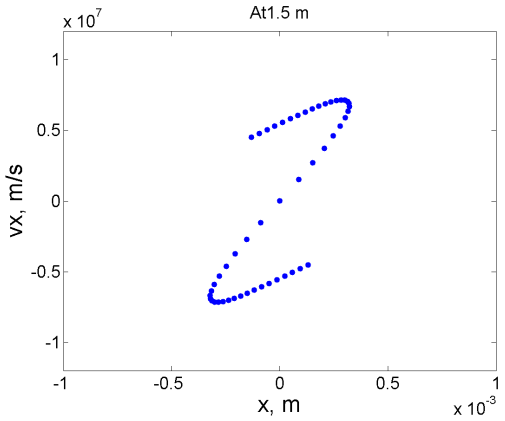
(c) $y = 1\sigma$



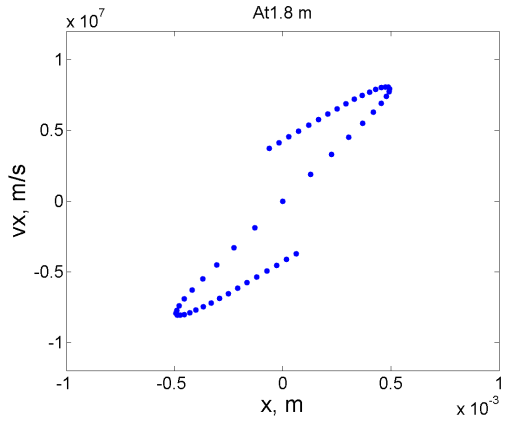
(a) $y = 0$



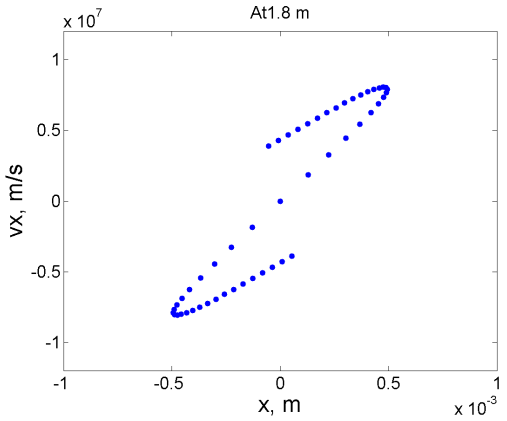
(b) $y = 0.5\sigma$



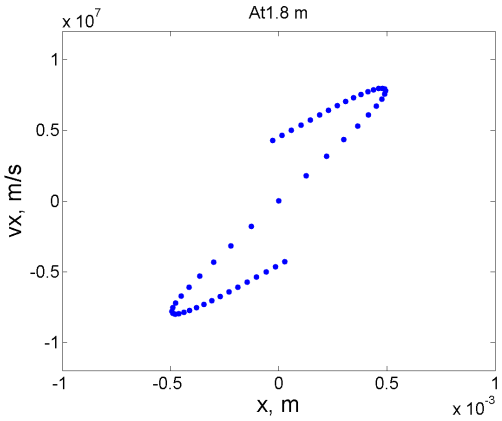
(c) $y = 1\sigma$



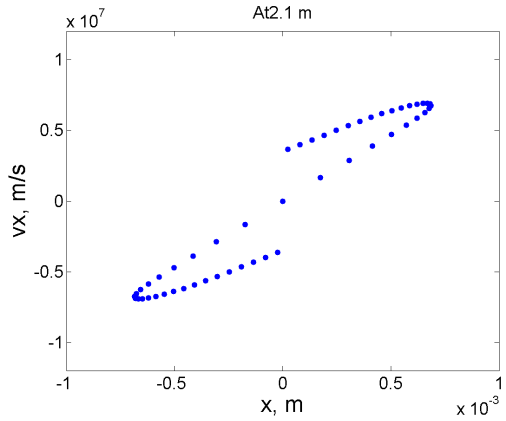
(a) $y = 0$



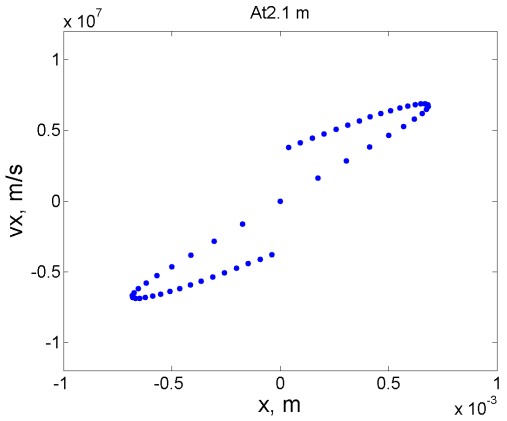
(b) $y = 0.5\sigma$



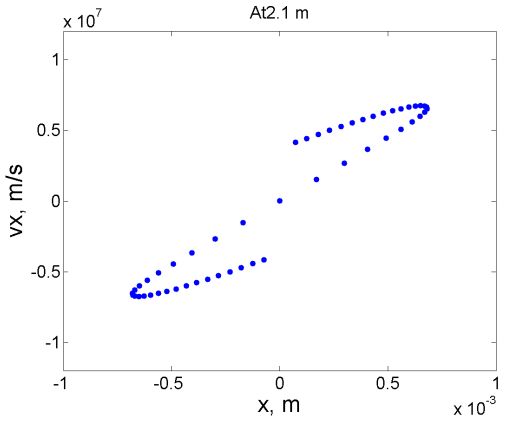
(c) $y = 1\sigma$



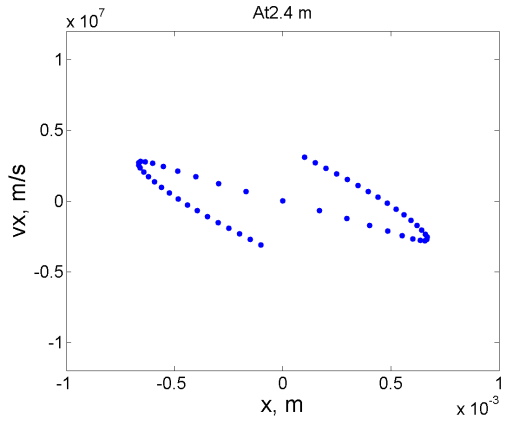
(a) $y = 0$



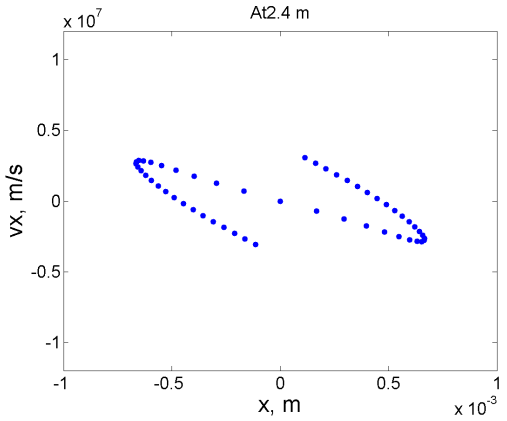
(b) $y = 0.5\sigma$



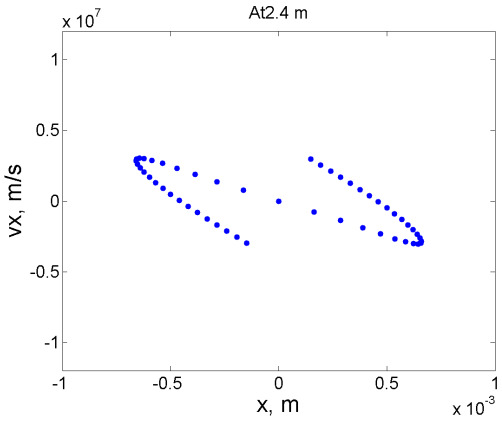
(c) $y = 1\sigma$



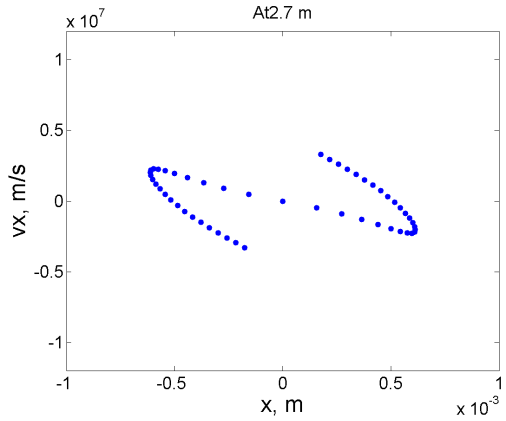
(a) $y = 0$



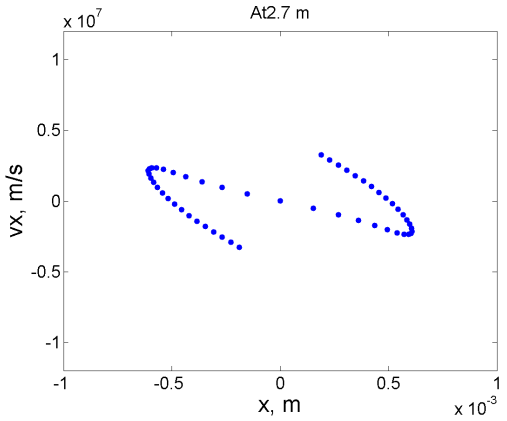
(b) $y = 0.5\sigma$



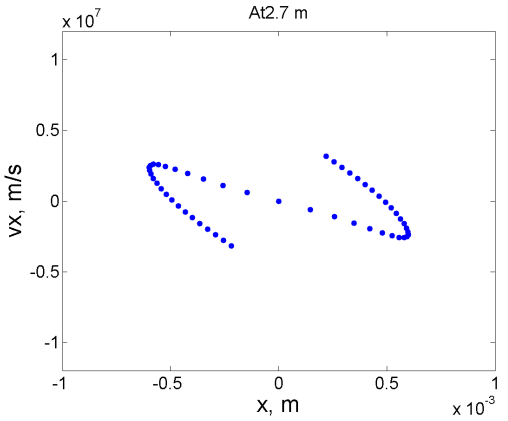
(c) $y = 1\sigma$



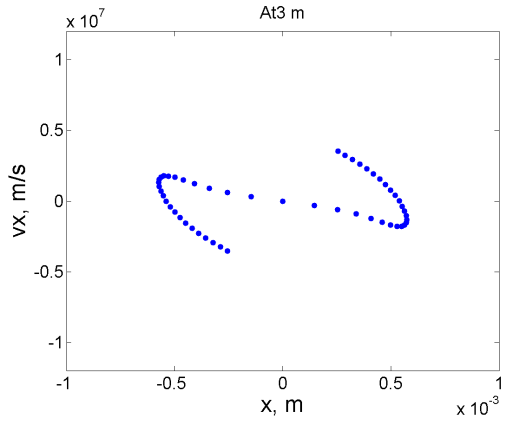
(a) $y = 0$



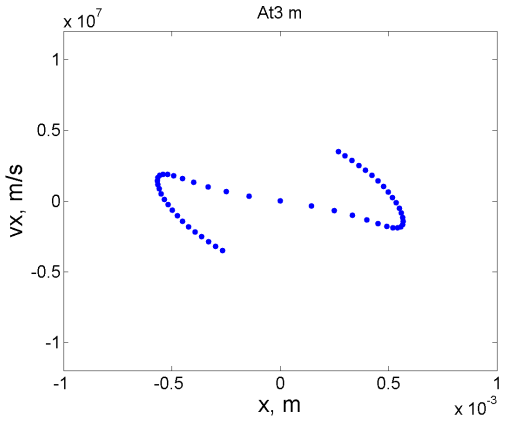
(b) $y = 0.5\sigma$



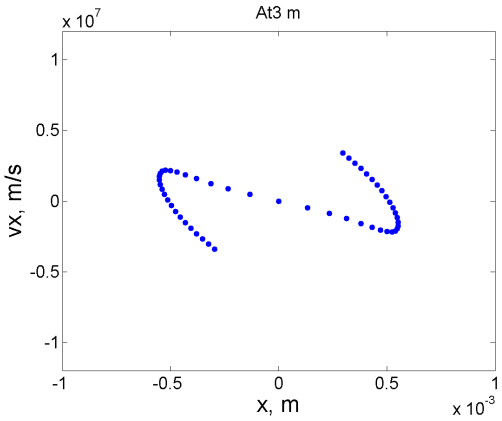
(c) $y = 1\sigma$



(a) $y = 0$



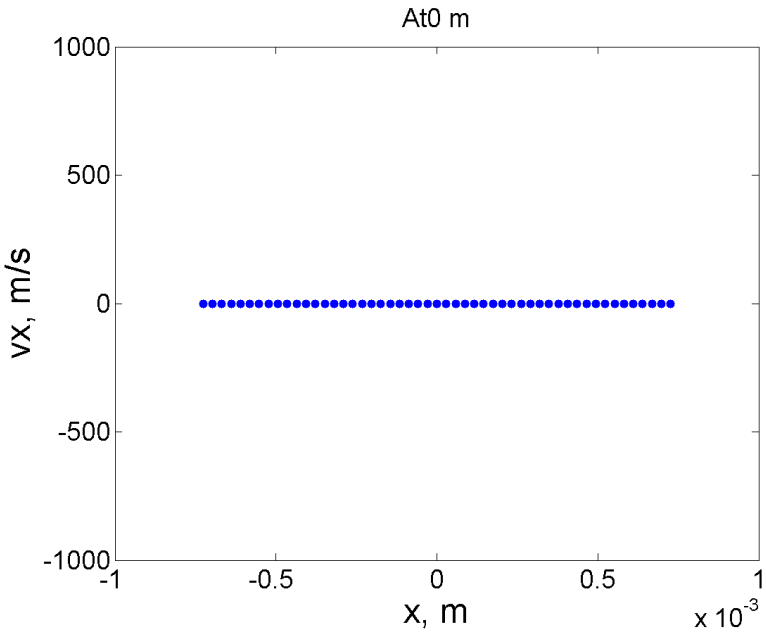
(b) $y = 0.5\sigma$



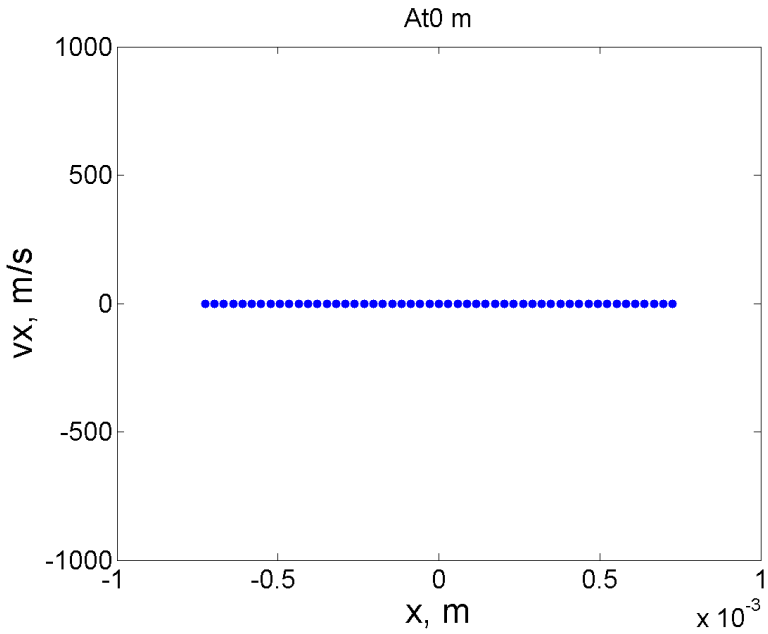
(c) $y = 1\sigma$

- No initial kick.
- With ion.

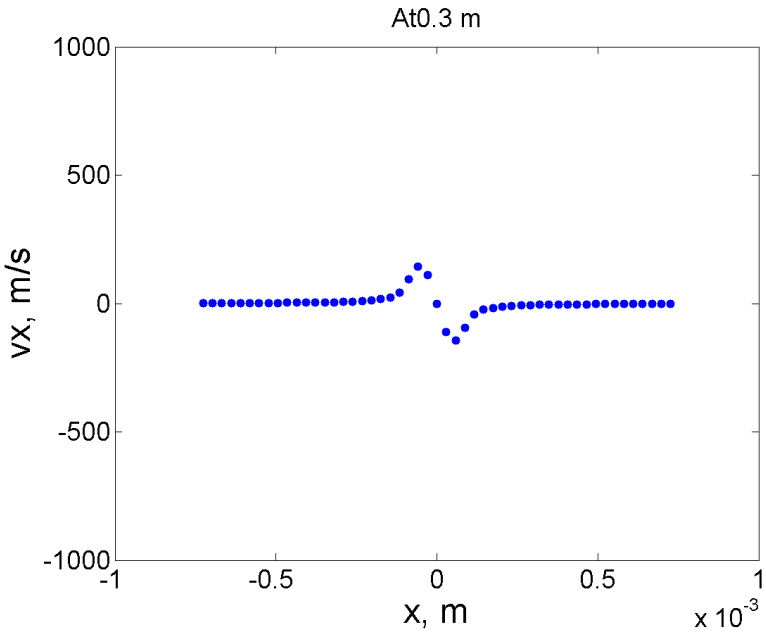
- $y = 0$.
- With / without space charge effect from whole electron beam.



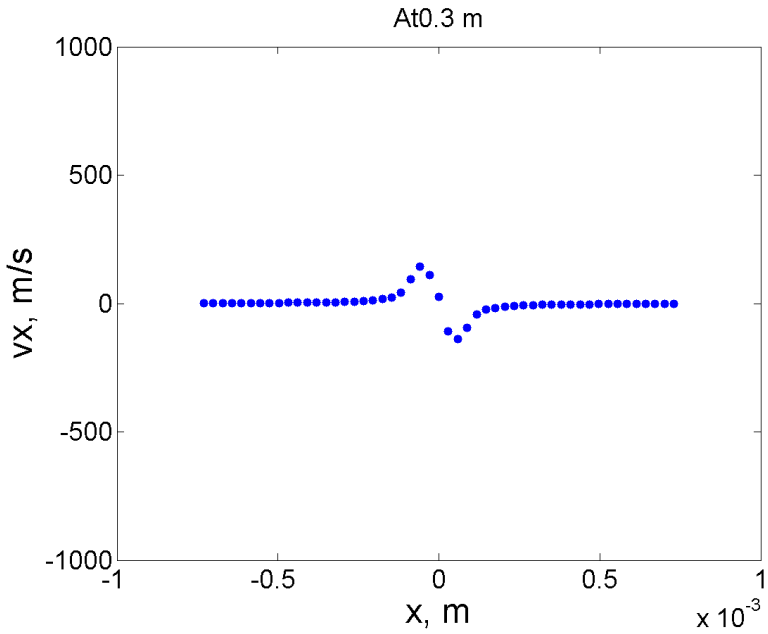
(a) Without SC



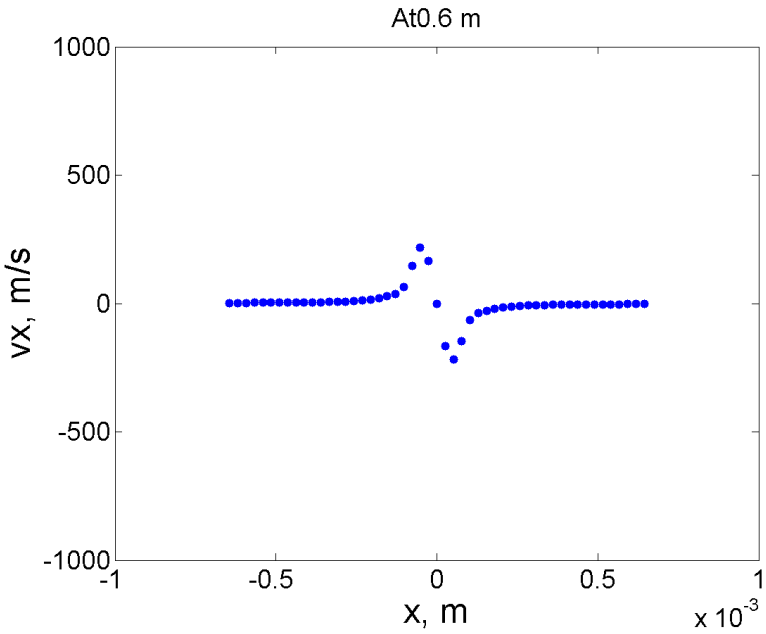
(b) With SC



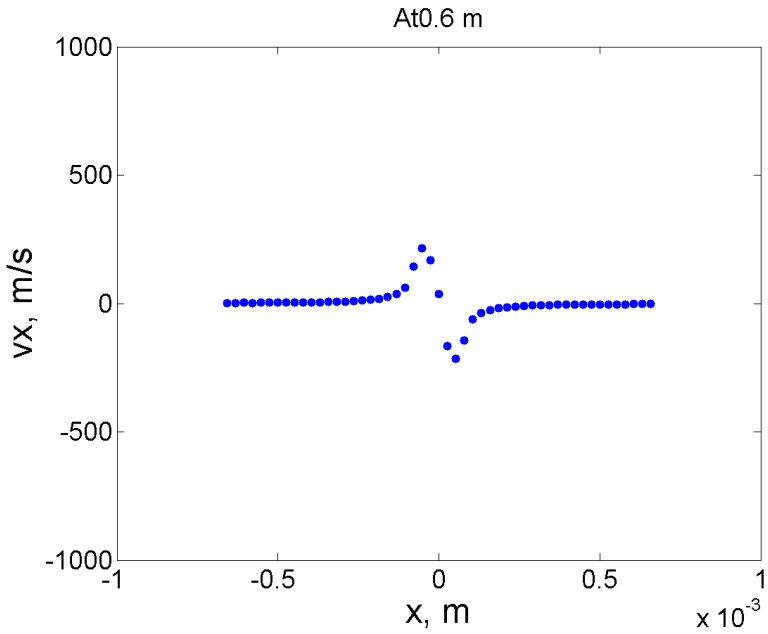
(a) Without SC



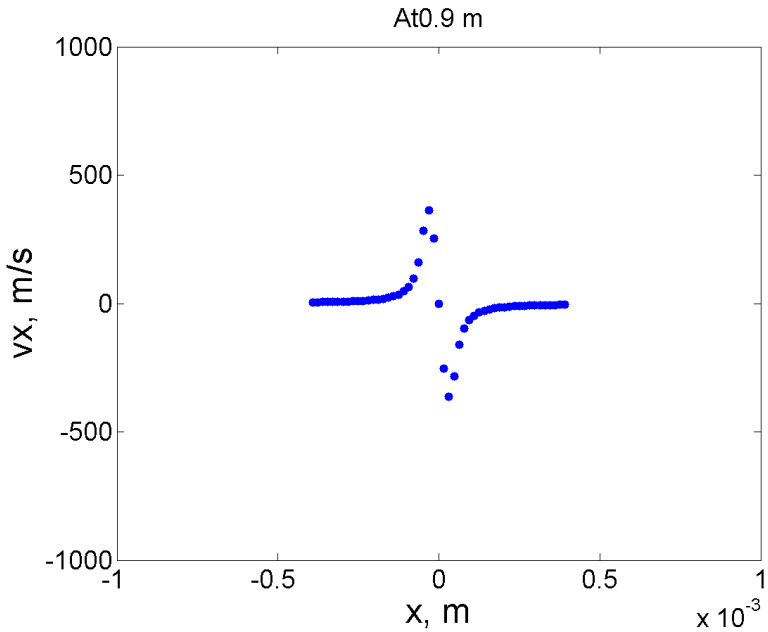
(b) With SC



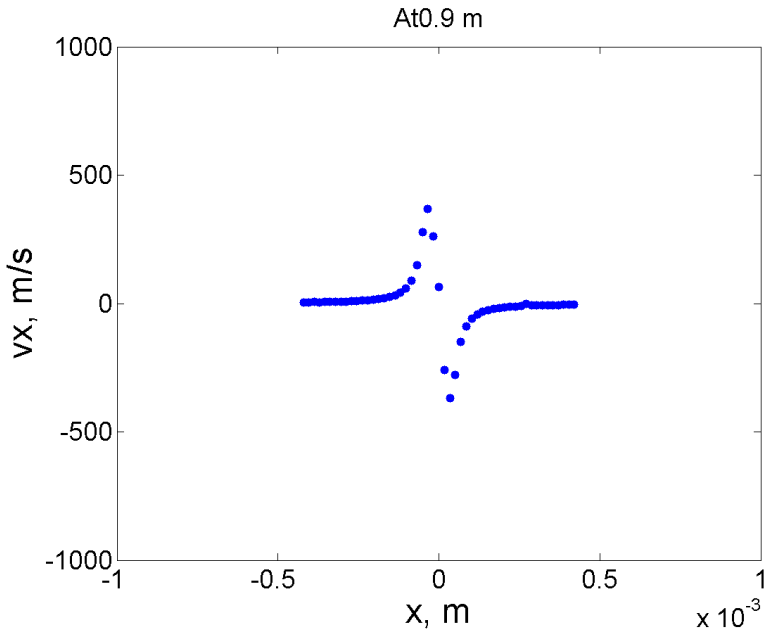
(a) Without SC



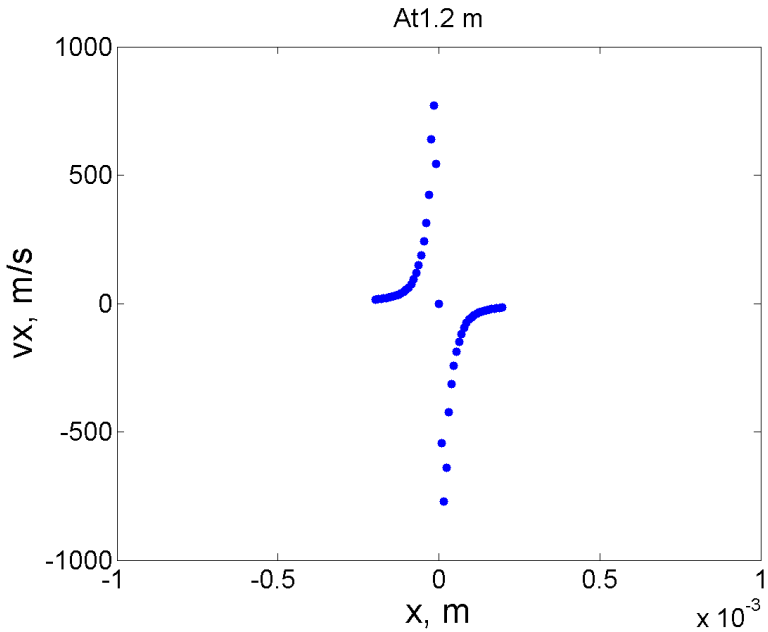
(b) With SC



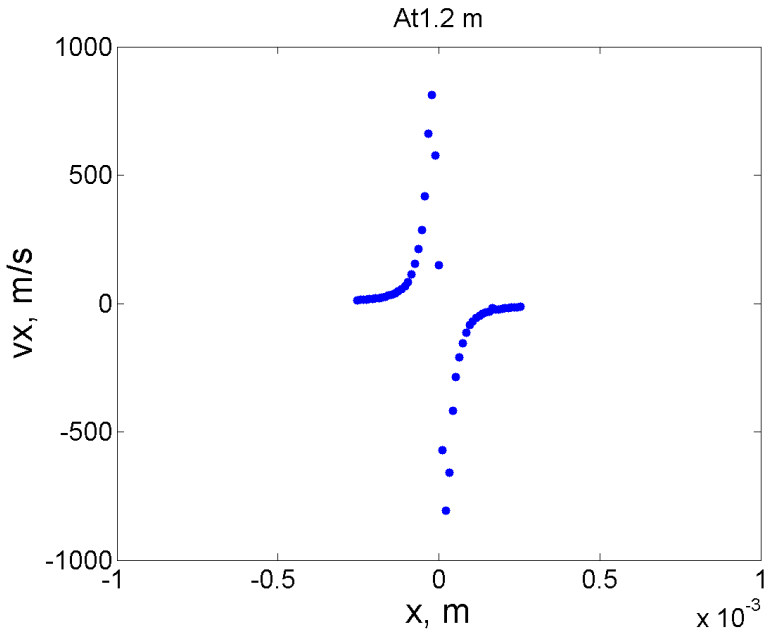
(a) Without SC



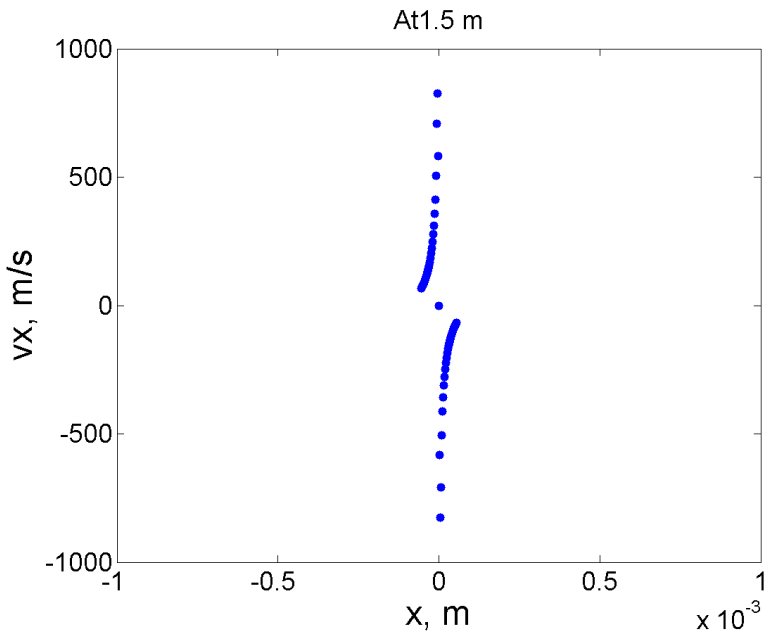
(b) With SC



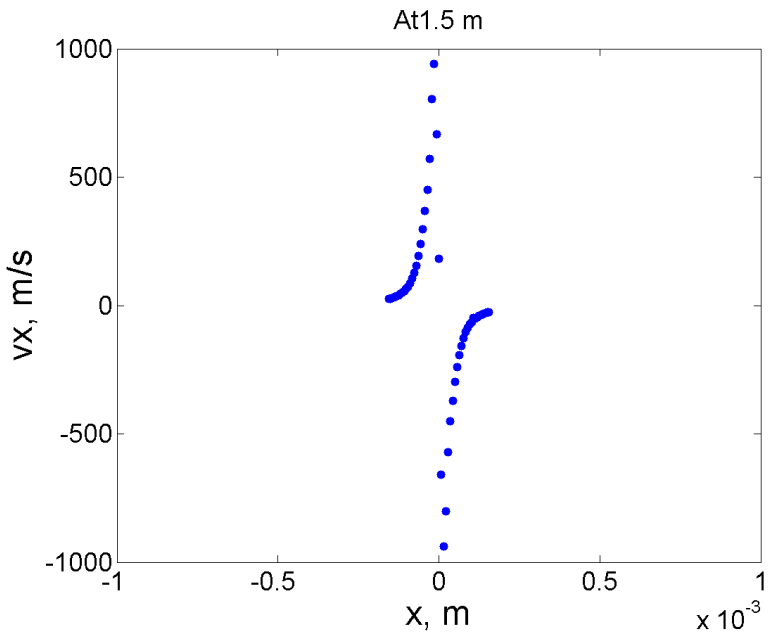
(a) Without SC



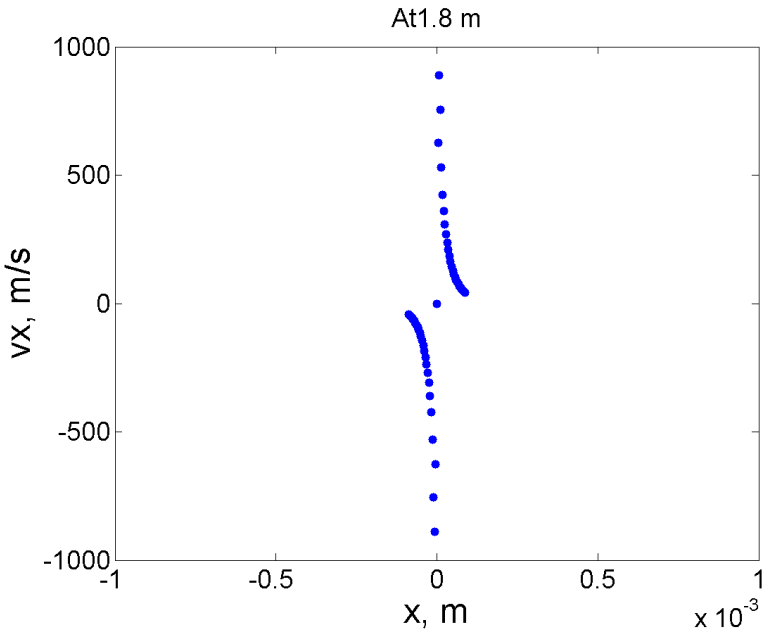
(b) With SC



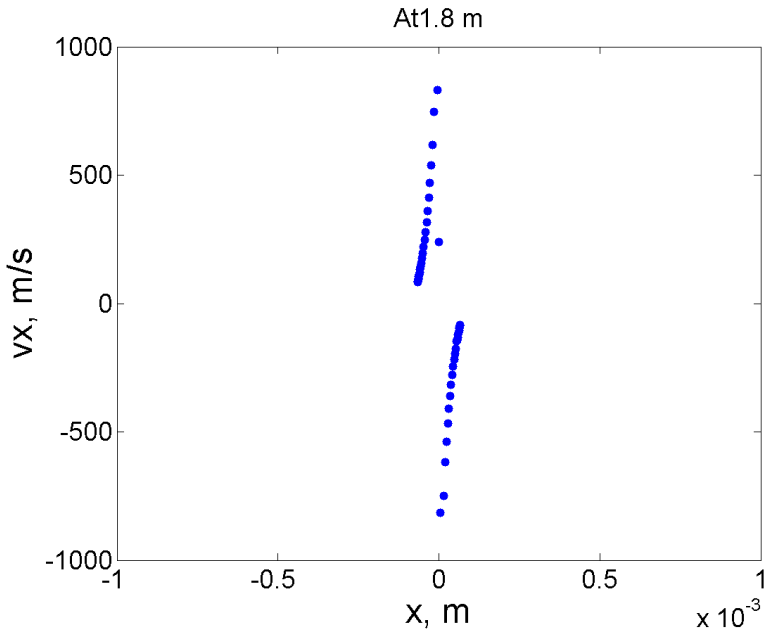
(a) Without SC



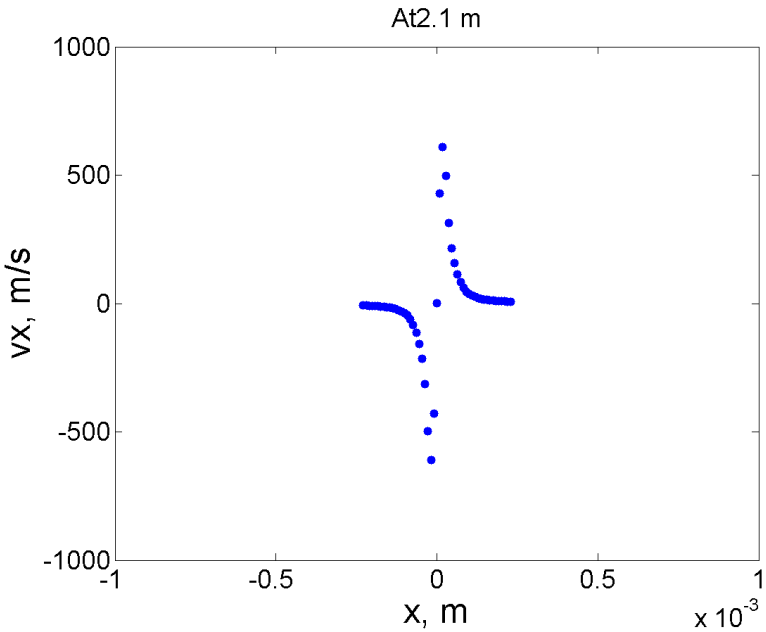
(b) With SC



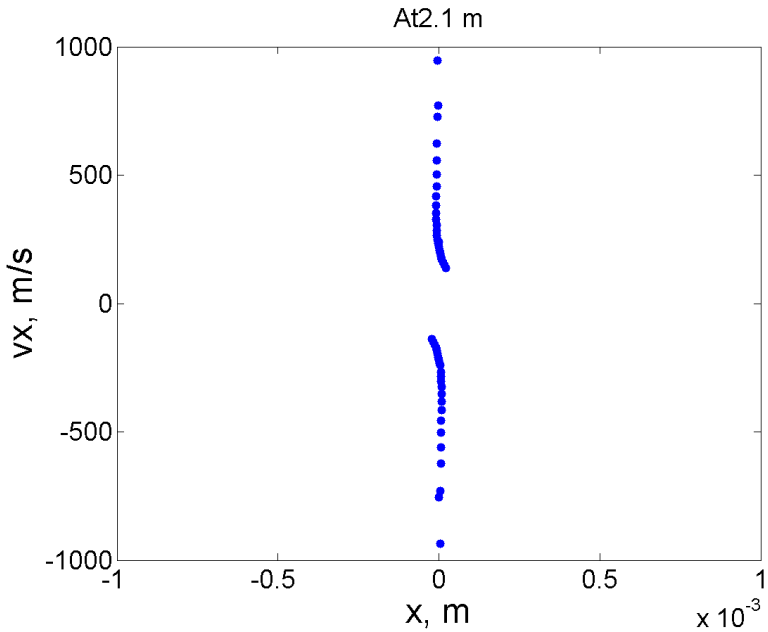
(a) Without SC



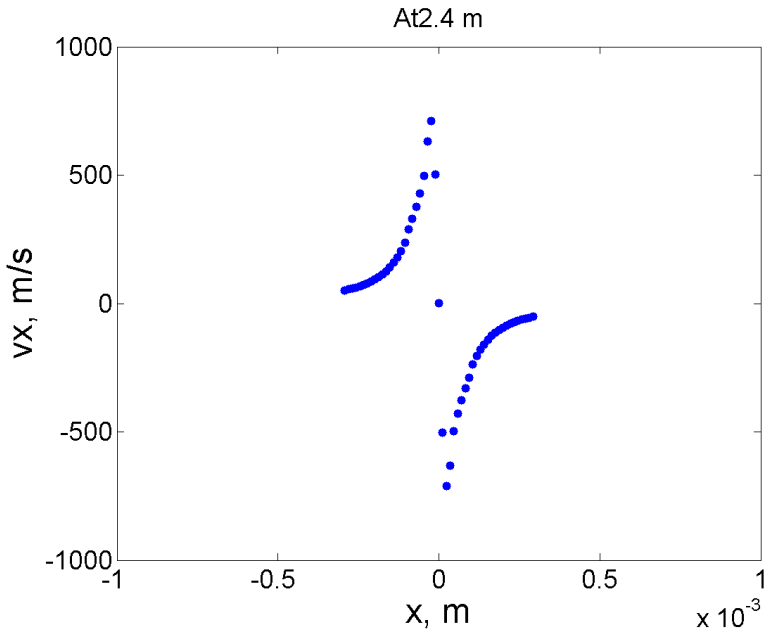
(b) With SC



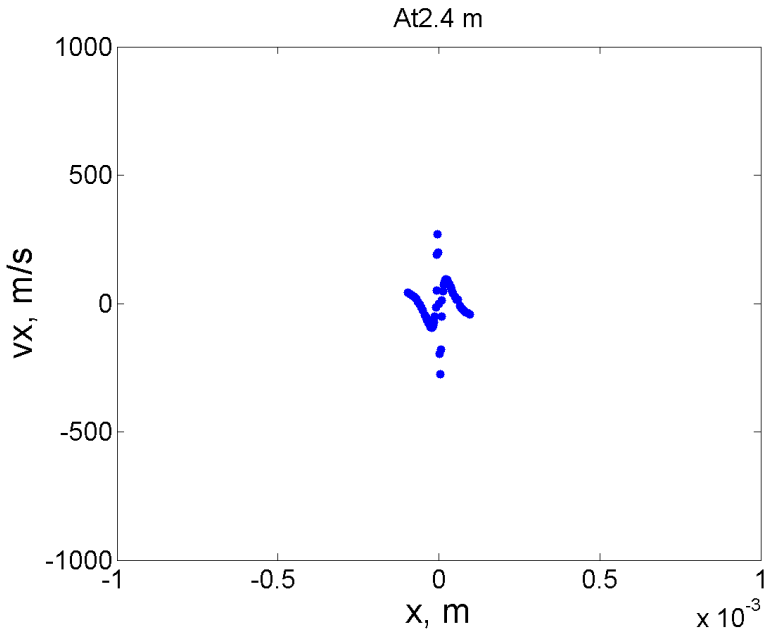
(a) Without SC



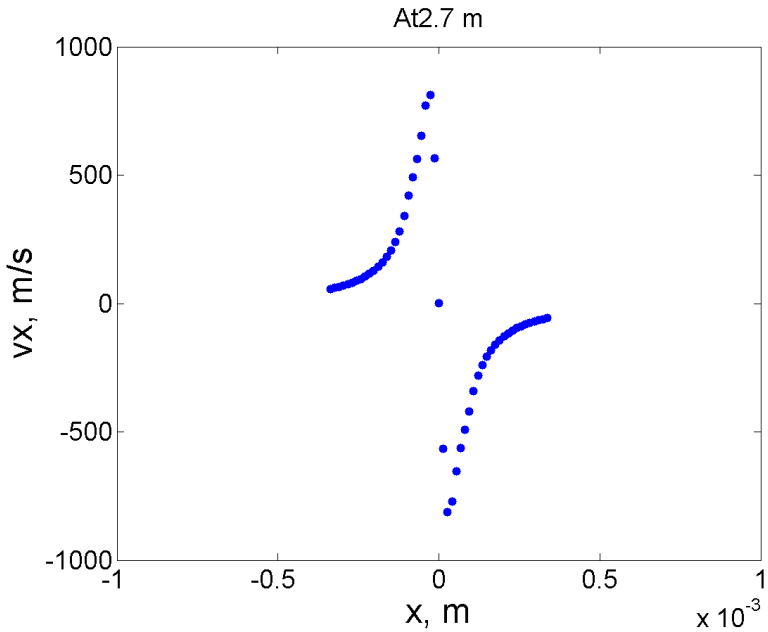
(b) With SC



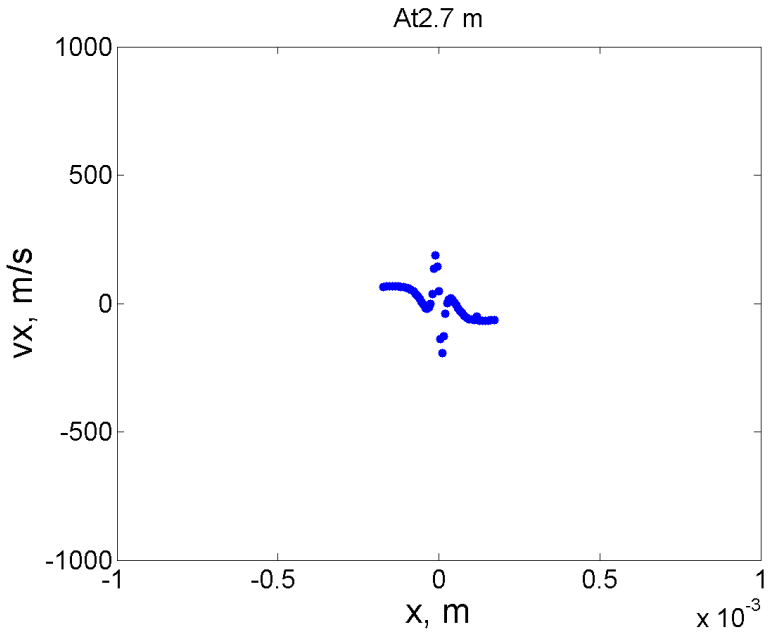
(a) Without SC



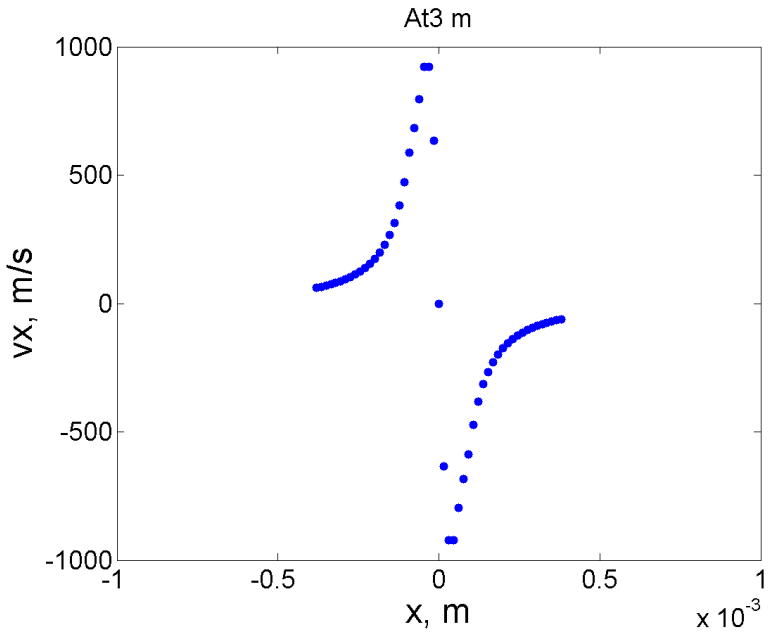
(b) With SC



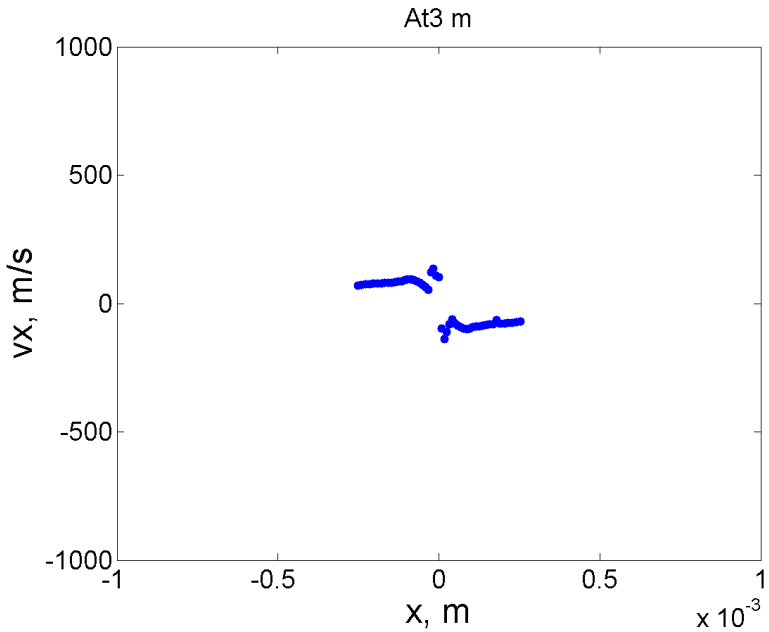
(a) Without SC



(b) With SC

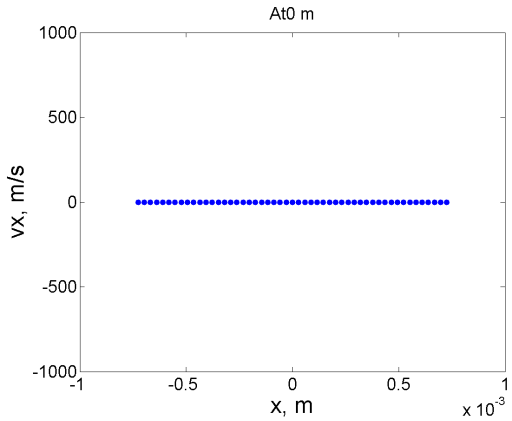


(a) Without SC

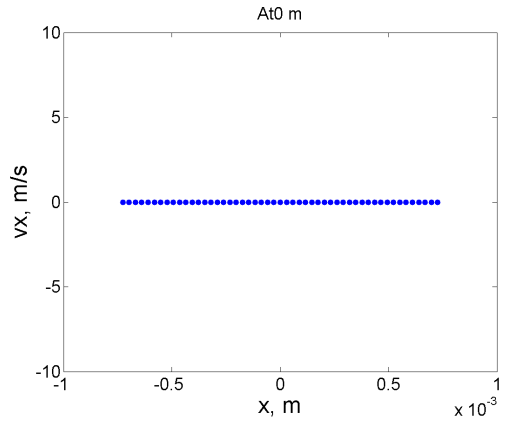


(b) With SC

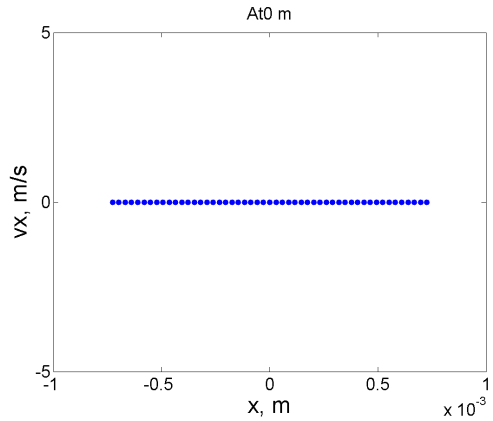
- $y = 0, 0.5\sigma, 1\sigma$.
- With space charge effect from whole electron beam.



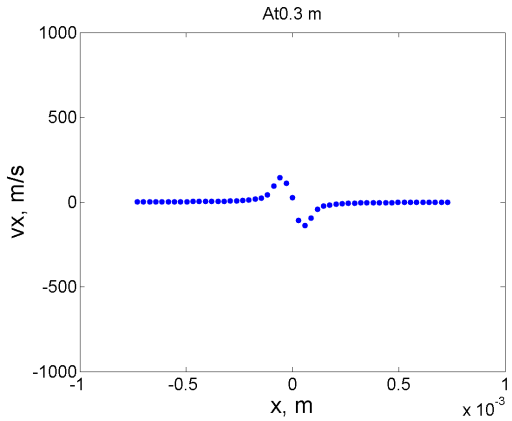
(a) $y = 0$



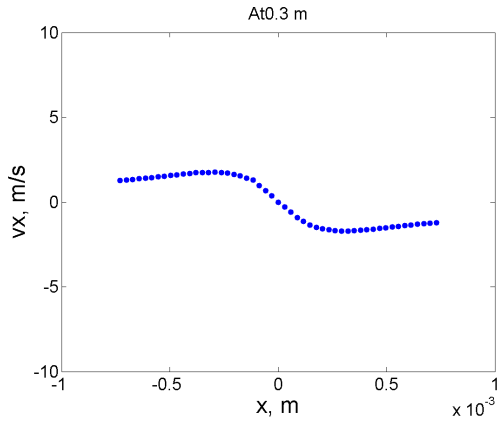
(b) $y = 0.5\sigma$



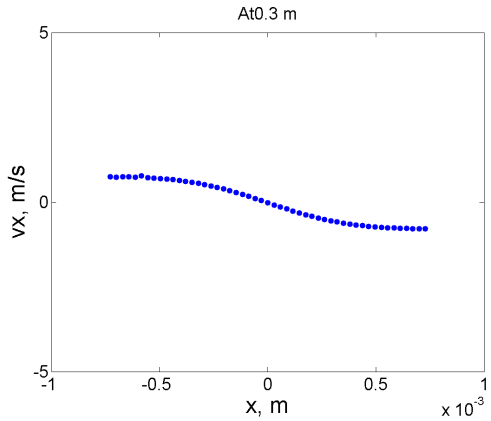
(c) $y = 1\sigma$



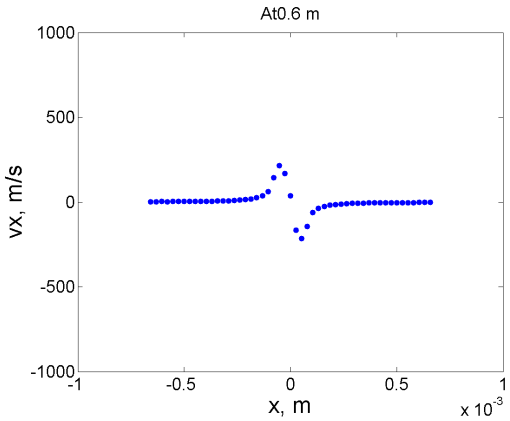
(a) $y = 0$



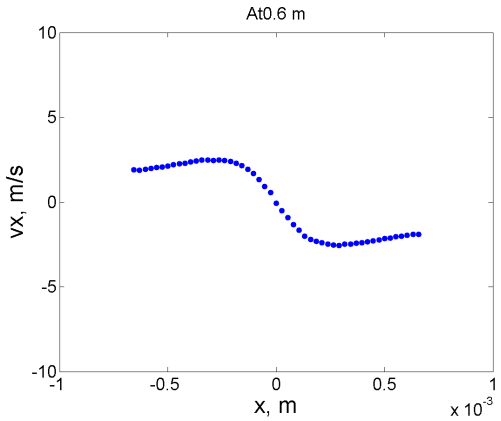
(b) $y = 0.5\sigma$



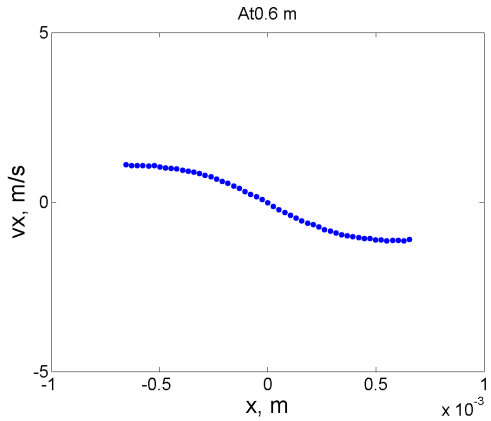
(c) $y = 1\sigma$



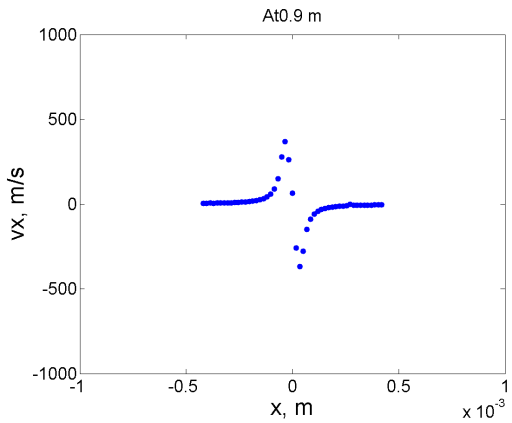
(a) $y = 0$



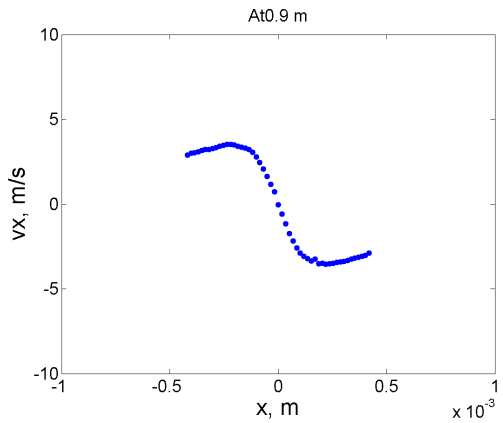
(b) $y = 0.5\sigma$



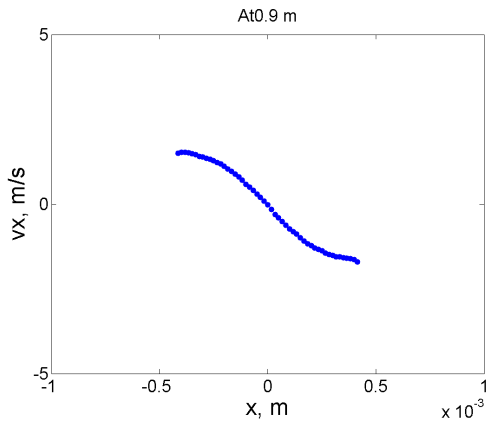
(c) $y = 1\sigma$



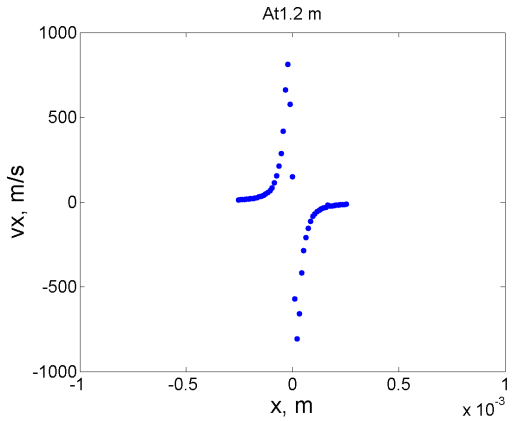
(a) $y = 0$



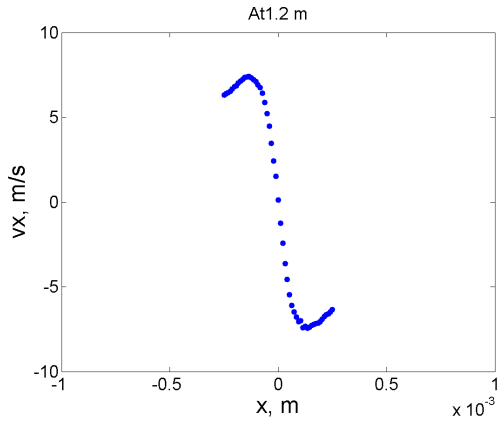
(b) $y = 0.5\sigma$



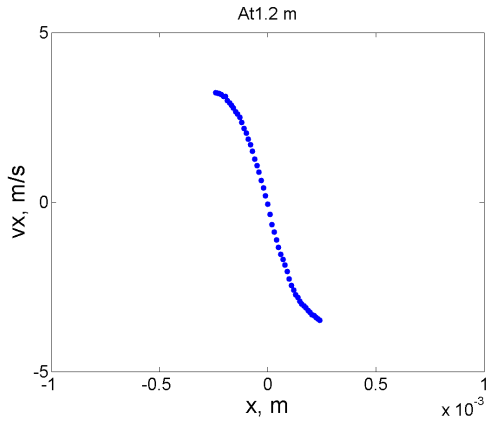
(c) $y = 1\sigma$



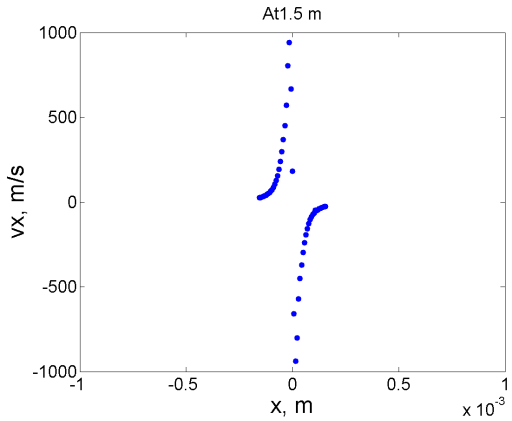
(a) $y = 0$



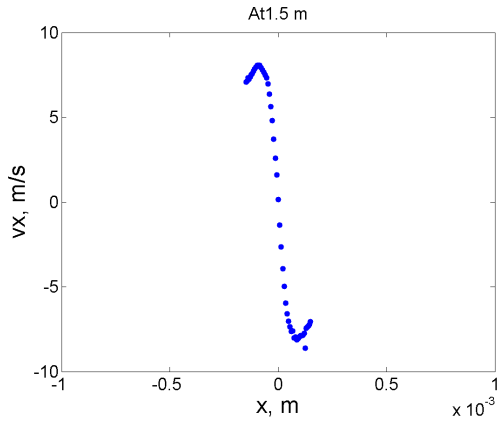
(b) $y = 0.5\sigma$



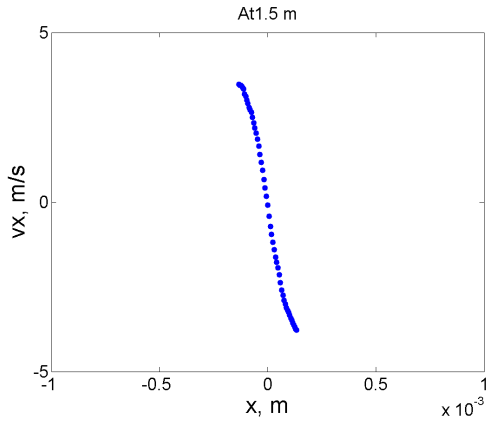
(c) $y = 1\sigma$



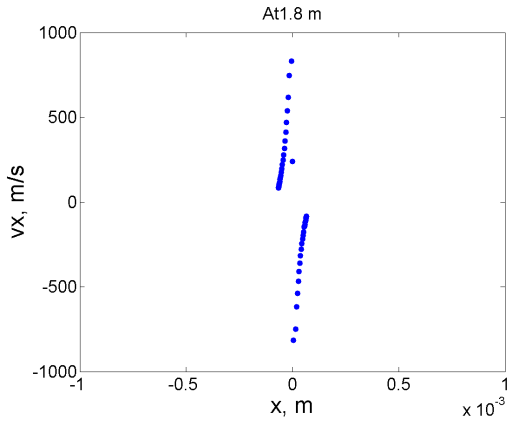
(a) $y = 0$



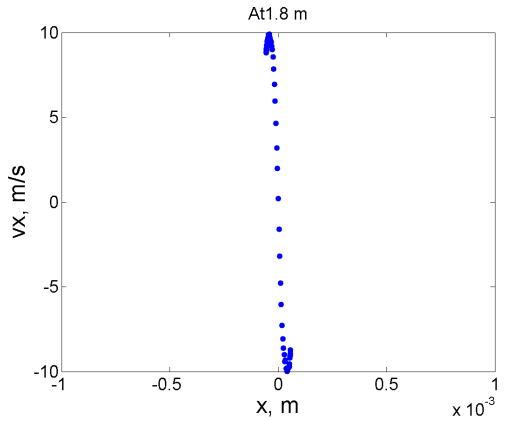
(b) $y = 0.5\sigma$



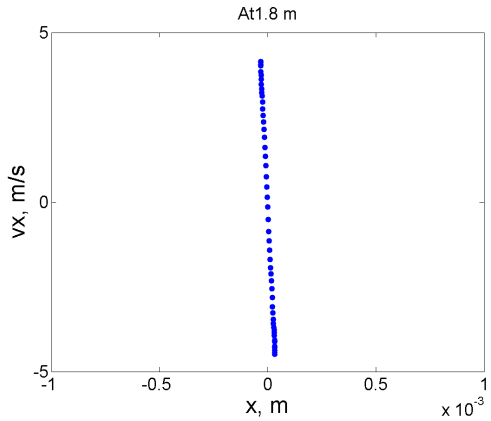
(c) $y = 1\sigma$



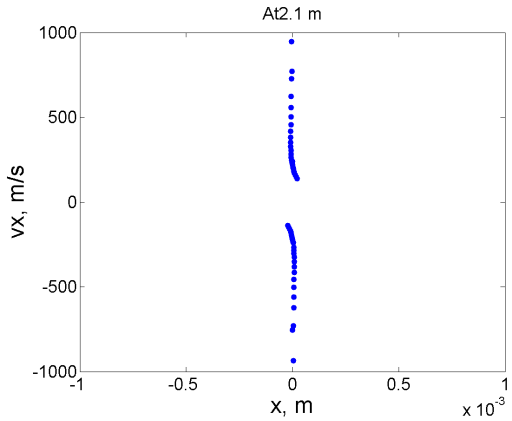
(a) $y = 0$



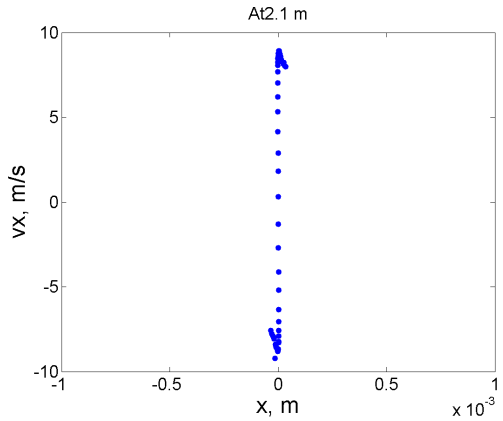
(b) $y = 0.5\sigma$



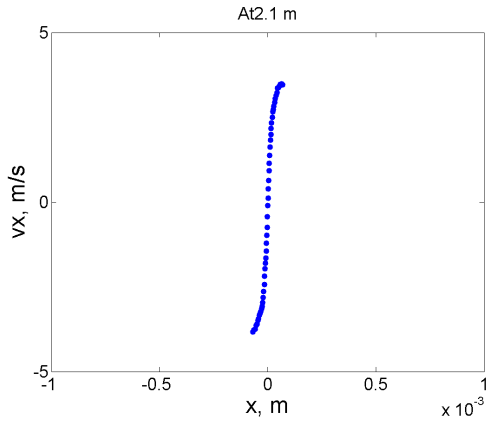
(c) $y = 1\sigma$



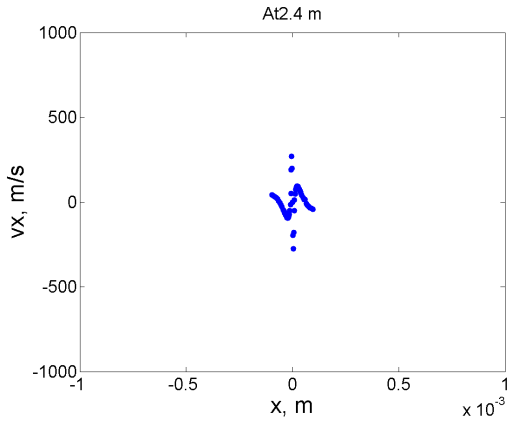
(a) $y = 0$



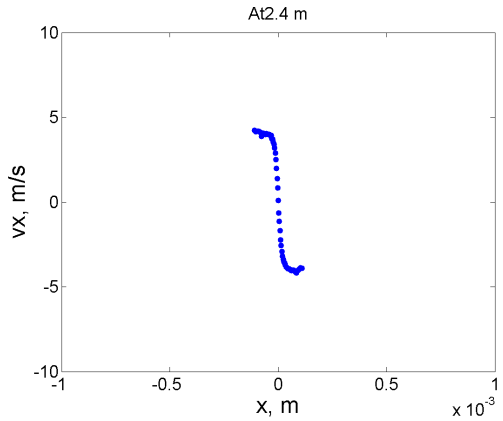
(b) $y = 0.5\sigma$



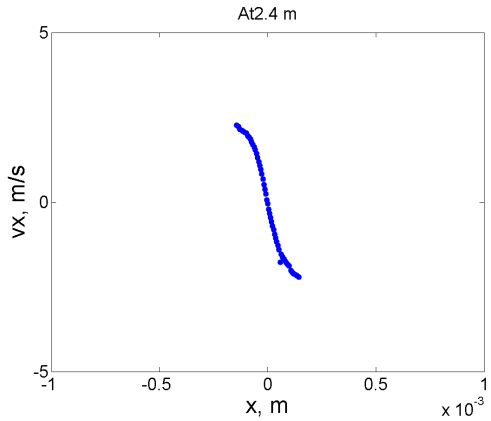
(c) $y = 1\sigma$



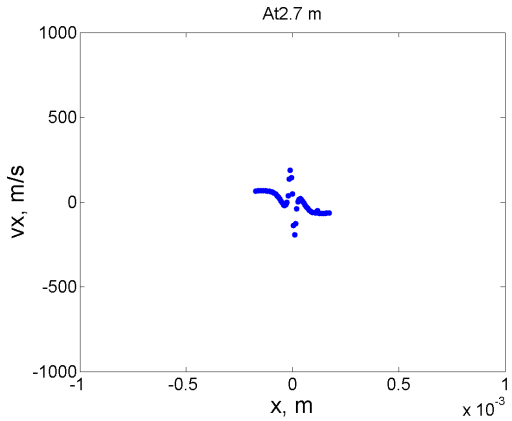
(a) $y = 0$



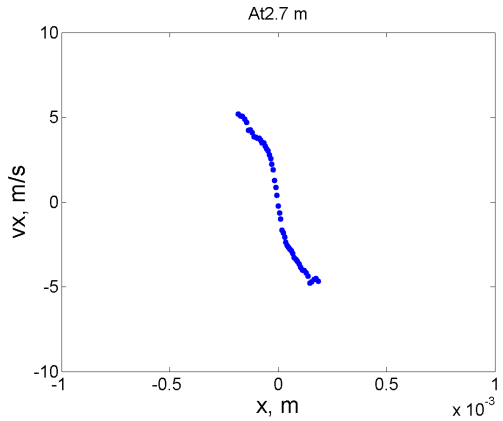
(b) $y = 0.5\sigma$



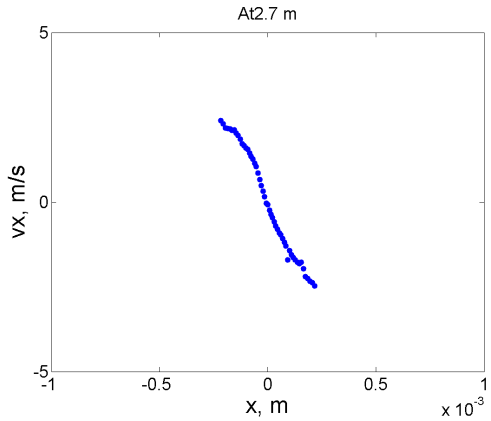
(c) $y = 1\sigma$



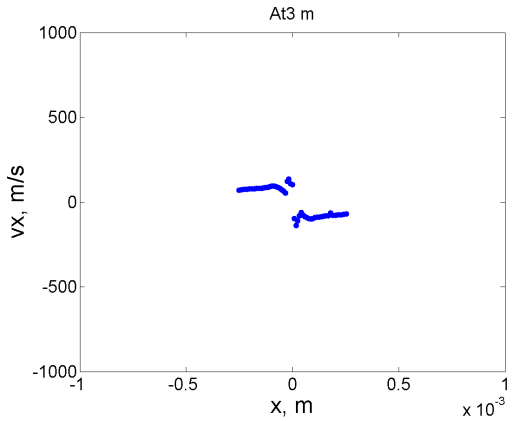
(a) $y = 0$



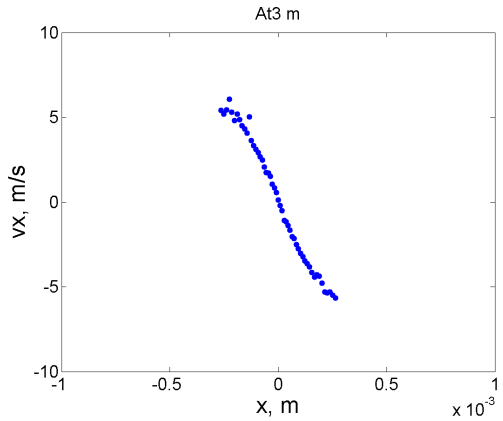
(b) $y = 0.5\sigma$



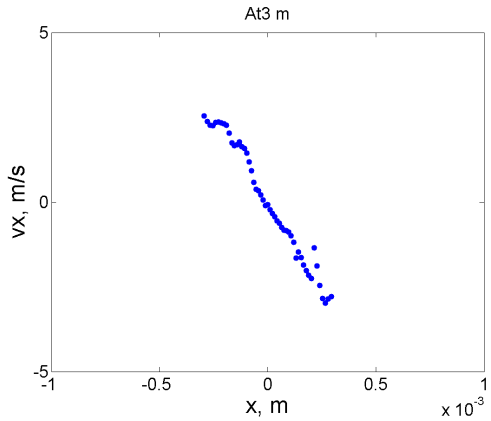
(c) $y = 1\sigma$



(a) $y = 0$



(b) $y = 0.5\sigma$



(c) $y = 1\sigma$