

Wiggler Simulations

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Test setup

- number of slices : 400
- number of particles per slice : 8192, 131072, 524288
- number of threads : 24

Test result

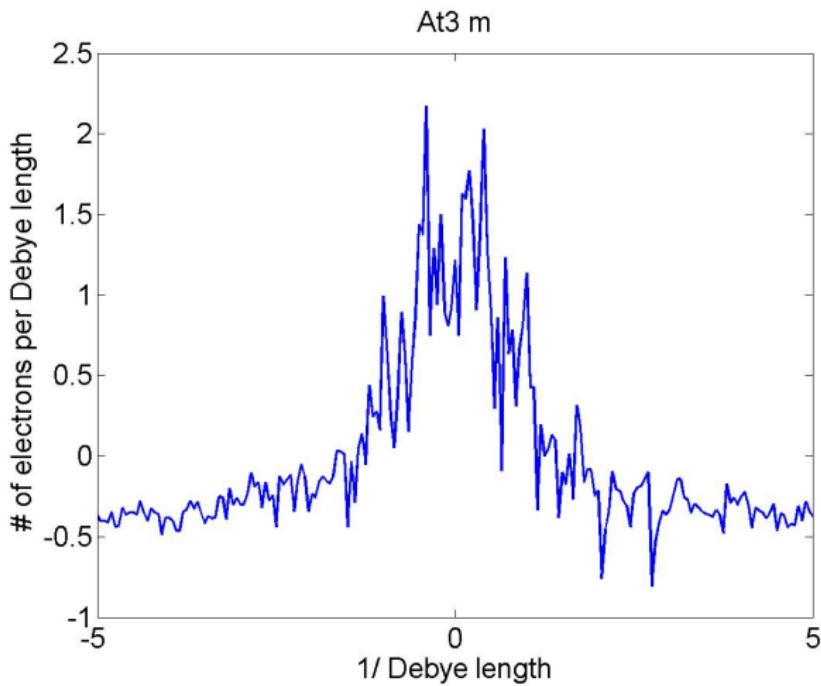
Table: GENESIS Scalability Test

| n per slice | Time (sec) |
|-------------|------------|
| 8192 | 35 |
| 131072 | 420 |
| 524288 | 1680 |
| 1048576 | $n > NMAX$ |

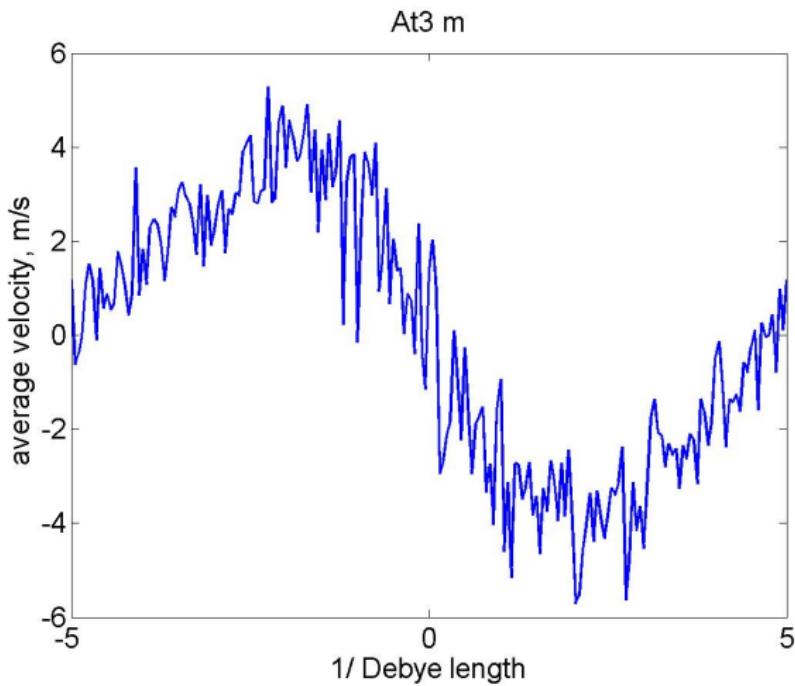
Setup

- Number of computational particles : 524288
- Representing number : 20
- The output will be the input of GENESIS by replacing one slice

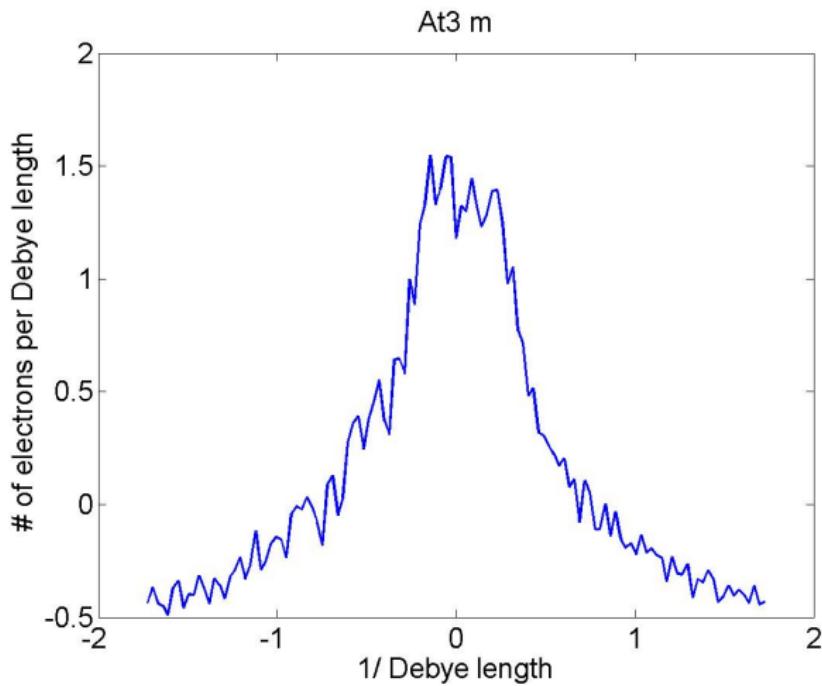
longitudinal density modulation



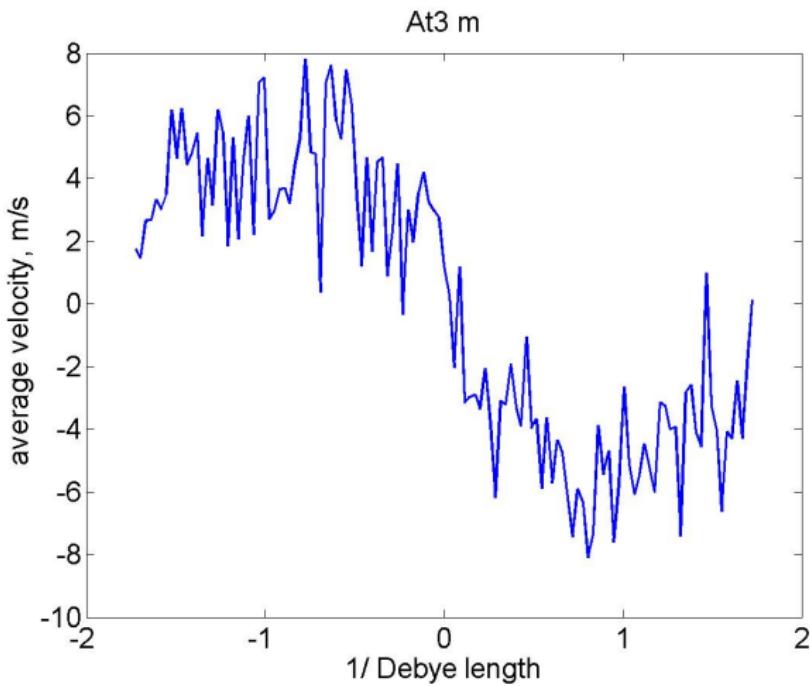
longitudinal velocity modulation



transverse density modulation



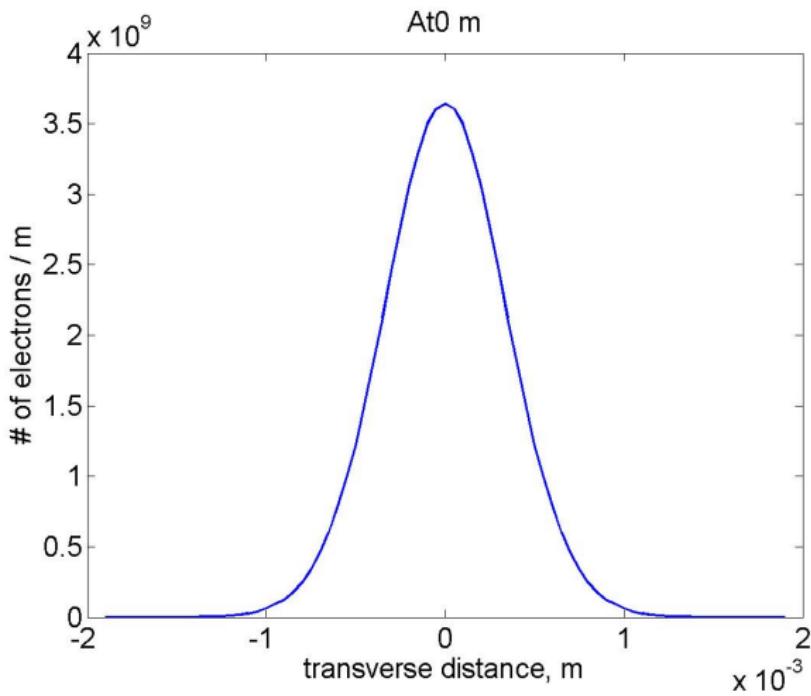
transverse velocity modulation



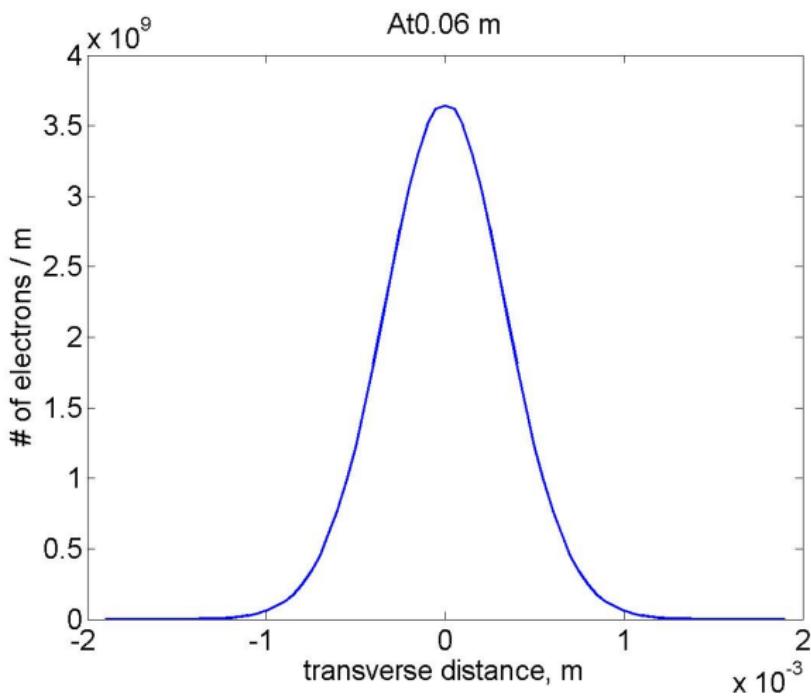
GENESIS setup

- number of slices : 400
- number of particles per slice : 8192
- output of GENESIS is taken as the input of kicker simulation

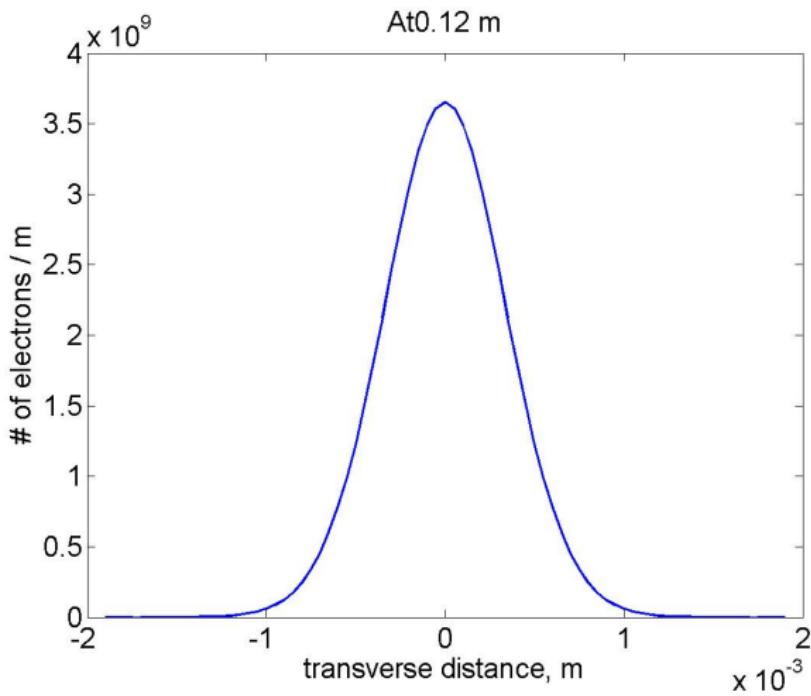
transverse density modulation



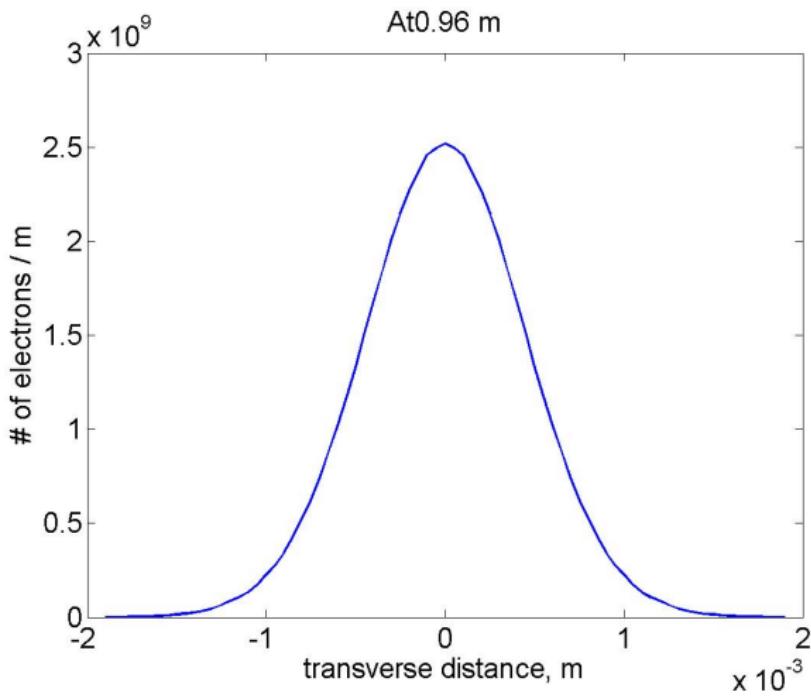
transverse density modulation



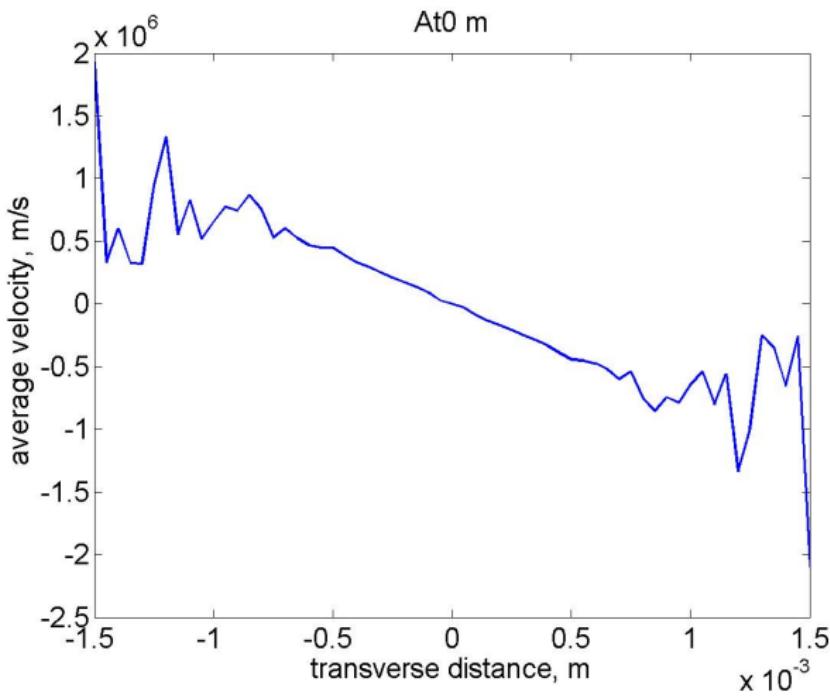
transverse density modulation



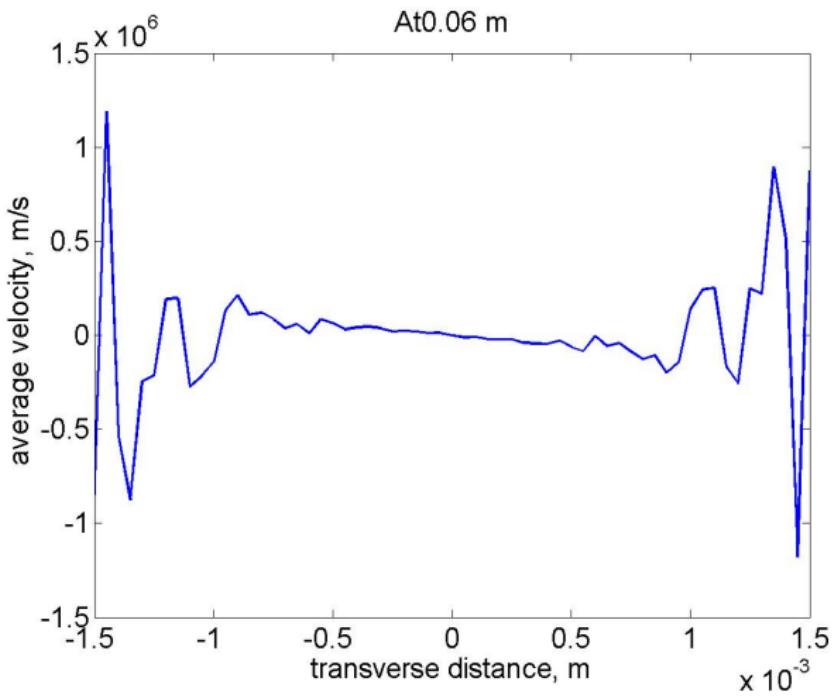
transverse density modulation



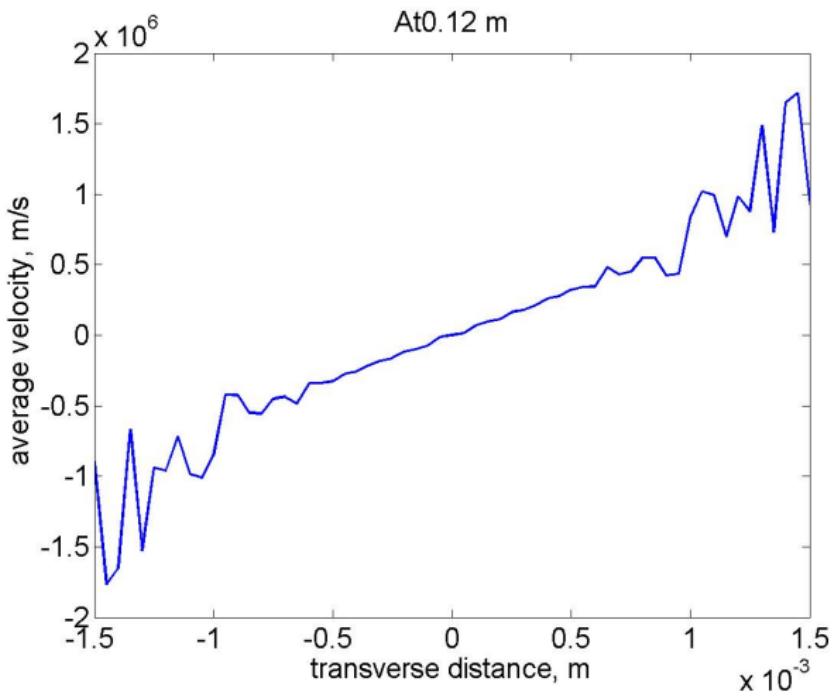
transverse velocity modulation



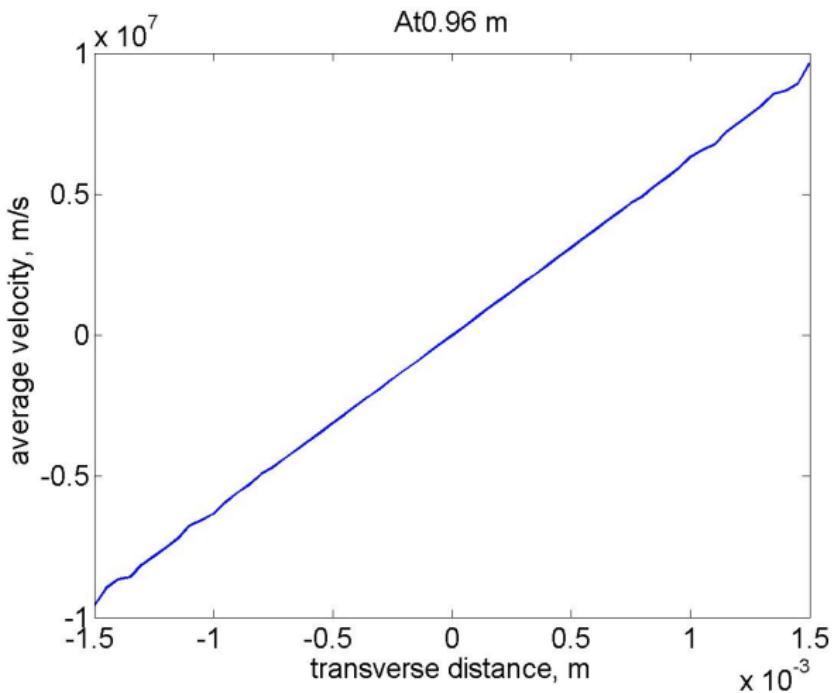
transverse velocity modulation



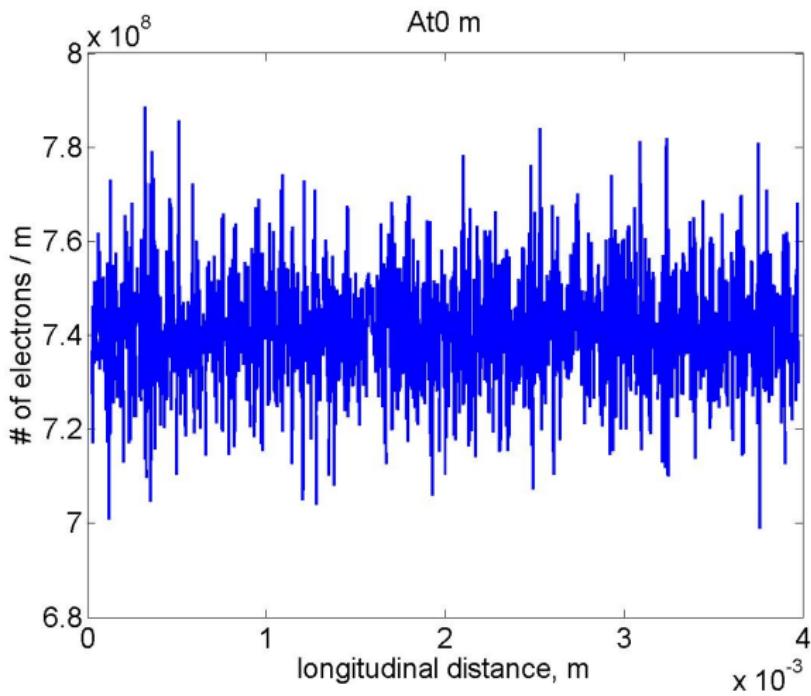
transverse velocity modulation



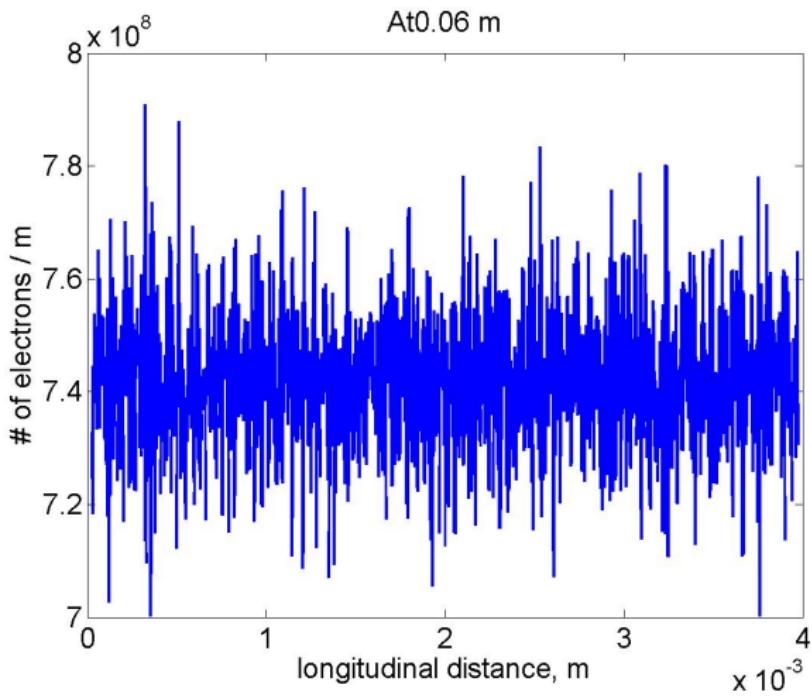
transverse velocity modulation



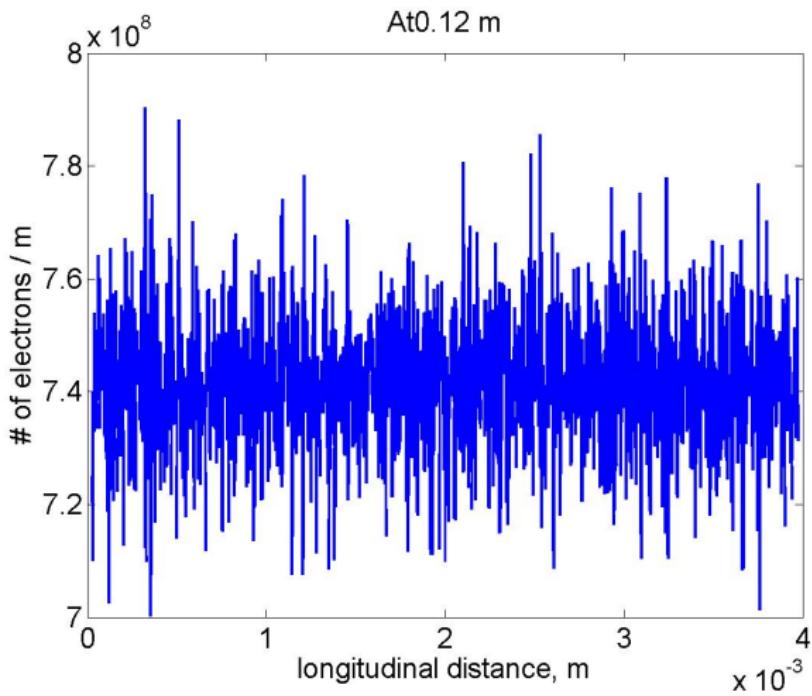
longitudinal density modulation



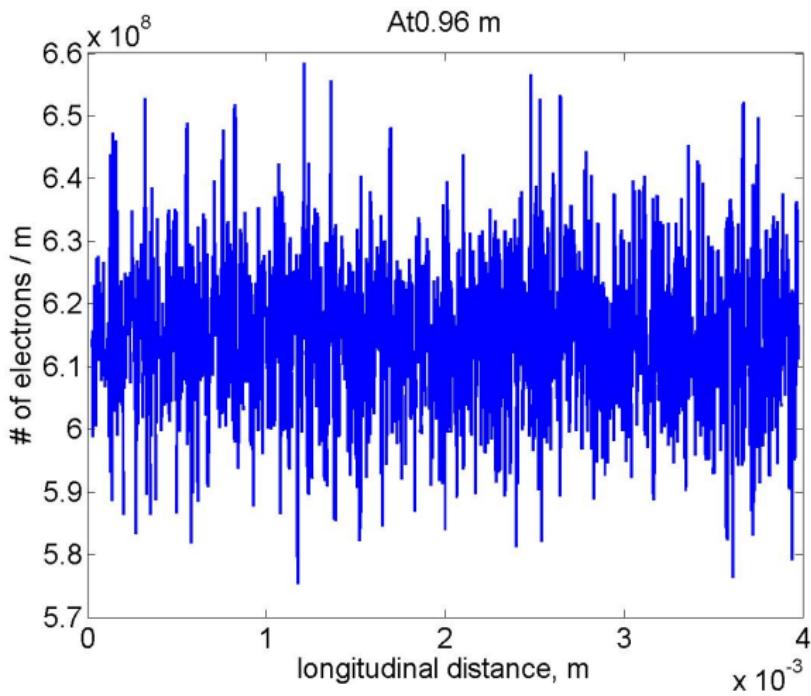
longitudinal density modulation



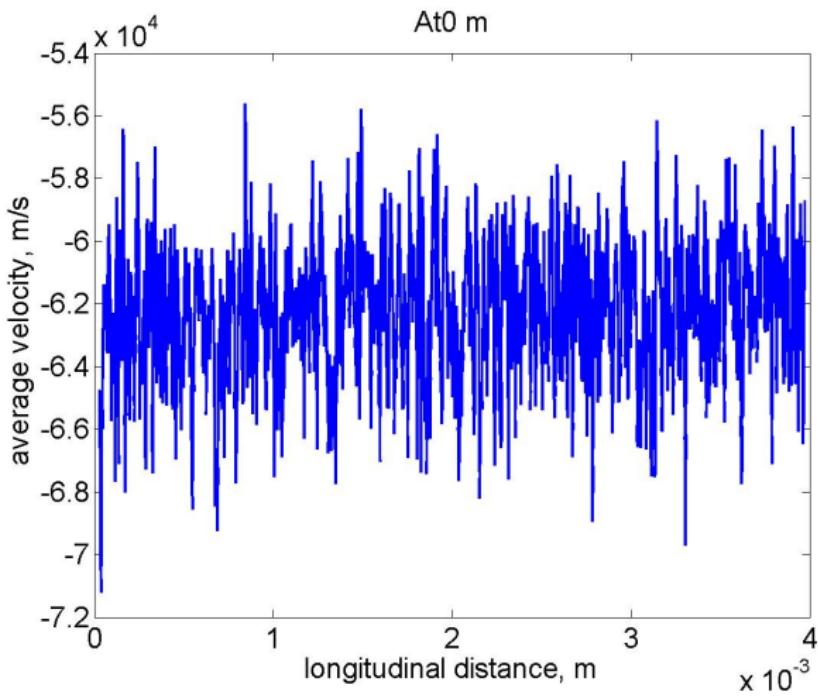
longitudinal density modulation



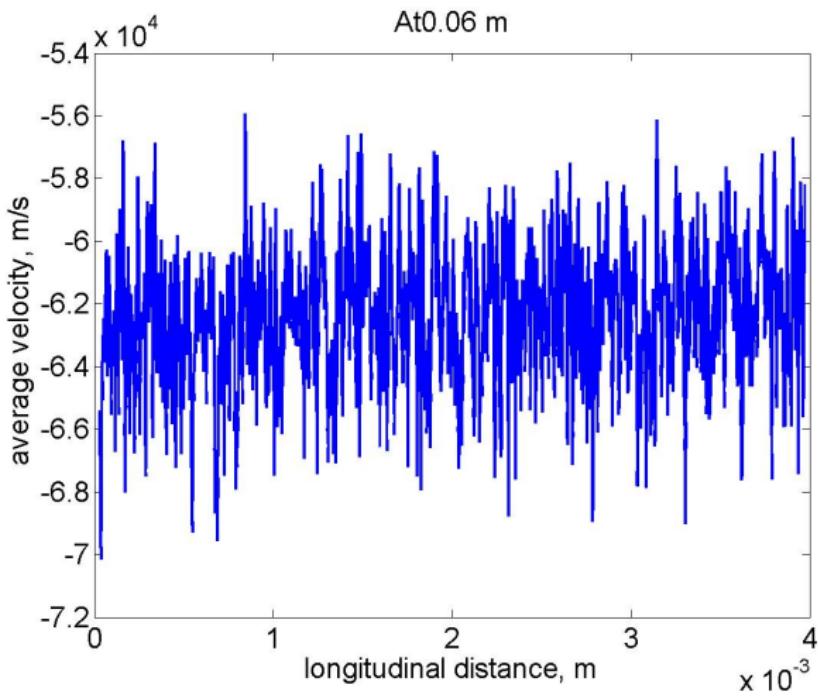
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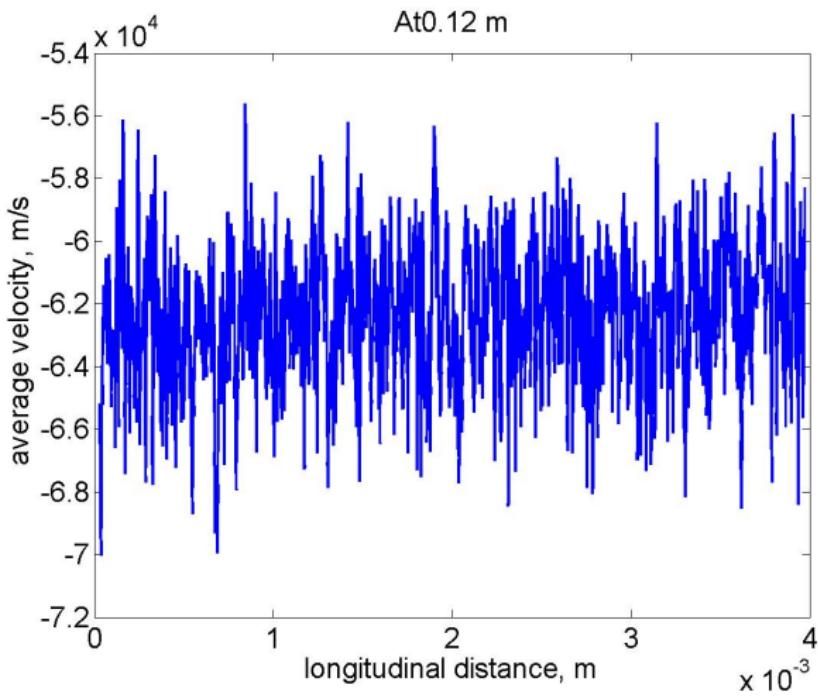
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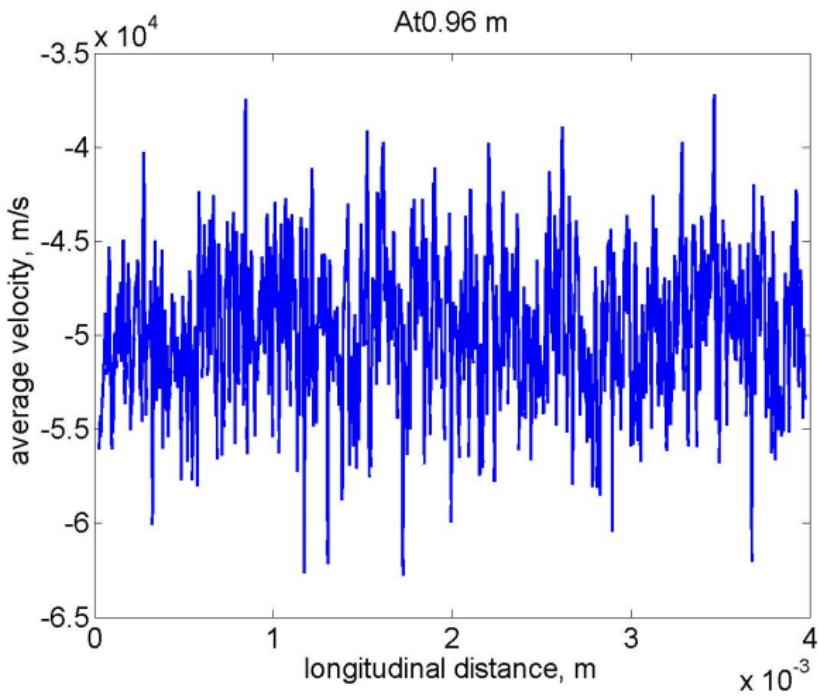
longitudinal velocity modulation



longitudinal velocity modulation



longitudinal velocity modulation



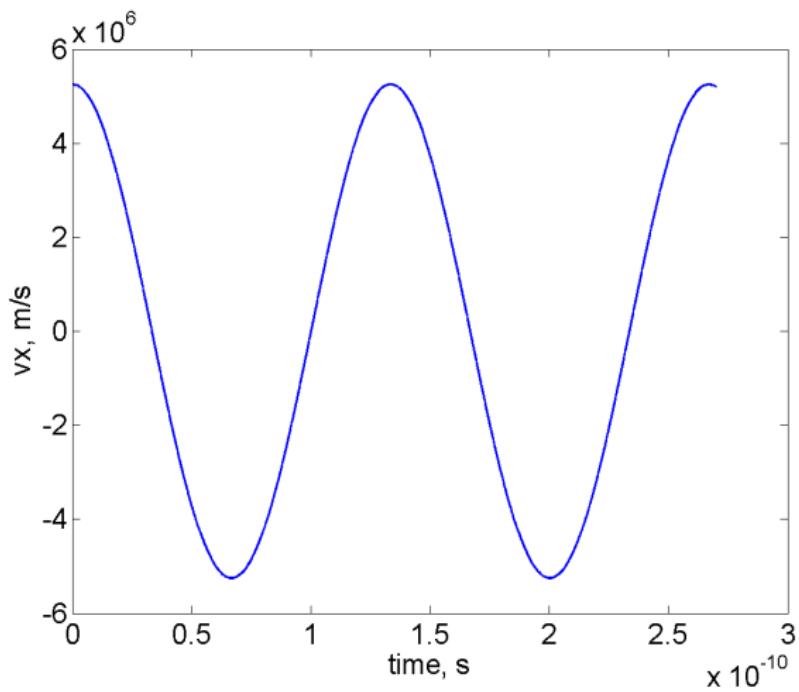
Magnetic field of dipoles

- $B_x(s) = B_0 \cos(k_w \cdot s)$
- $B_y(s) = -B_0 \sin(k_w \cdot s)$
- $k_w = 2\pi/\lambda_w$
- $\lambda_w = 4\text{cm}$
- $B_0 = 0.2\text{T}$

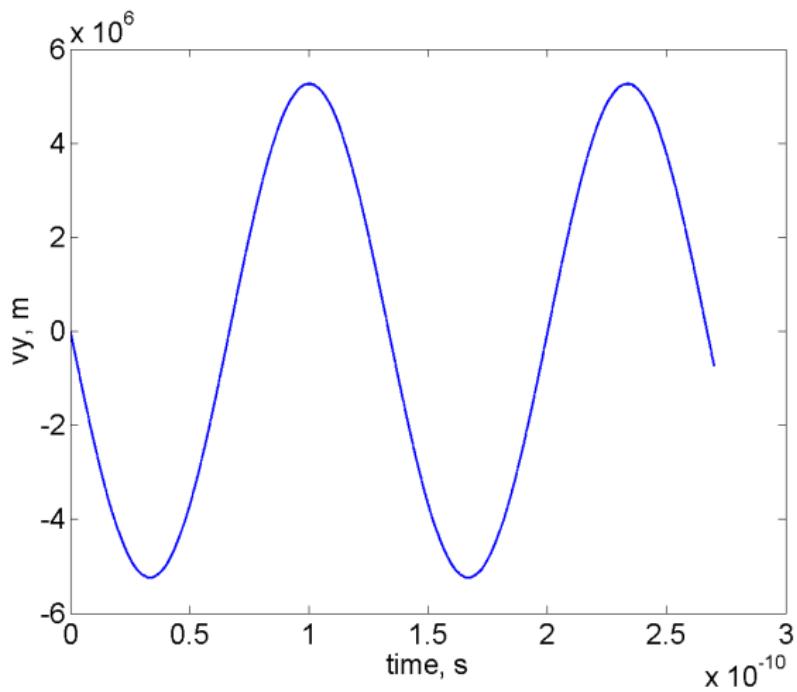
Kick velocity

- discontinuity at initial
- give a kick velocity to vx initially
- particle motion depends on the initial kick

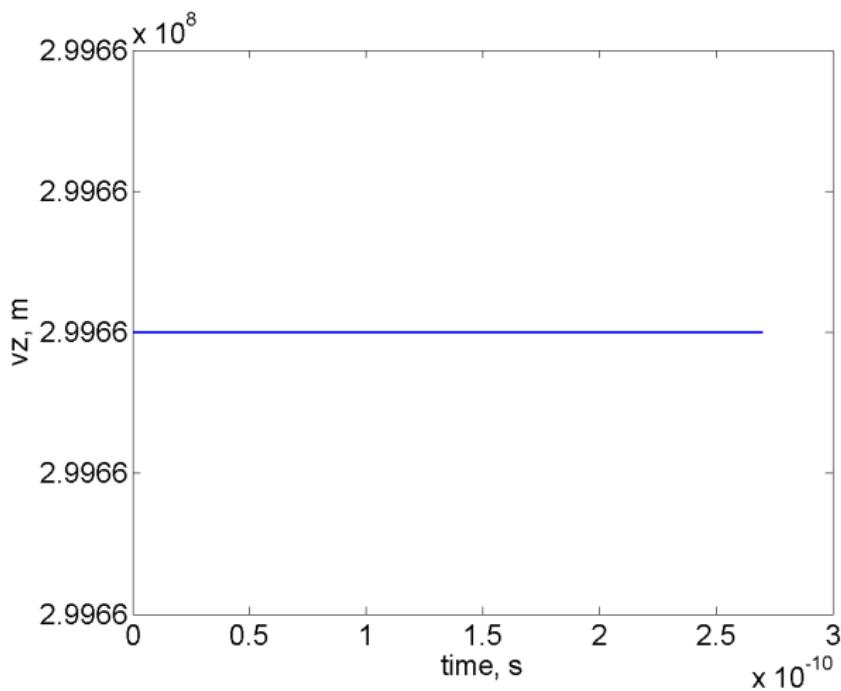
vx



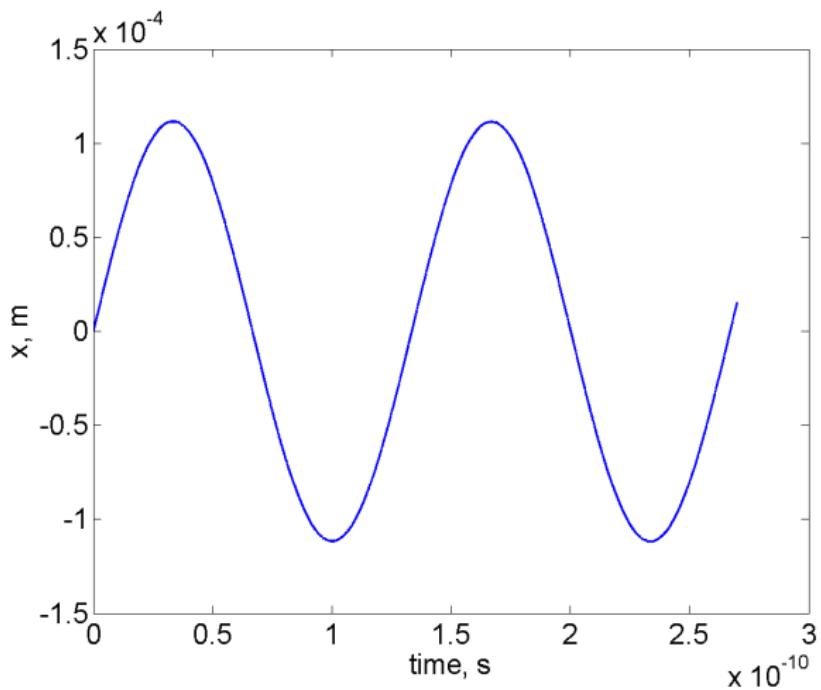
vy



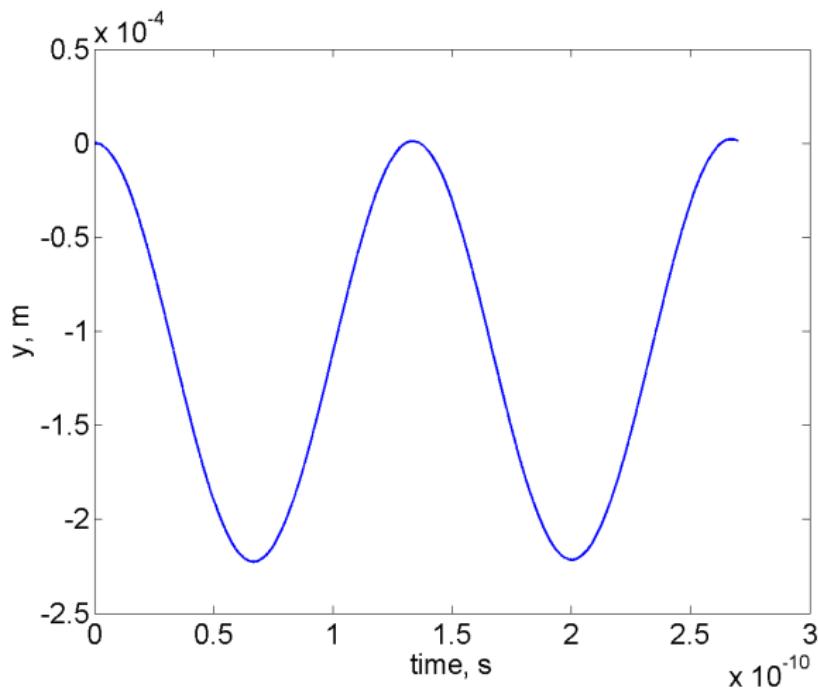
VZ



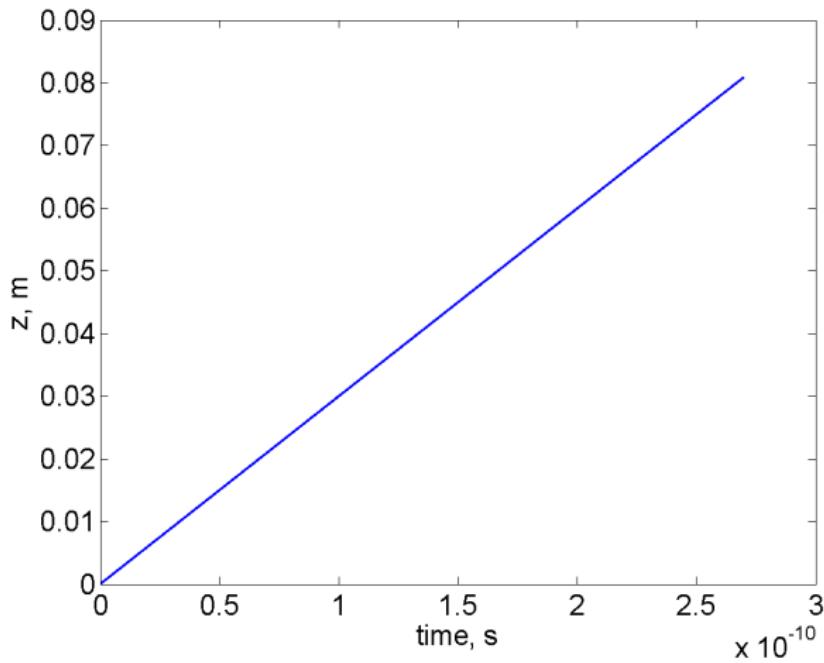
X



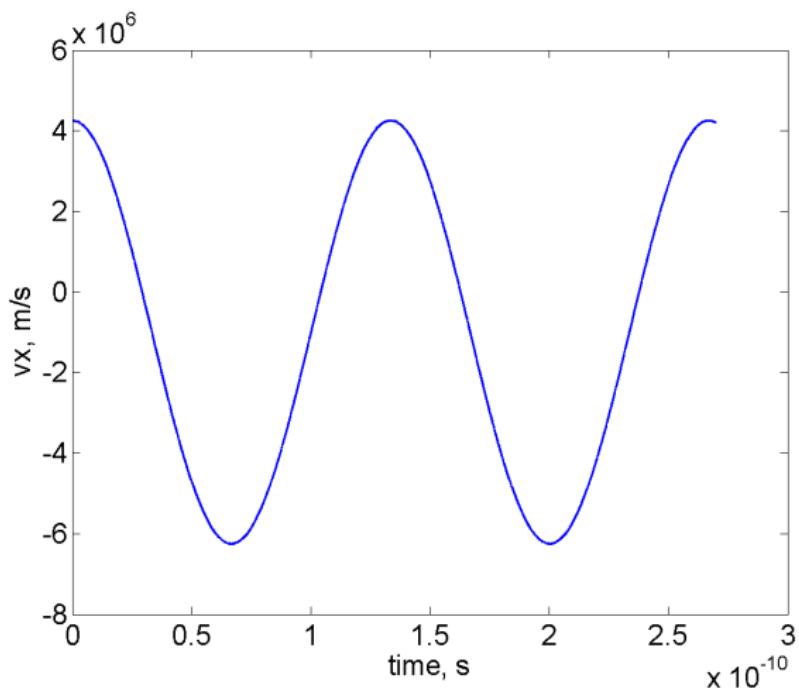
y



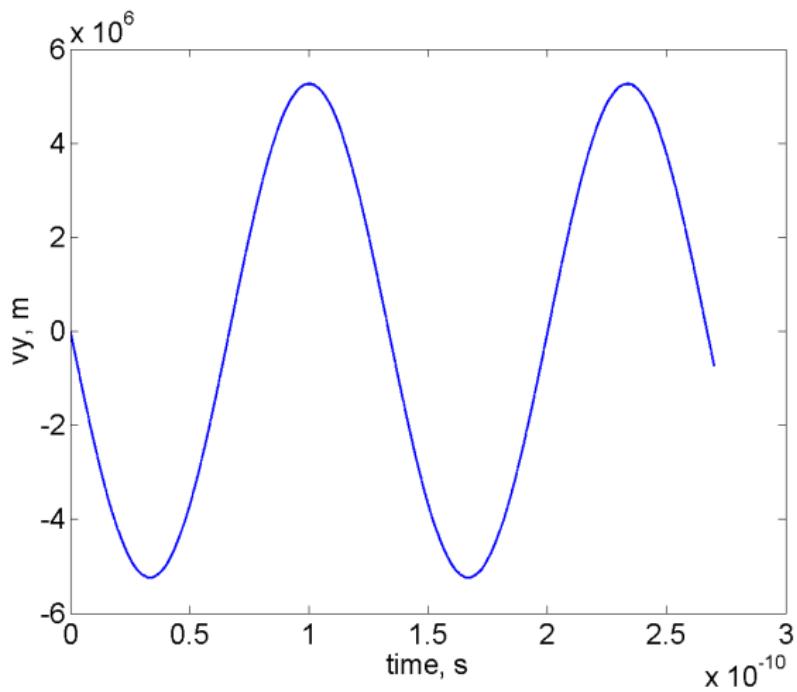
Z



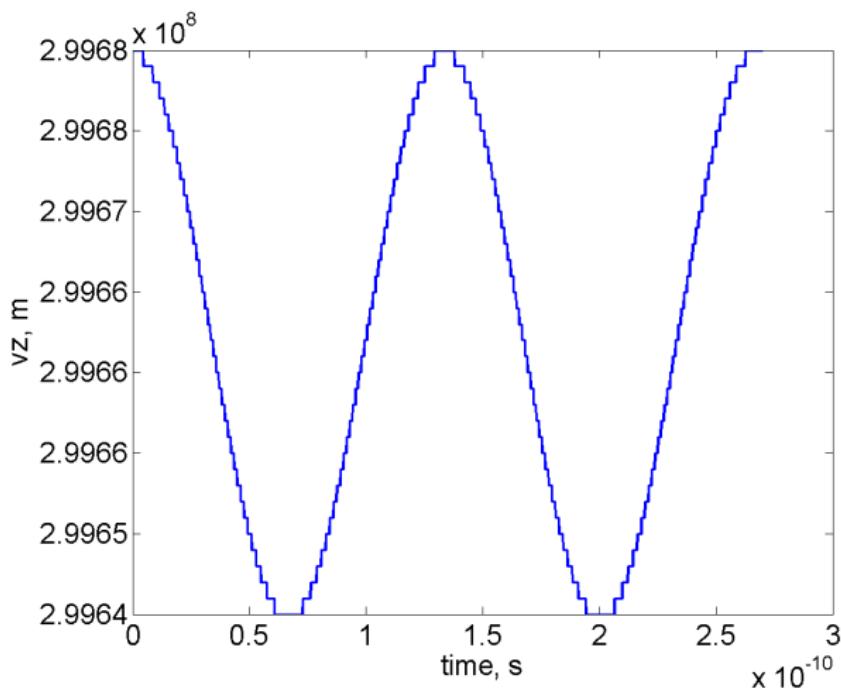
vx



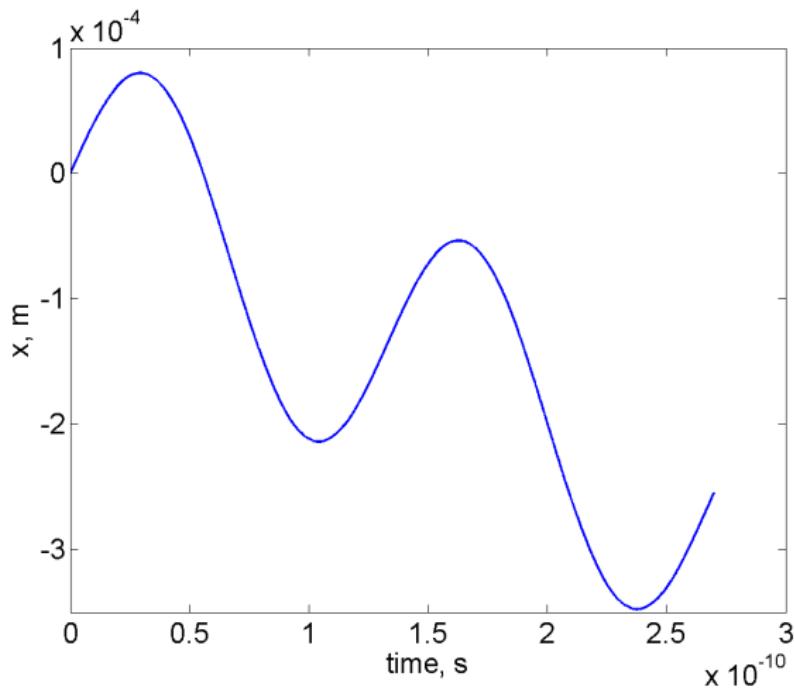
vy



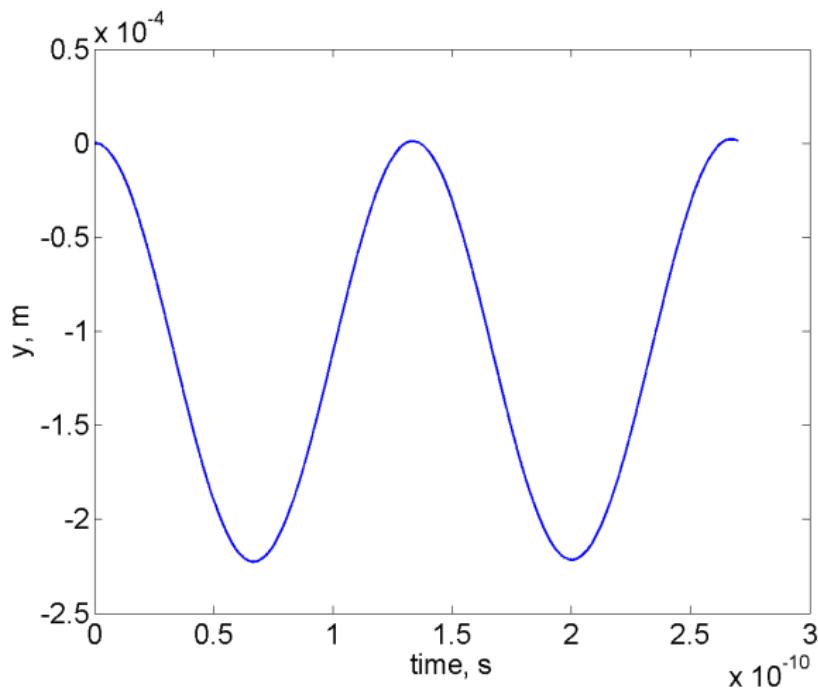
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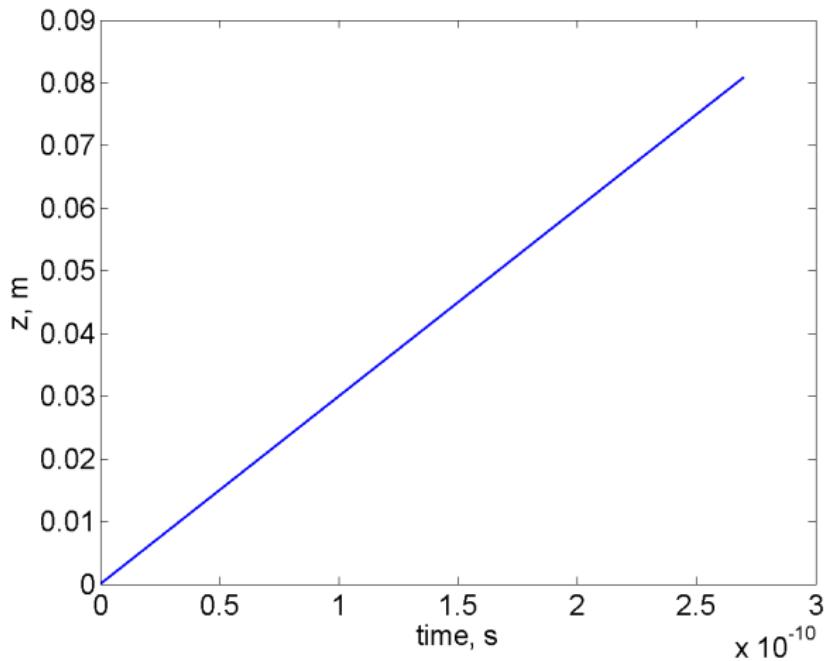
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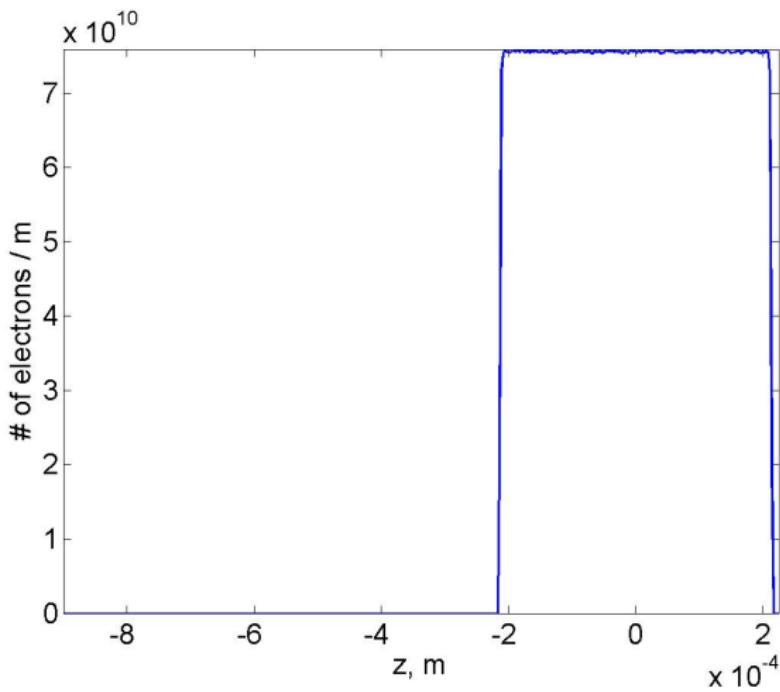
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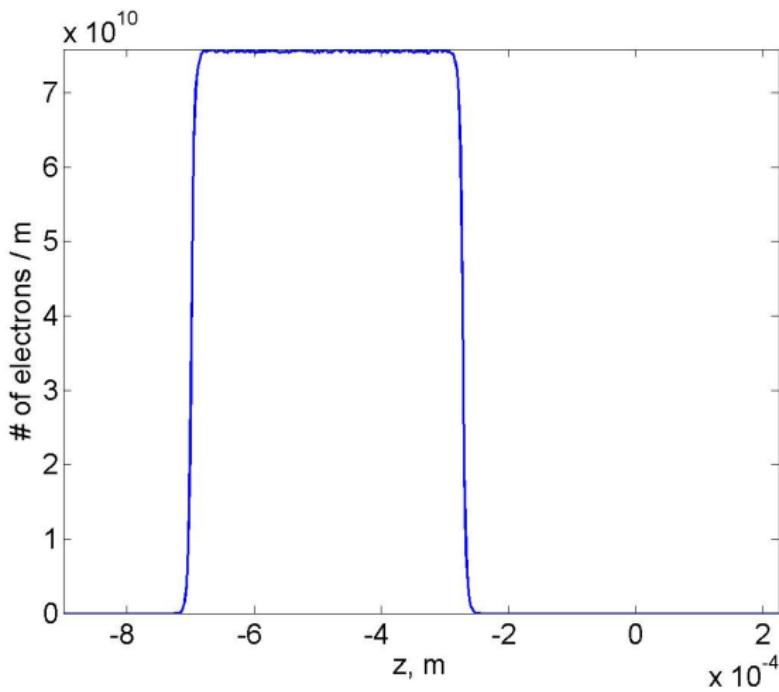
Z



longitudinal density distribution



longitudinal density distribution



longitudinal density distribution

