MC results for the reference design

JB. Lagrange, V. Blackmore, C. Hunt,
J. Pasternak, C. Rogers, P. Snopok

Initial beam

- Pure muon beam, ~10 000 particles
- Position: before first plane upstream tracker (after diffuser)
- Gaussian distribution
- Normalised rms transverse emittance = 6 mm
- Transverse beta (symmetric xy) = 339 mm
- Transverse alpha = 0

Outline

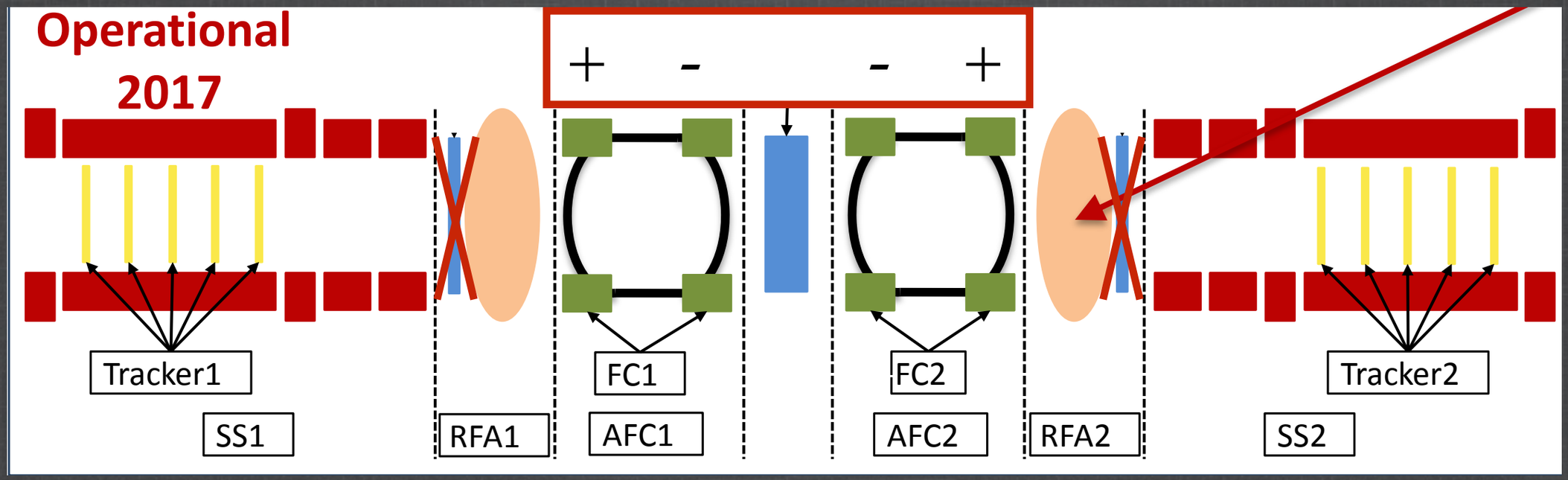
- + - - + lattice (primary absorber only)
- + + - - lattice (primary absorber only)
- + + - - lattice (with secondary absorbers)

Outline

- + - - + lattice (primary absorber only)
- + + - - lattice (primary absorber only)
- + + - - lattice (with secondary absorbers)

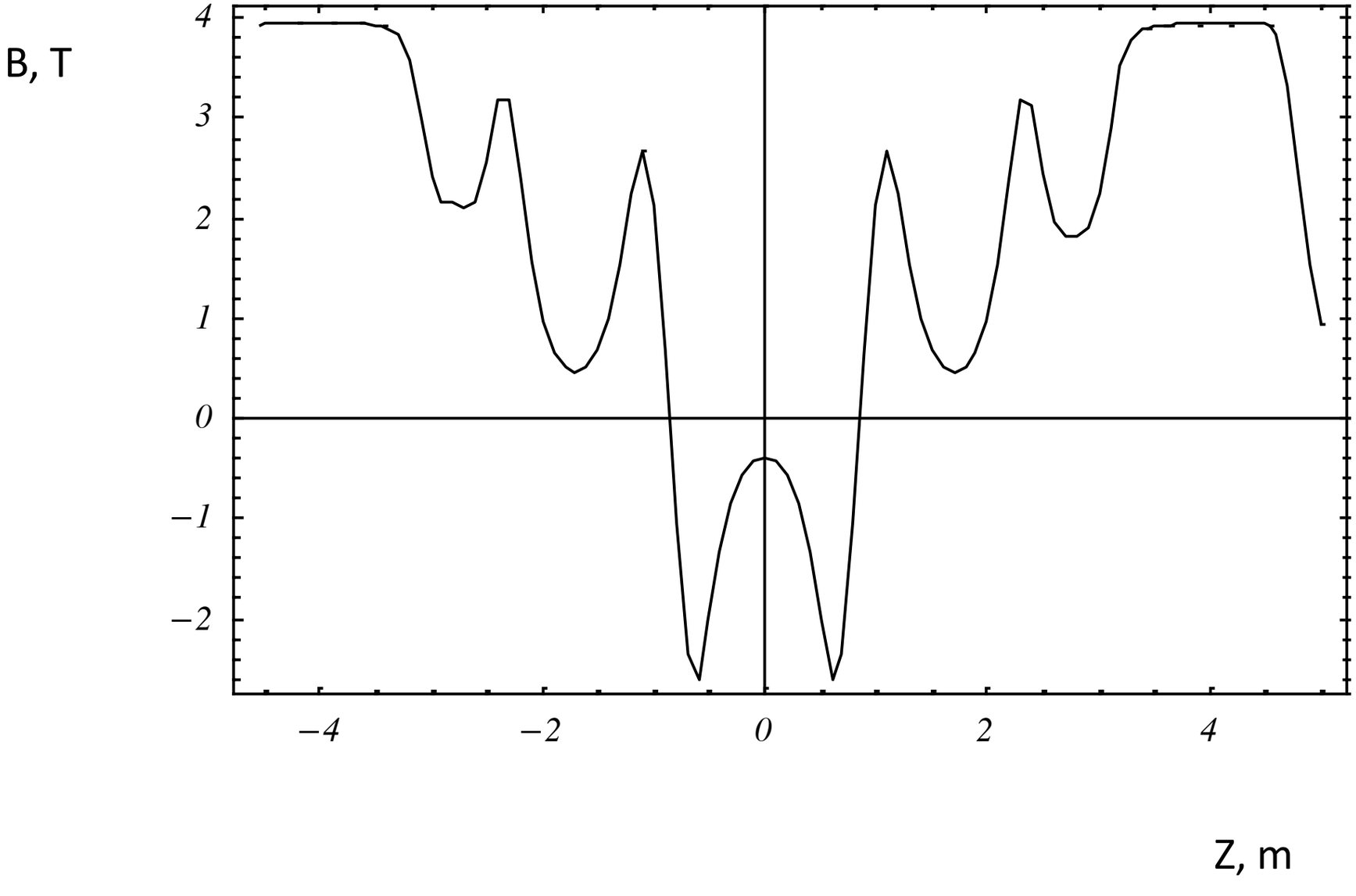
+ - - + lattice

primary absorber only
4 mm longitudinal emittance



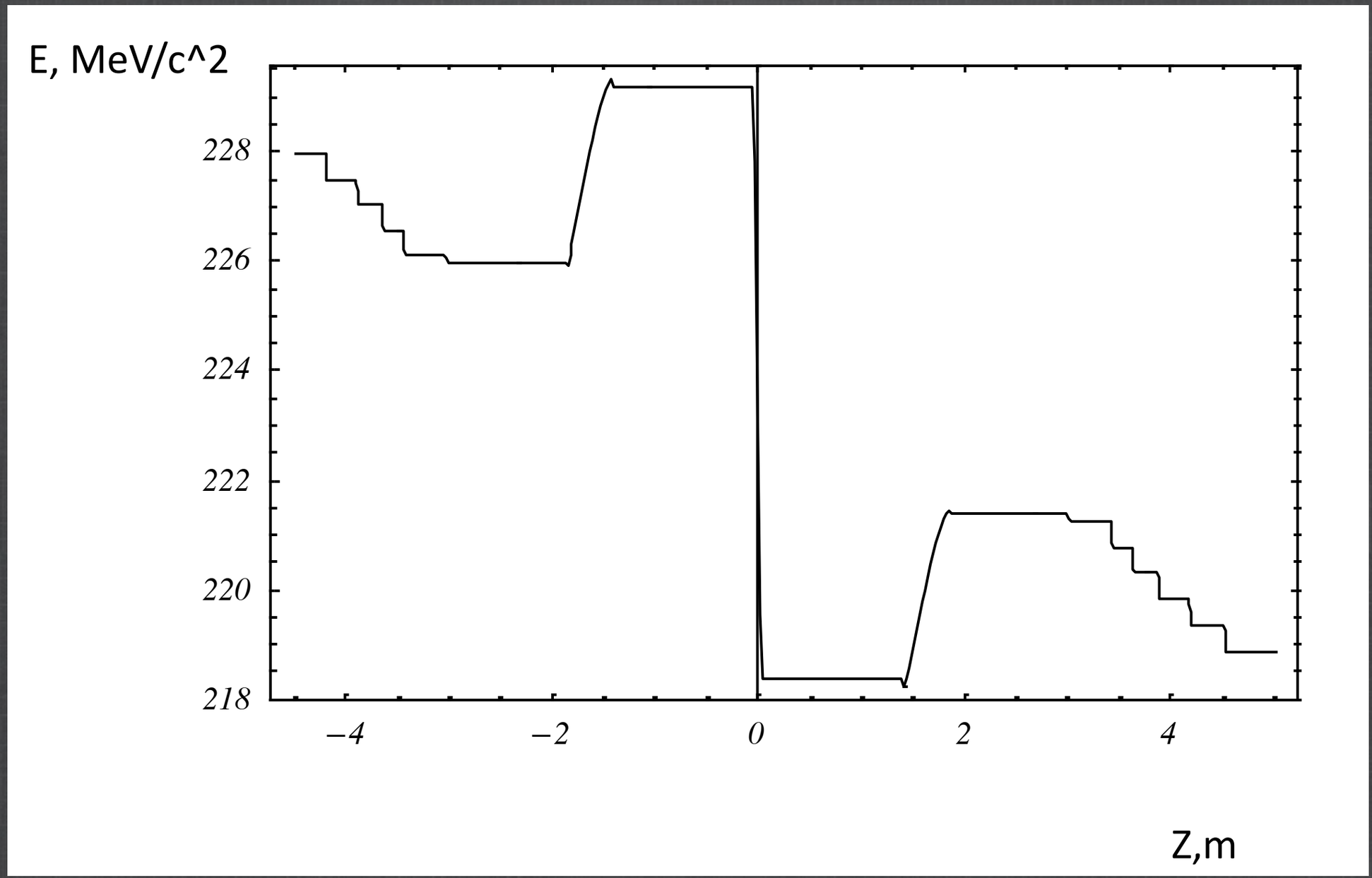
+ - - + lattice

Magnetic field



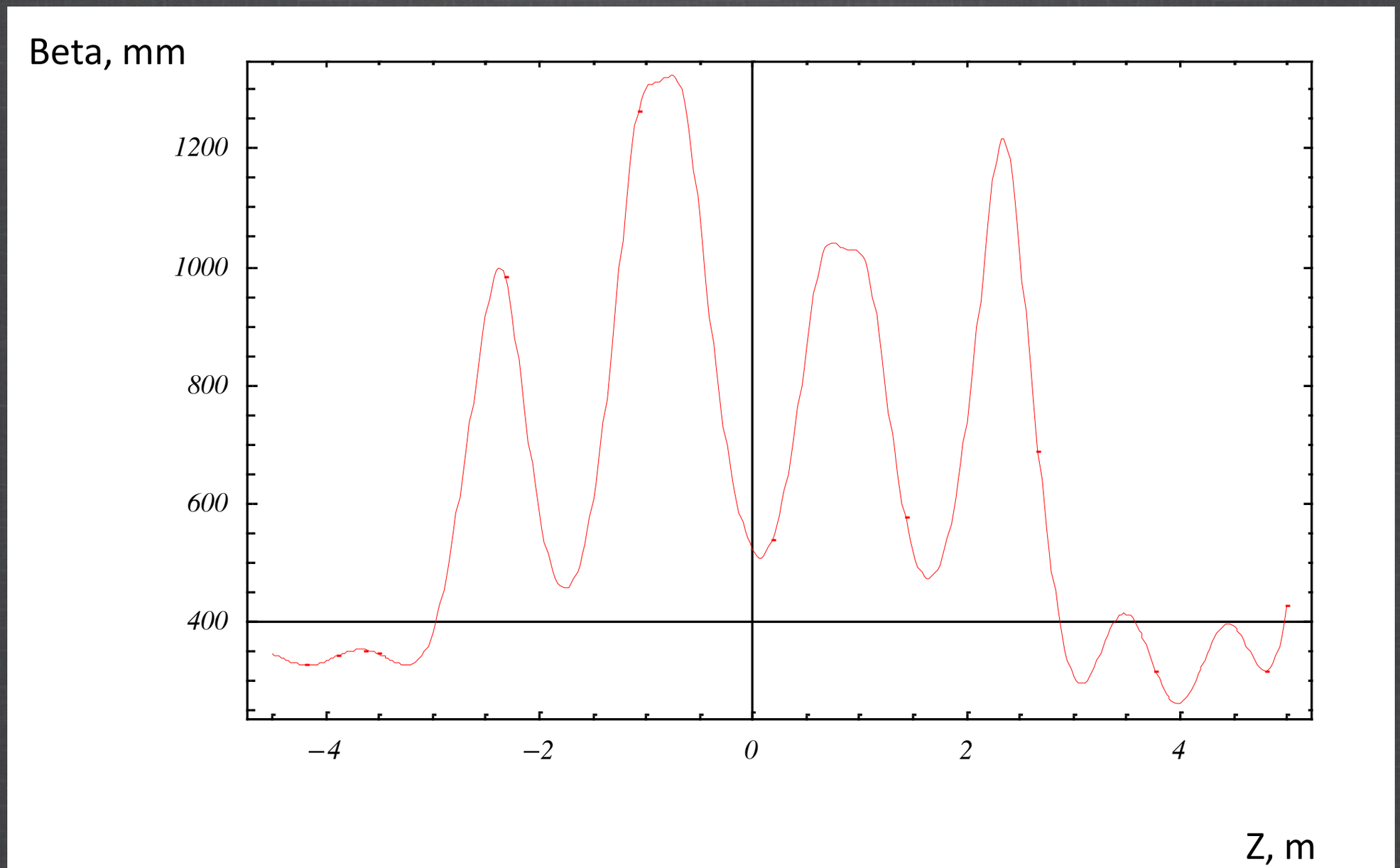
+ - - + lattice

Energy



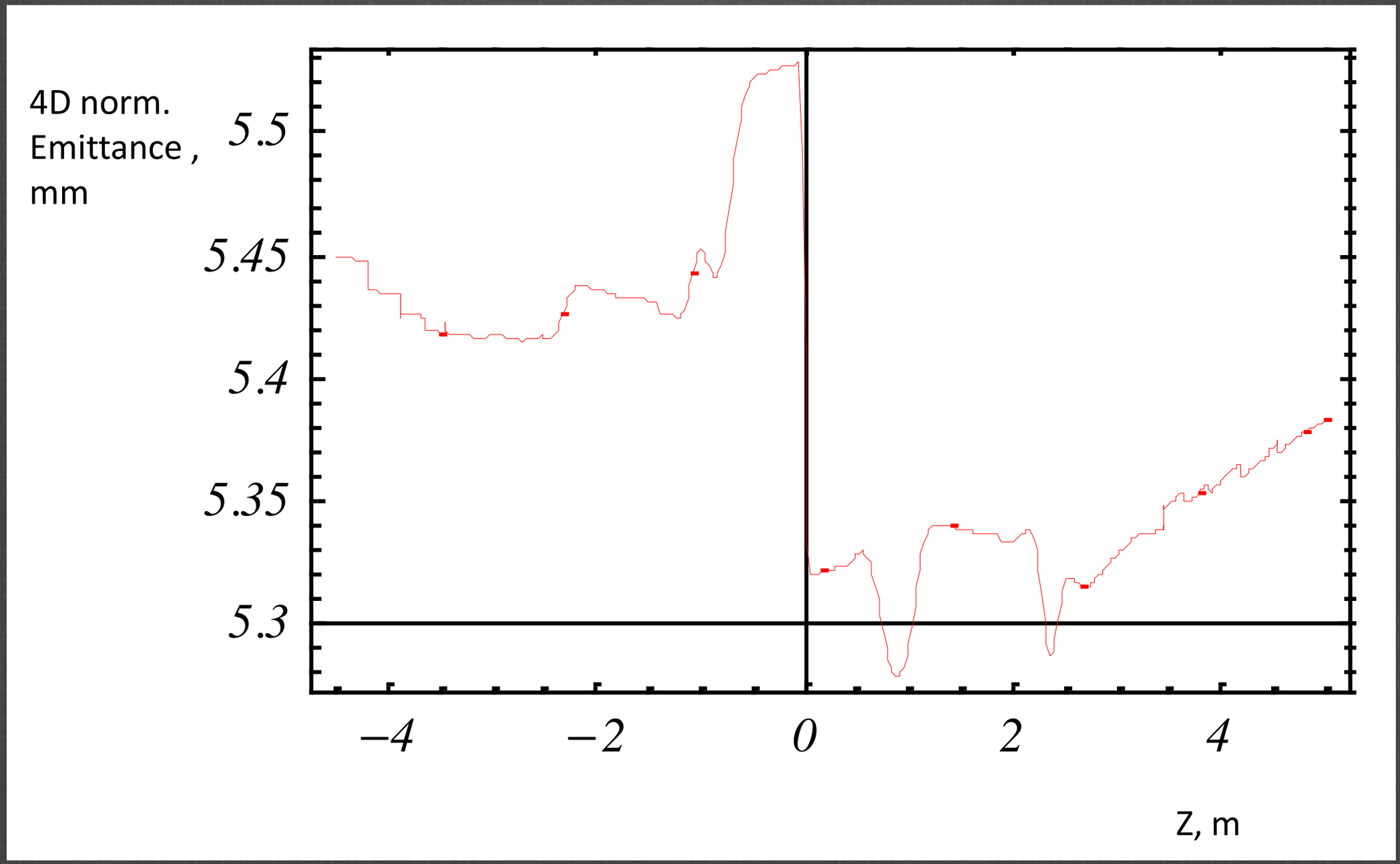
+ - - + lattice

Transverse beta



+ - - + lattice

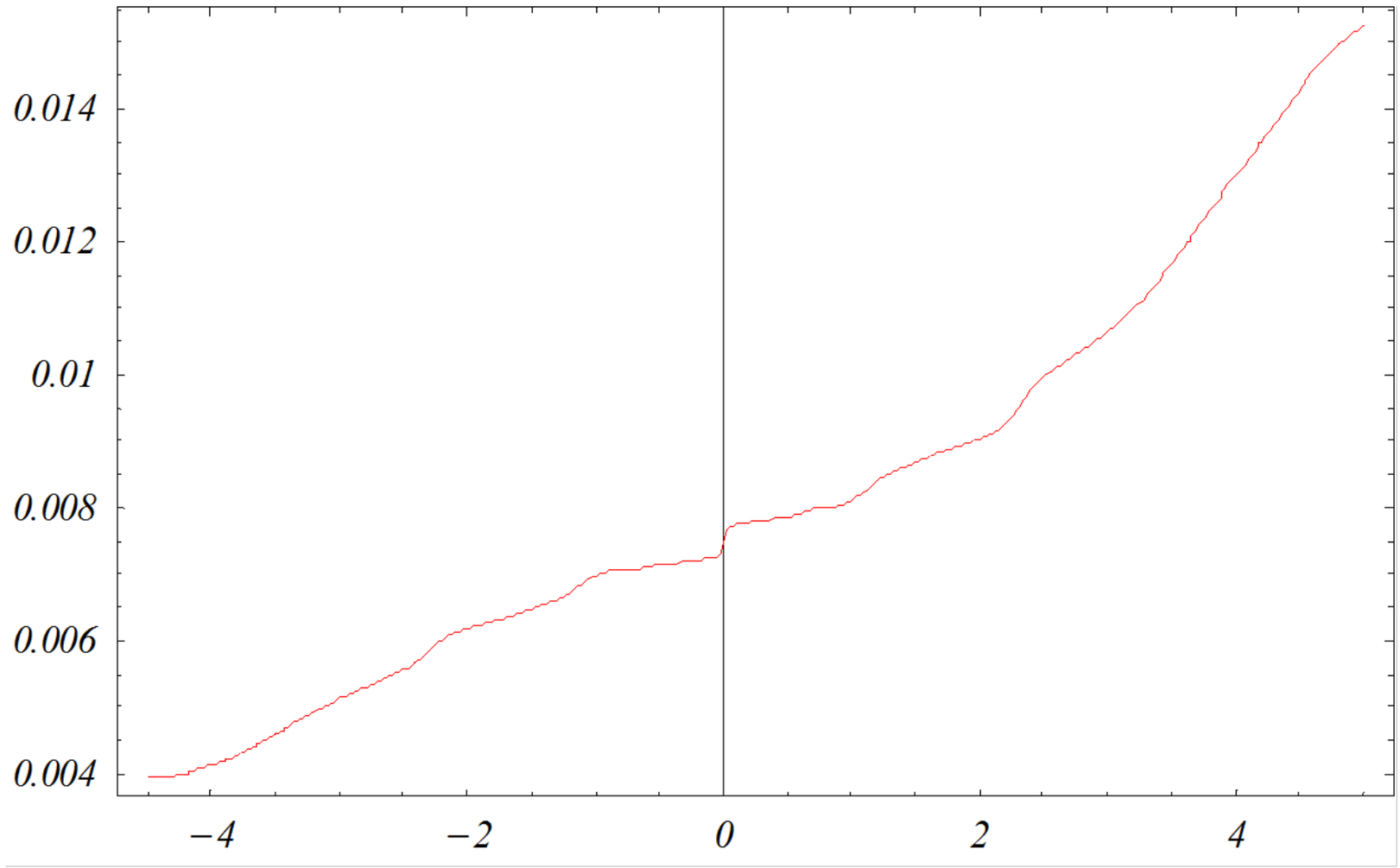
4D emittance



+ - - + lattice

longitudinal emittance

Long. Emittance, mm



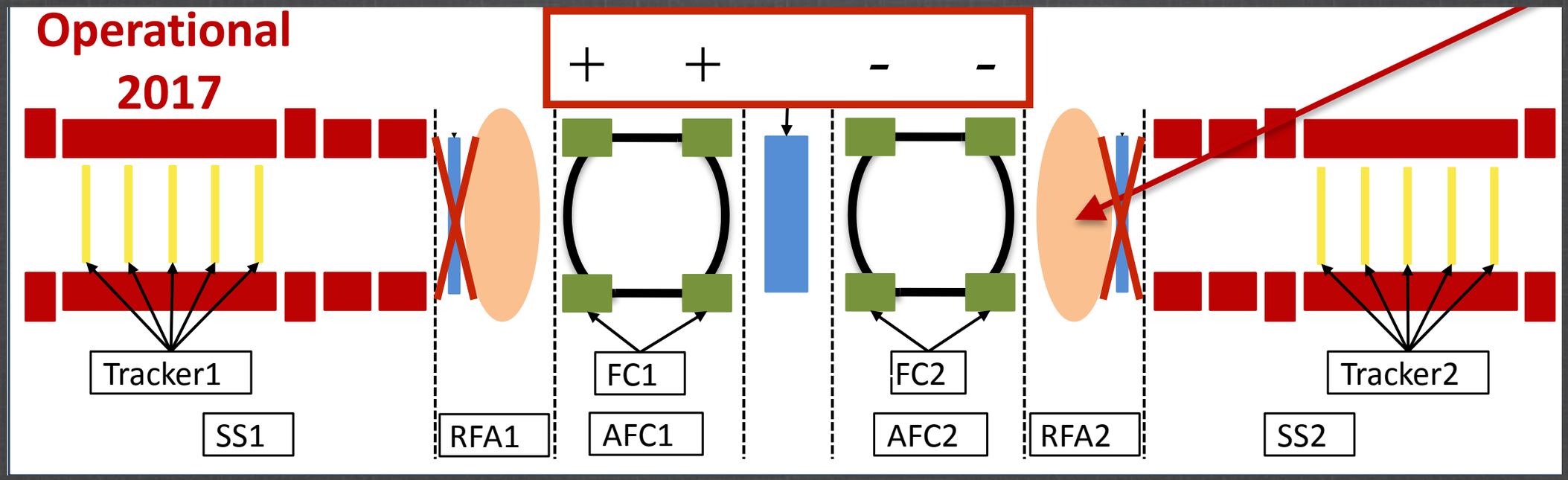
Z,m

Outline

- + - - + lattice (primary absorber only)
- + + - - lattice (primary absorber only)
- + + - - lattice (with secondary absorbers)

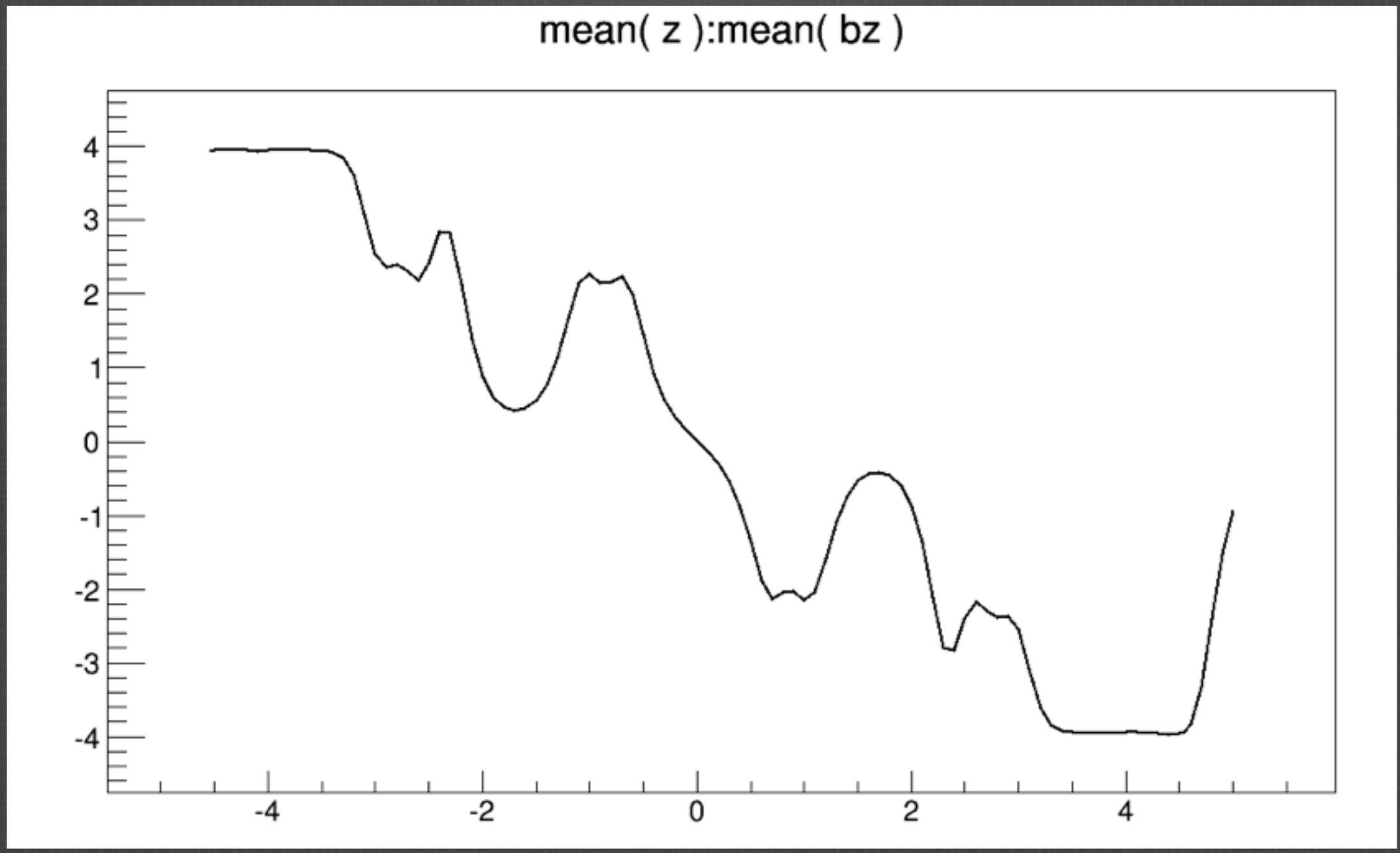
+ + - - lattice (1)

primary absorber only
4 mm longitudinal emittance



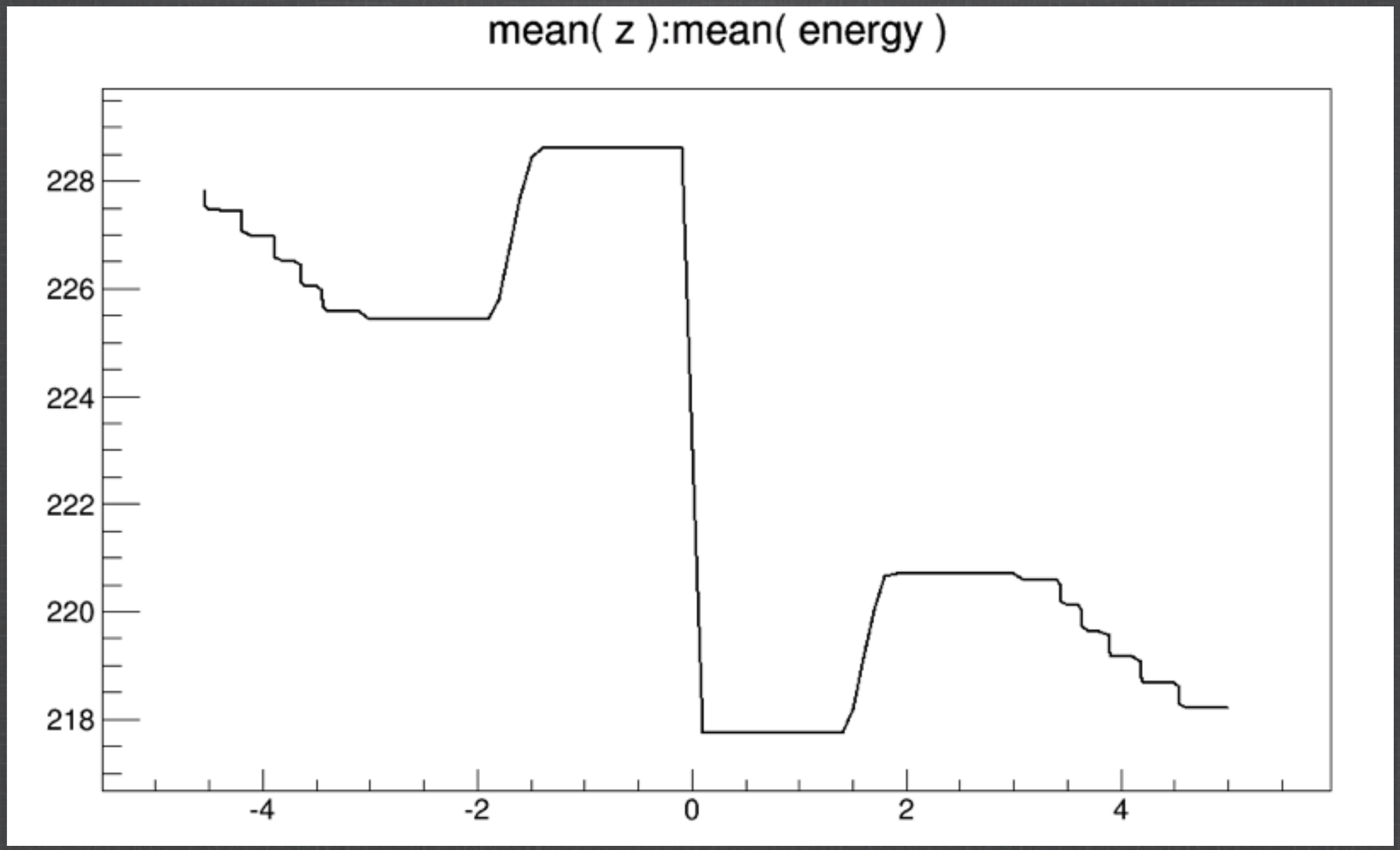
+ + - - lattice (1)

Magnetic field



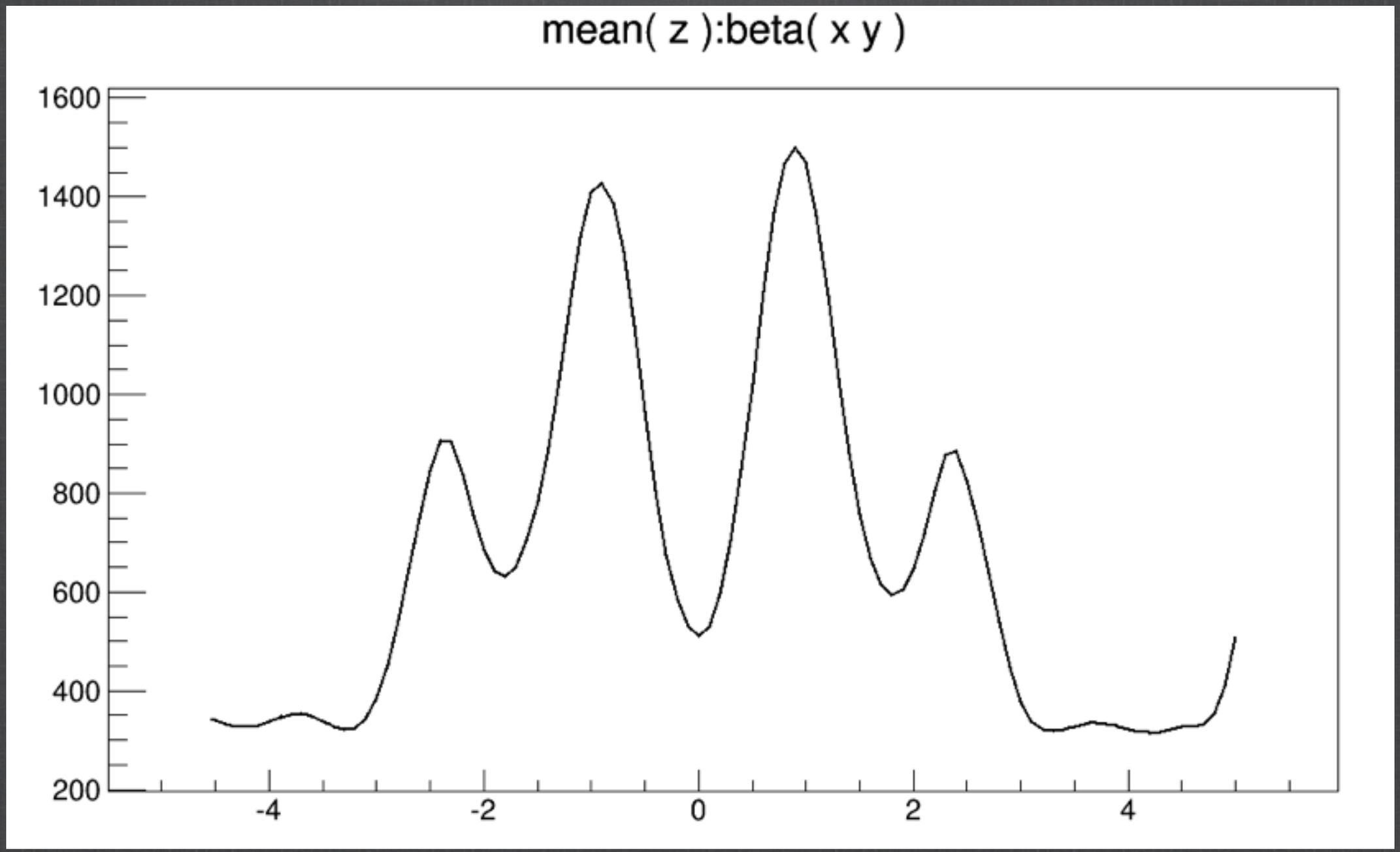
+ + - - lattice (1)

Energy



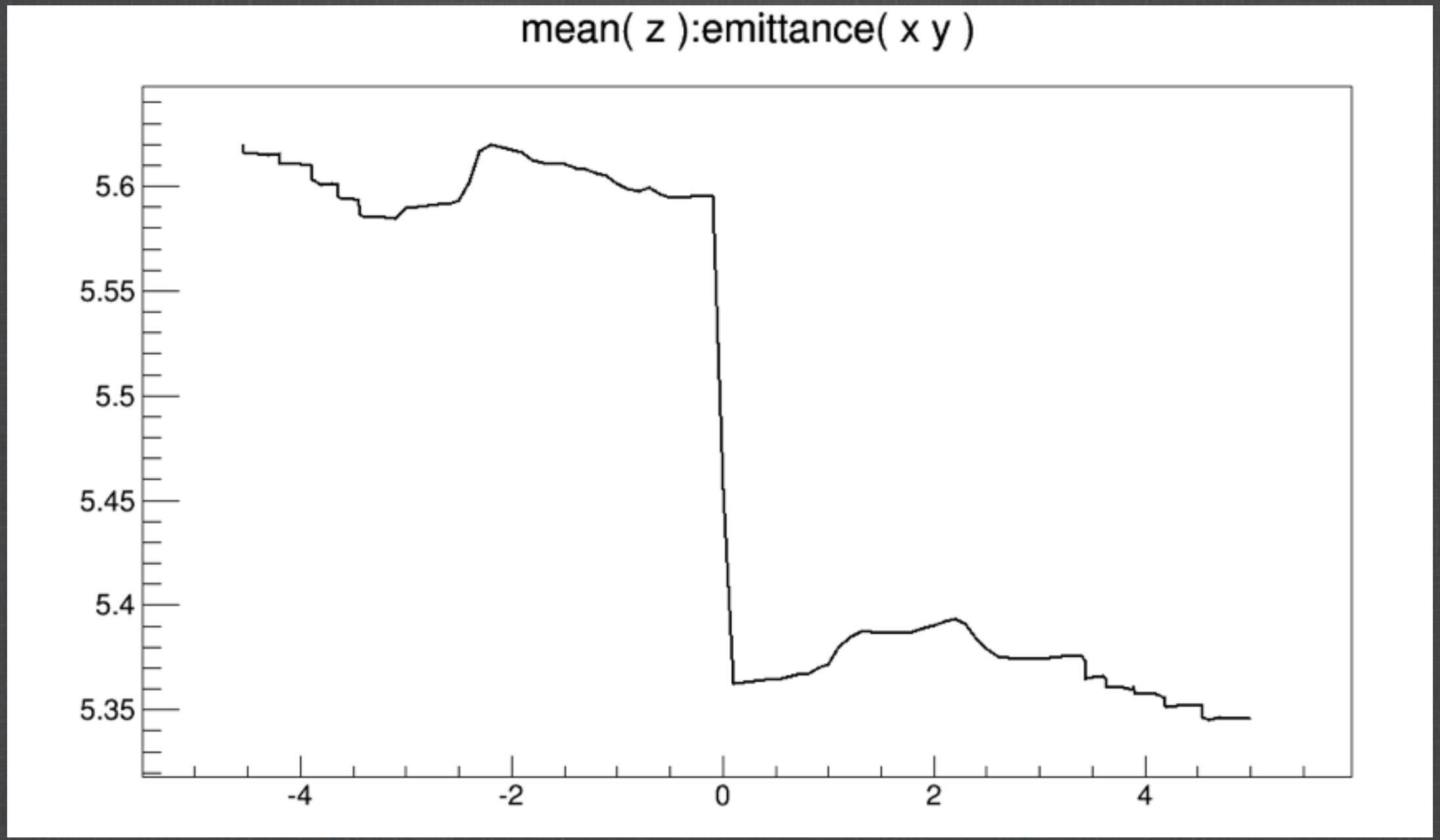
+ + - - lattice (1)

Transverse beta



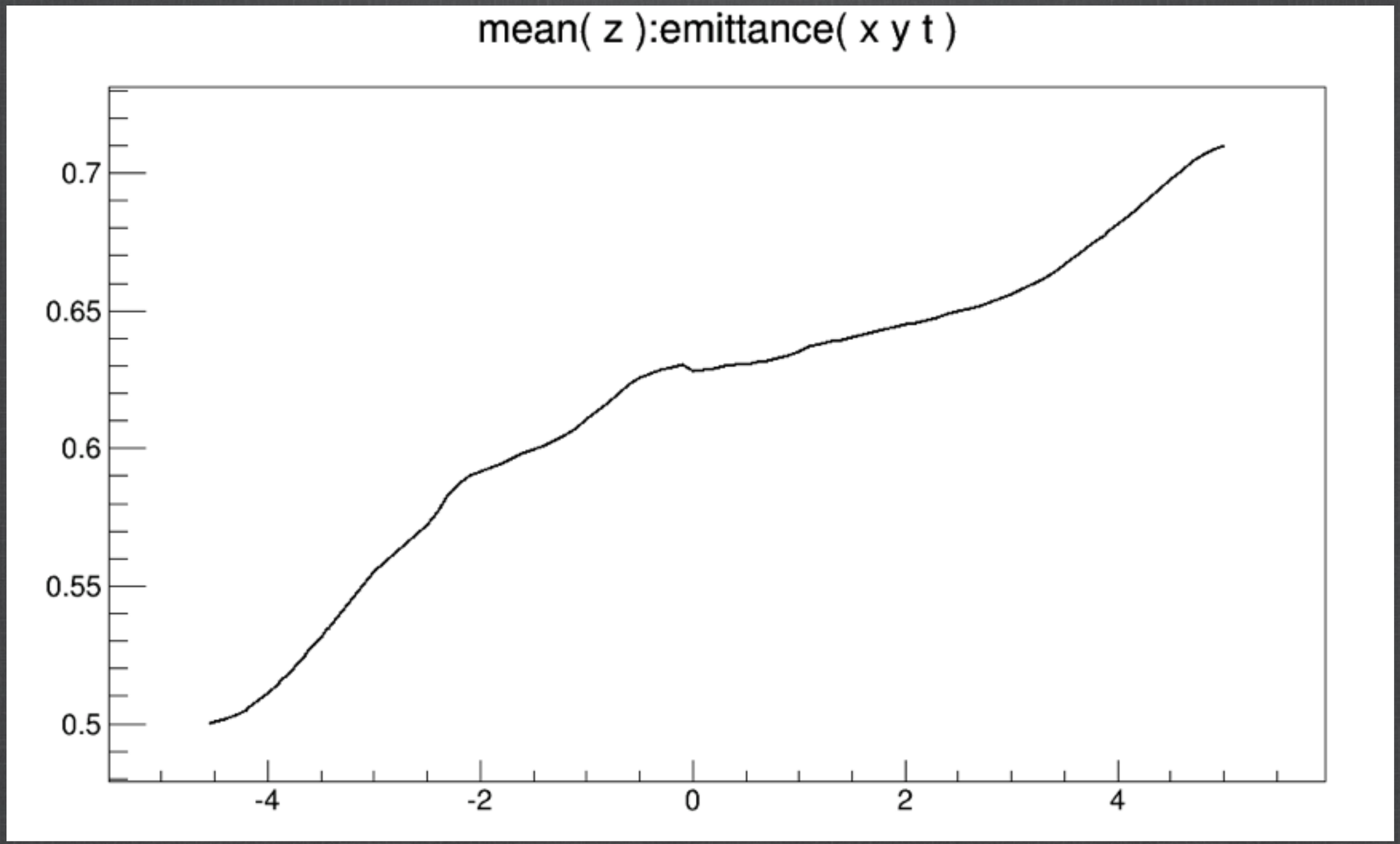
+ + - - lattice (1)

4D emittance



+ + - - lattice (1)

6D emittance

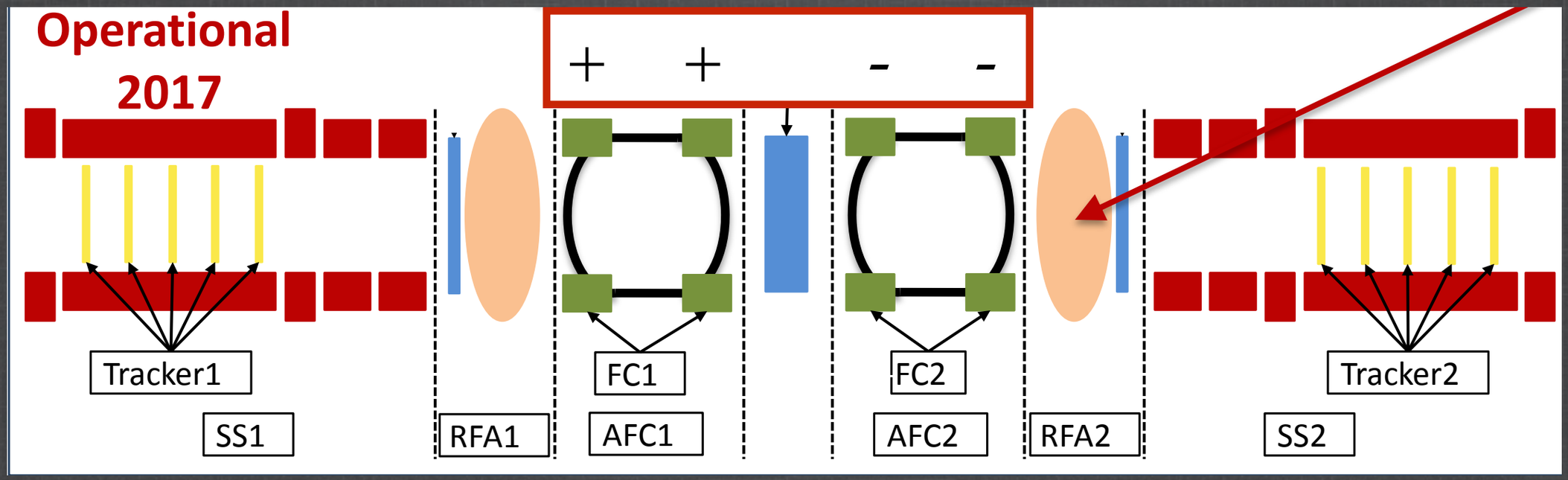


Outline

- + - - + lattice (primary absorber only)
- + + - - lattice (primary absorber only)
- + + - - lattice (with secondary absorbers)

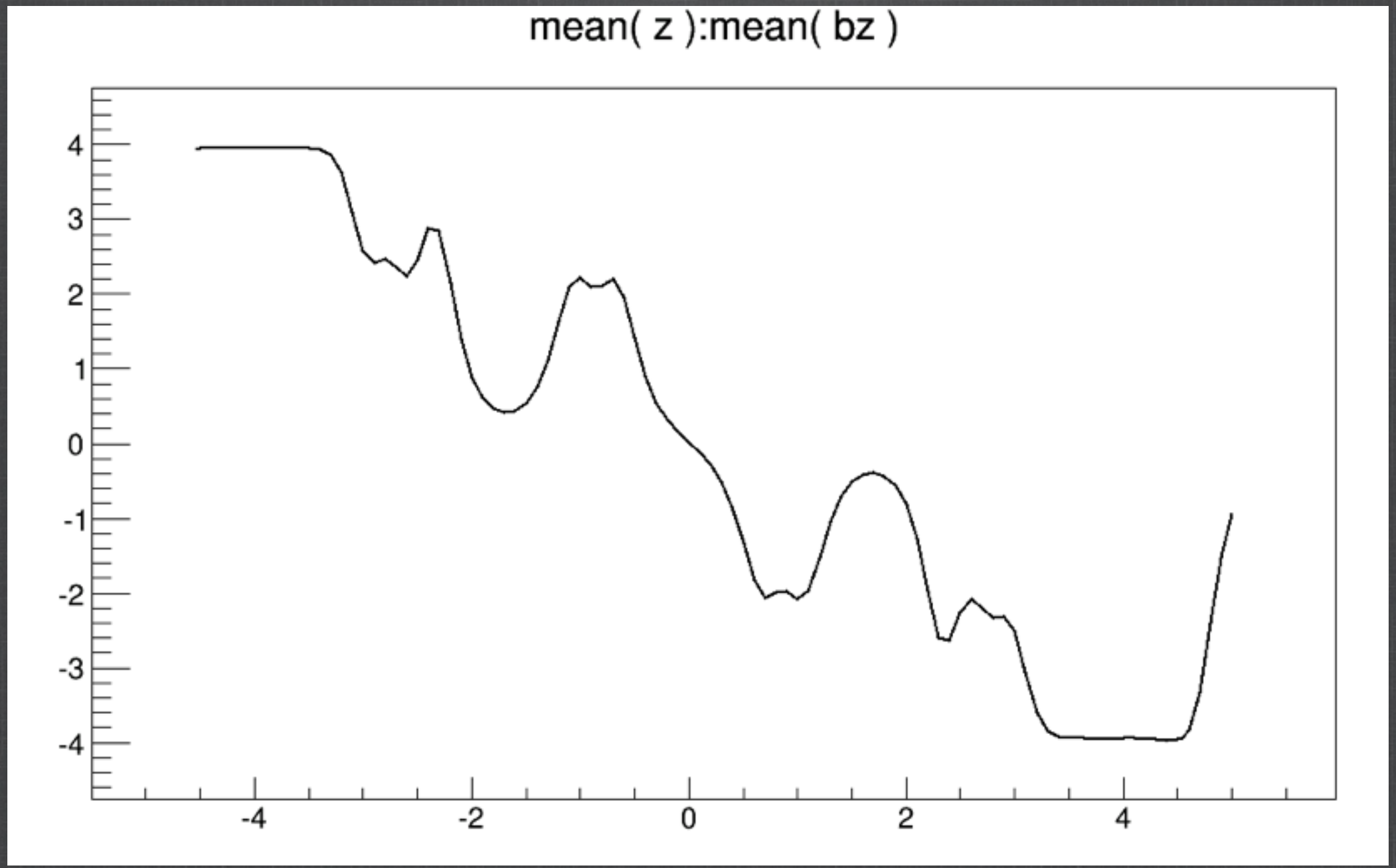
+ + - - lattice (2)

with secondary absorbers
4 mm longitudinal emittance



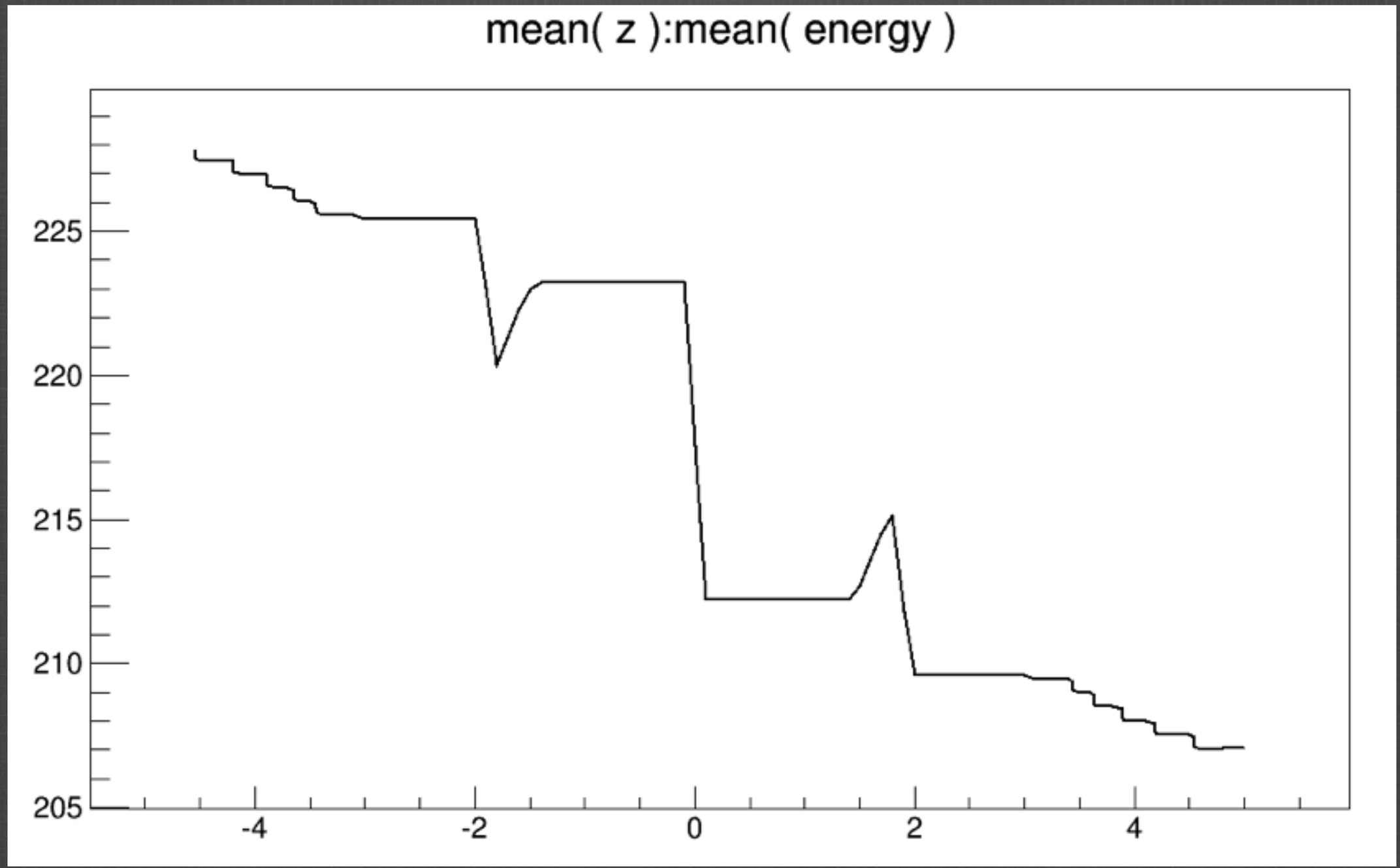
+ + - - lattice (2)

Magnetic field



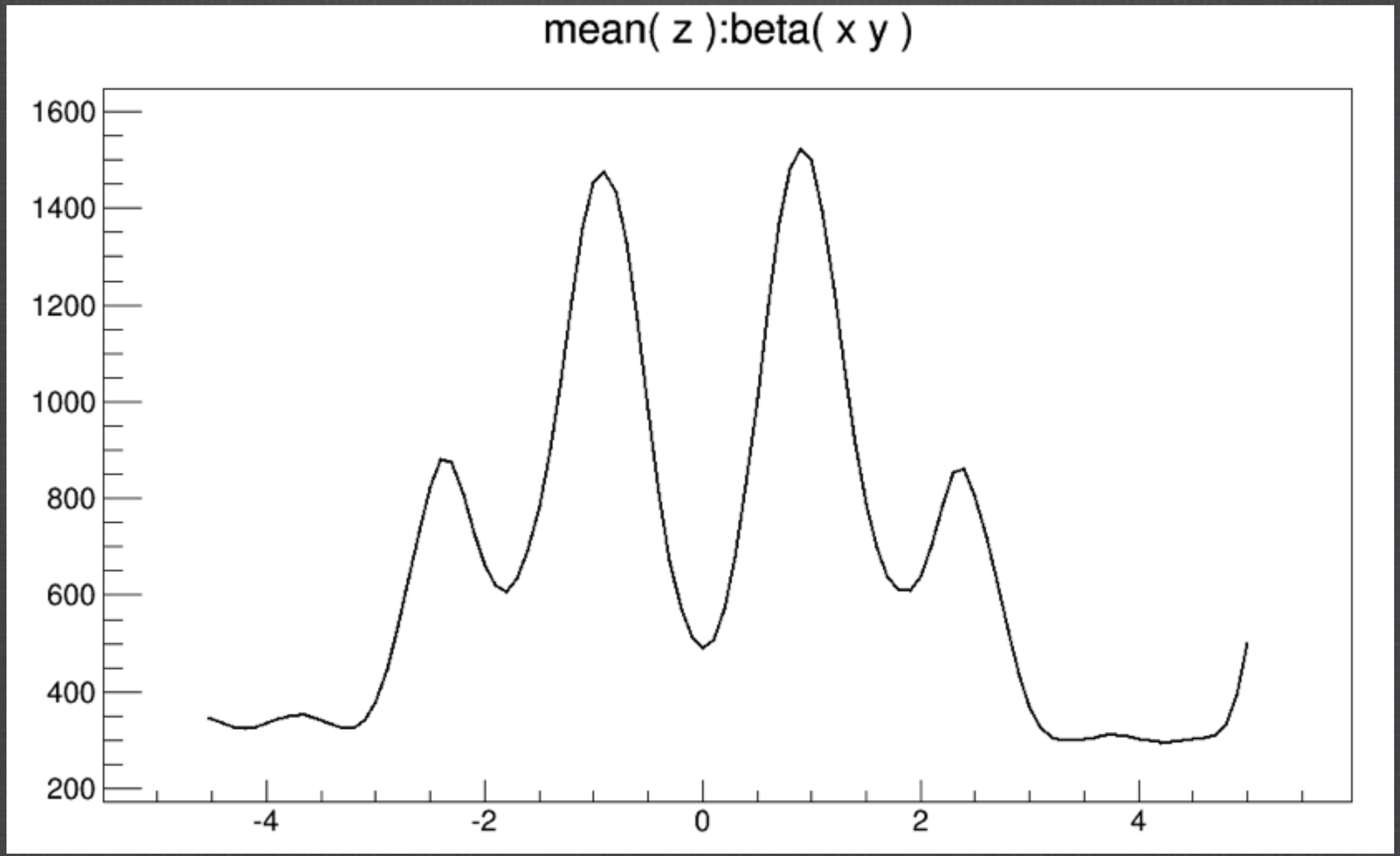
+ + - - lattice (2)

Energy



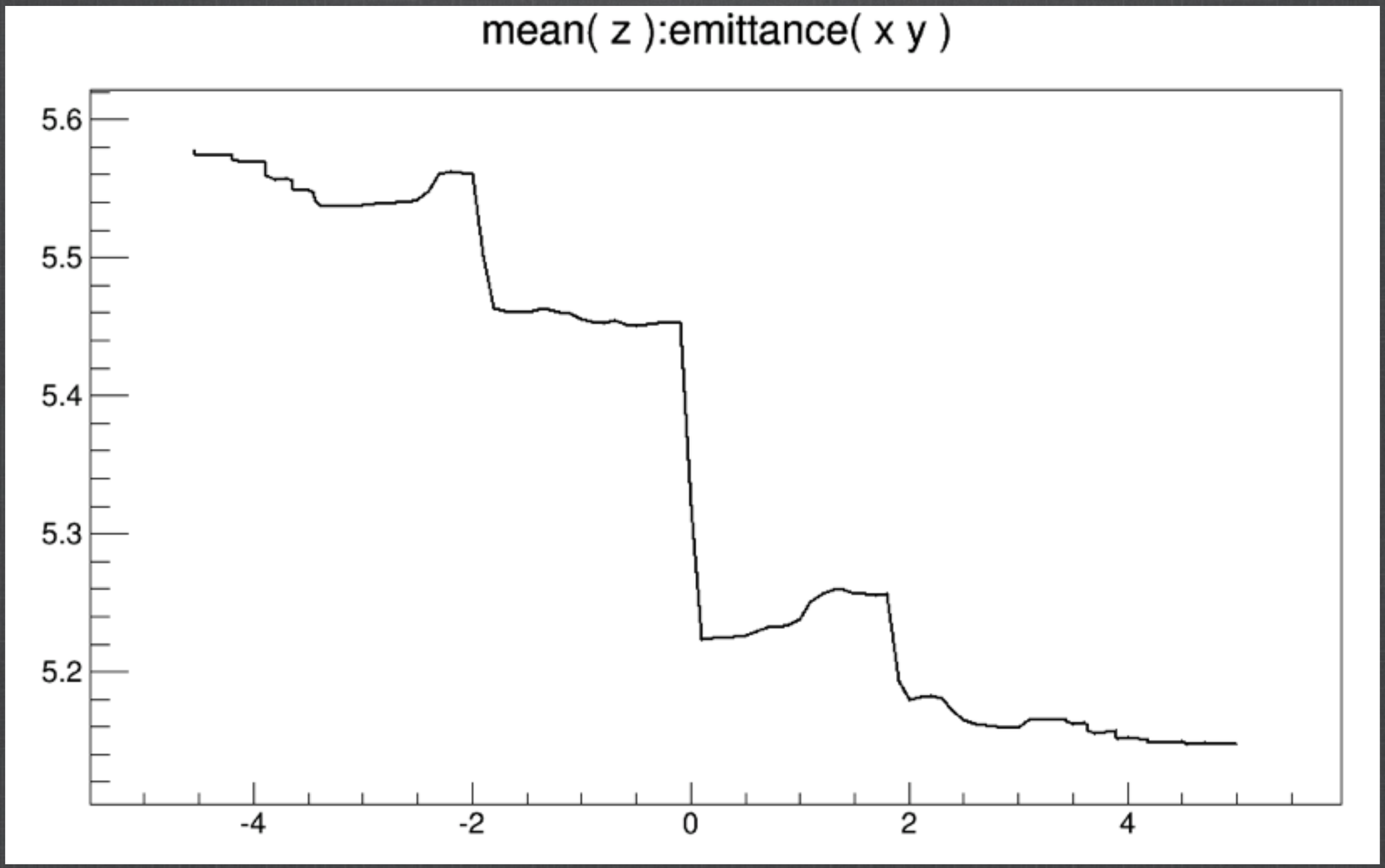
+ + - - lattice (2)

Transverse beta



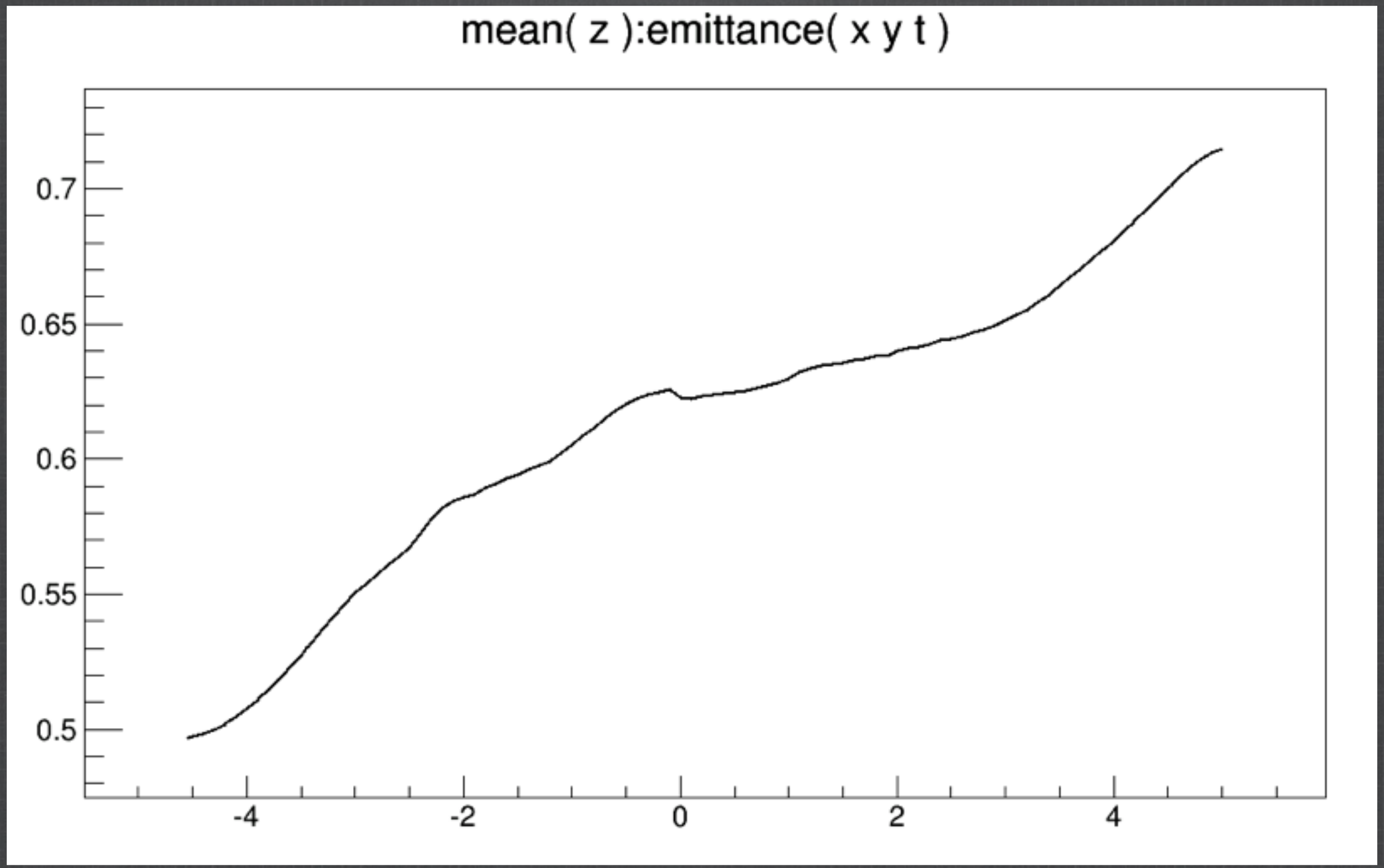
+ + - - lattice (2)

4D emittance



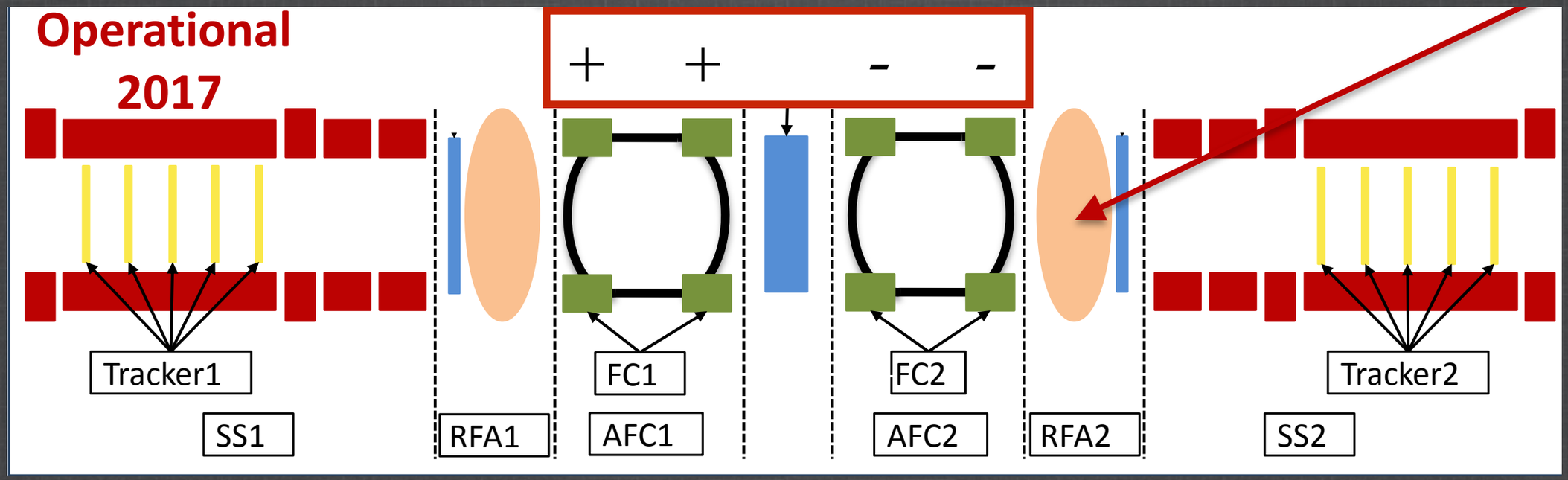
+ + - - lattice (2)

6D emittance



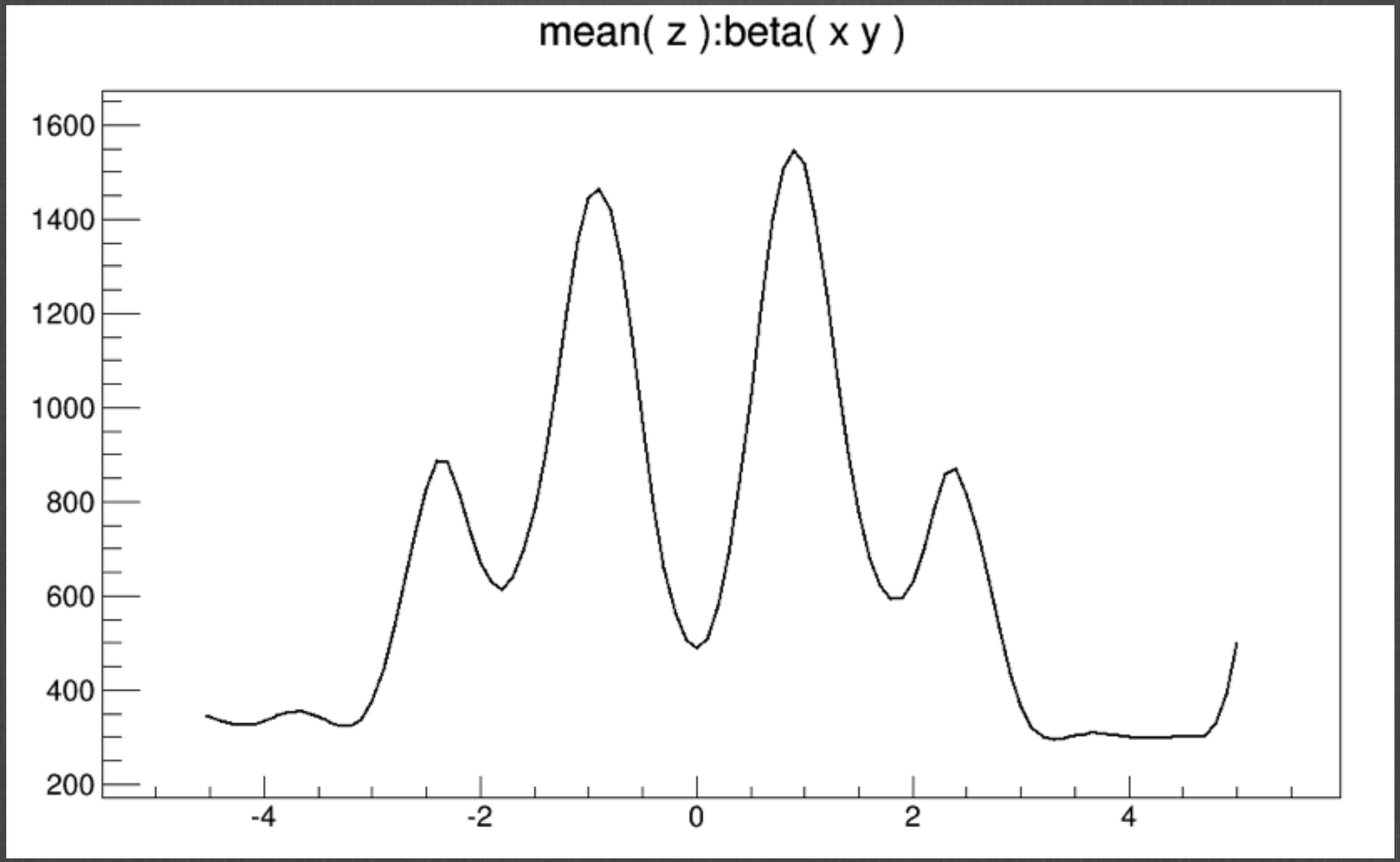
+ + - - lattice (3)

with secondary absorbers
20 mm longitudinal emittance



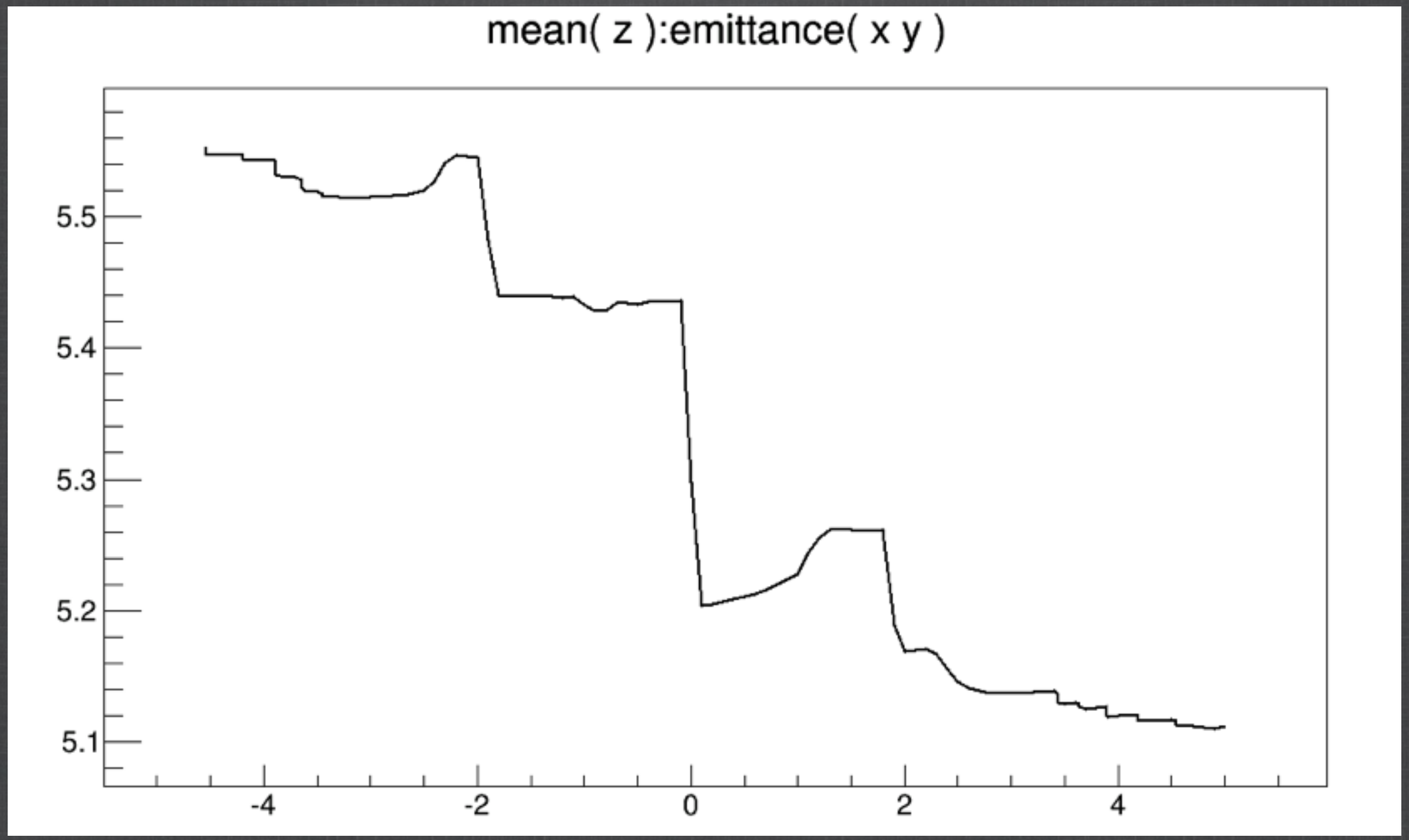
+ + - - lattice (3)

Transverse beta



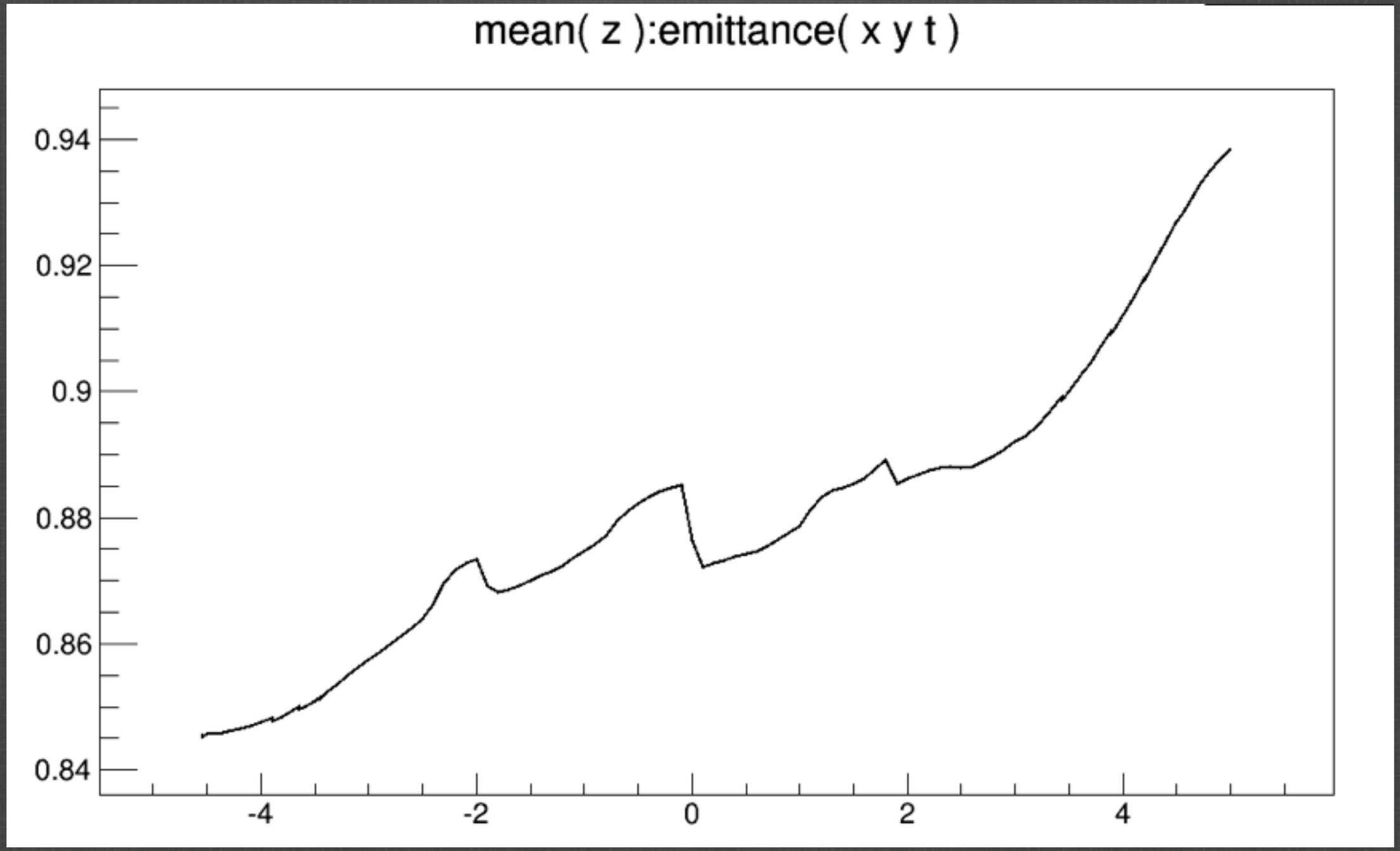
+ + - - lattice (3)

4D emittance



+ + - - lattice (3)

6D emittance



Summary

- + - - + lattice very interesting to study, but dominated by non linear effects, so difficult to optimise.
- + + - - lattice promising in terms of results - currently our reference lattice
  - ~4% 4D cooling with primary absorber only,
  - ~7% 4D cooling with secondary absorbers.
- Longitudinal emittance matched to reduce 6D heating -> systematic study to have overall 6D cooling.

Thank you for your attention