LWFA with External Injection: 5 GeV beams

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Input laser parameters and plasma target

LASER

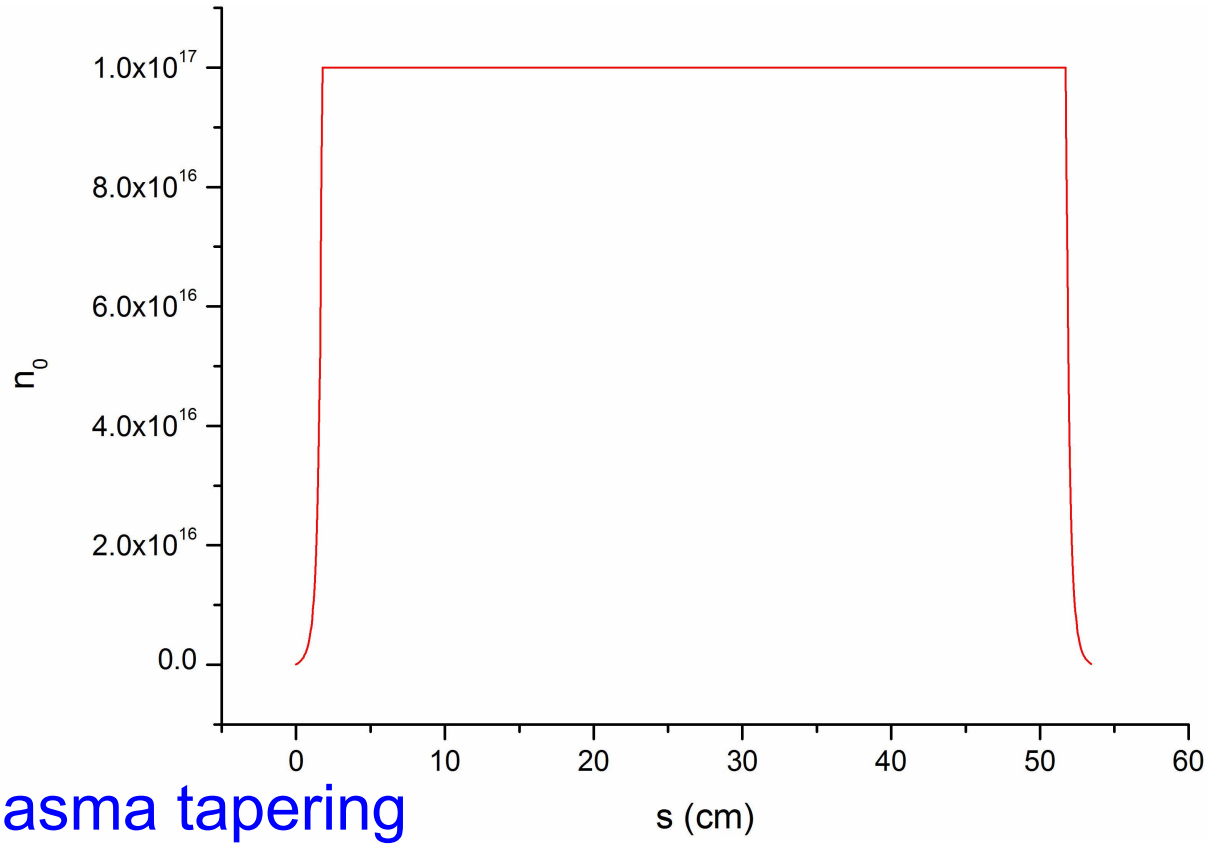
w_0 = 70 μm τ_{FWHM} = 112 fs Tr. profile: Gaussian

E = 24.5 J Long. profile: Cos^2

PLASMA

Input/Output ramps
- profile: Gaussian
- char. length: 2.5 mm

Plateau:
- $n_0 = 10^{17}$ cm^{-3}

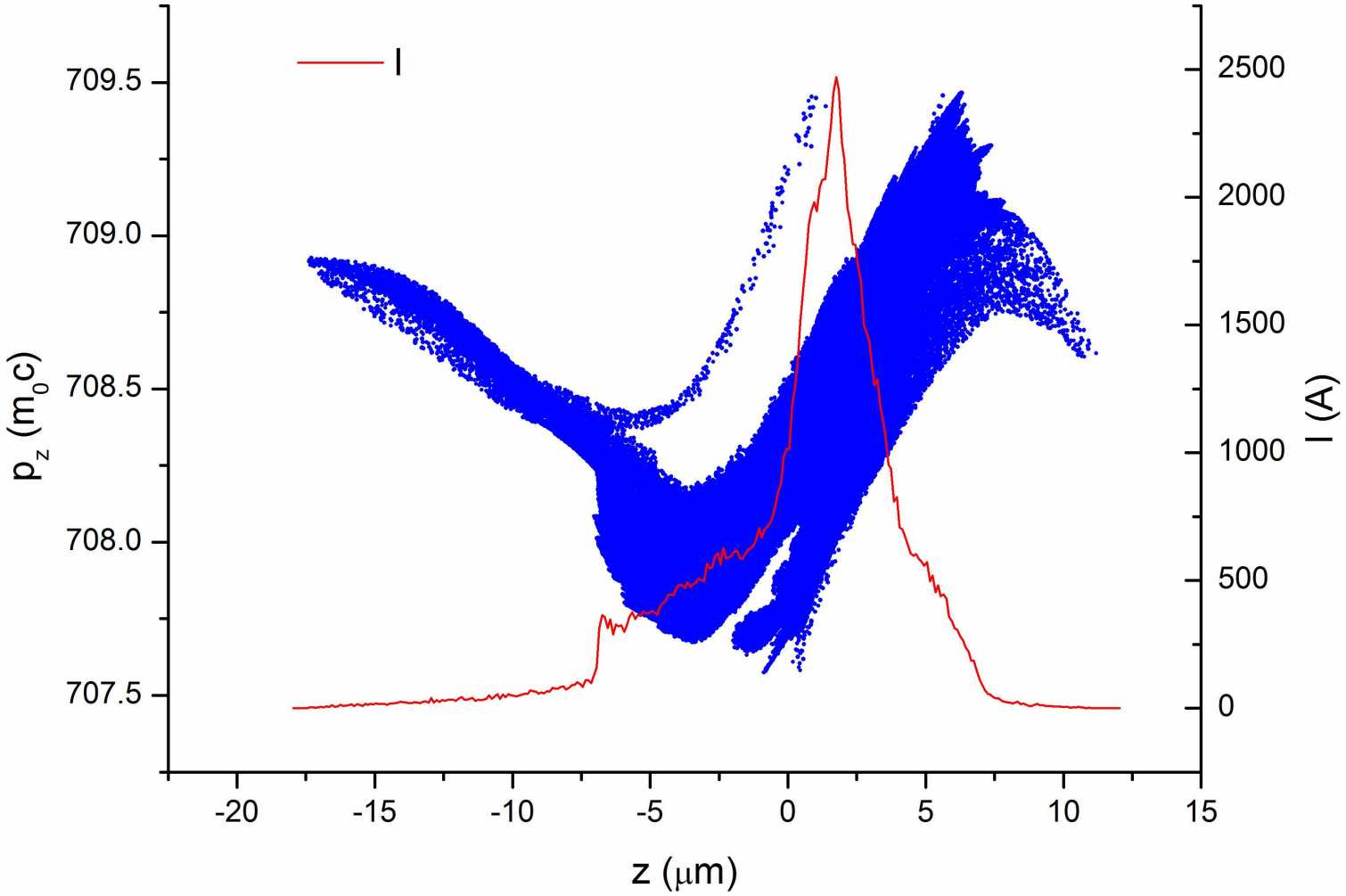


GUIDING: transverse plasma tapering

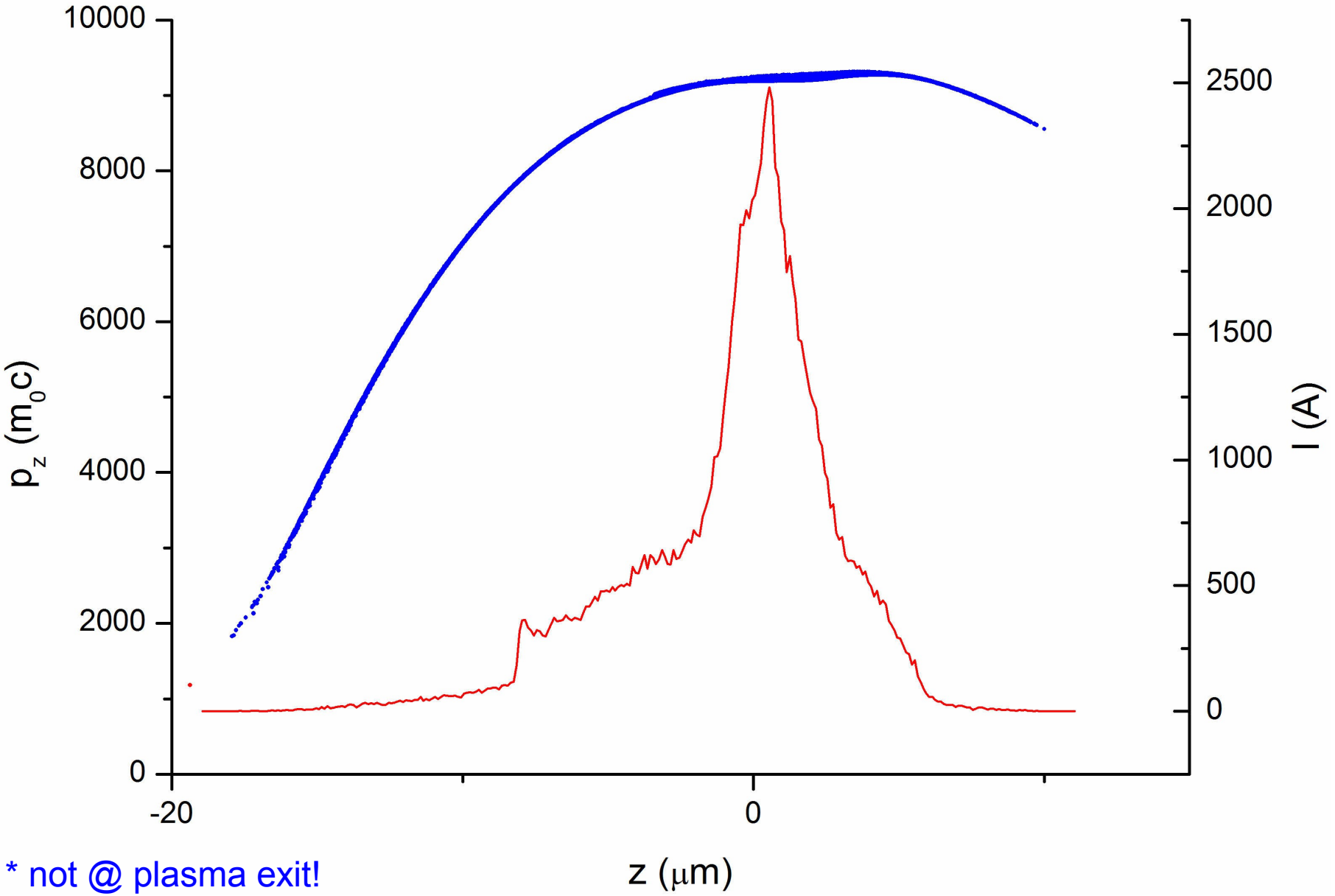
Input beam by A. Bacci

σ_{tr} = 3 μm σ_z = 12 fs E = 354 MeV N_{MP} = 200k

dE/E = 5.7 10^{-4} L_{FWHM} = 2 fs q = 40 pC ε_n = 0.46 µm

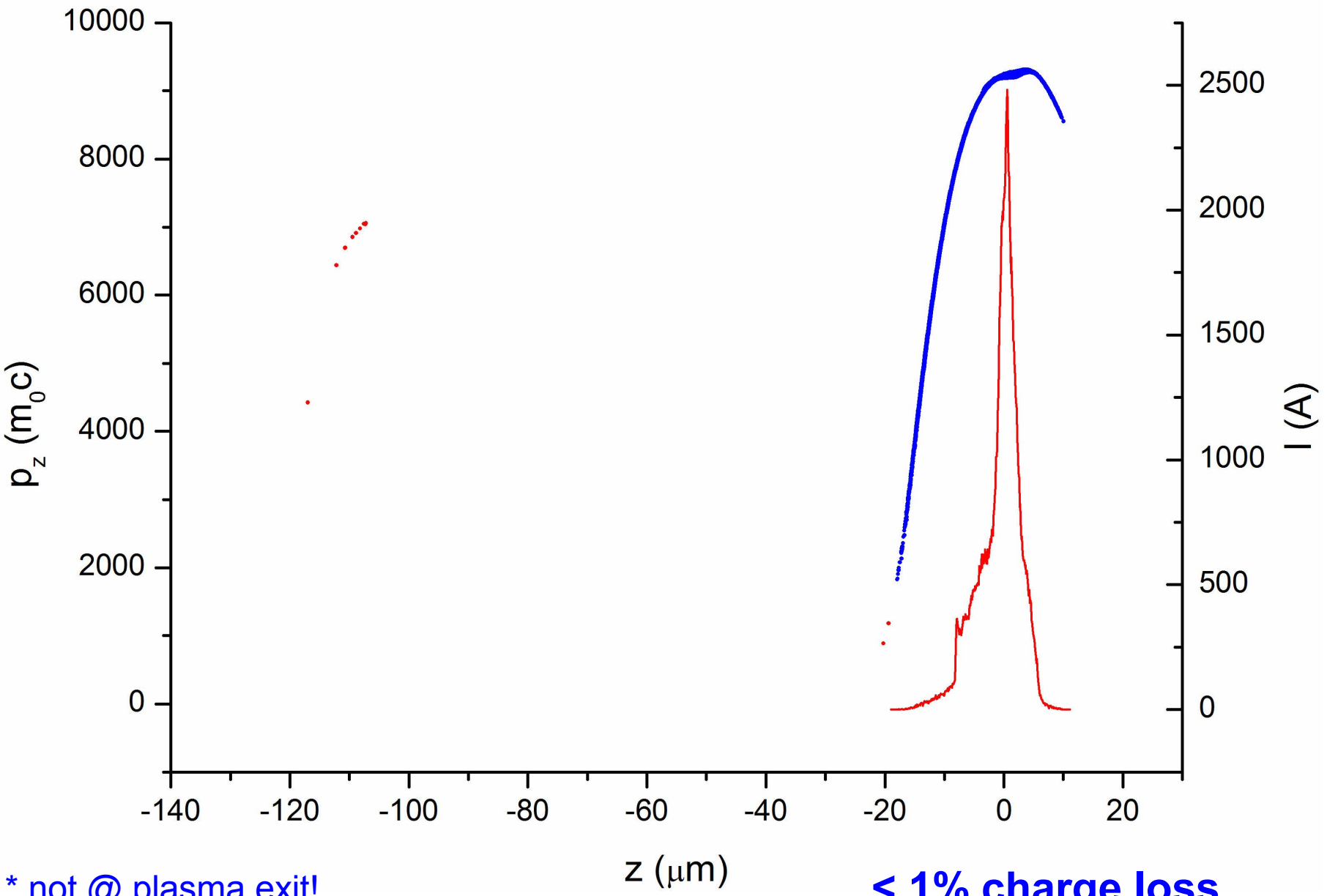


Final* beam LPS



* not @ plasma exit!

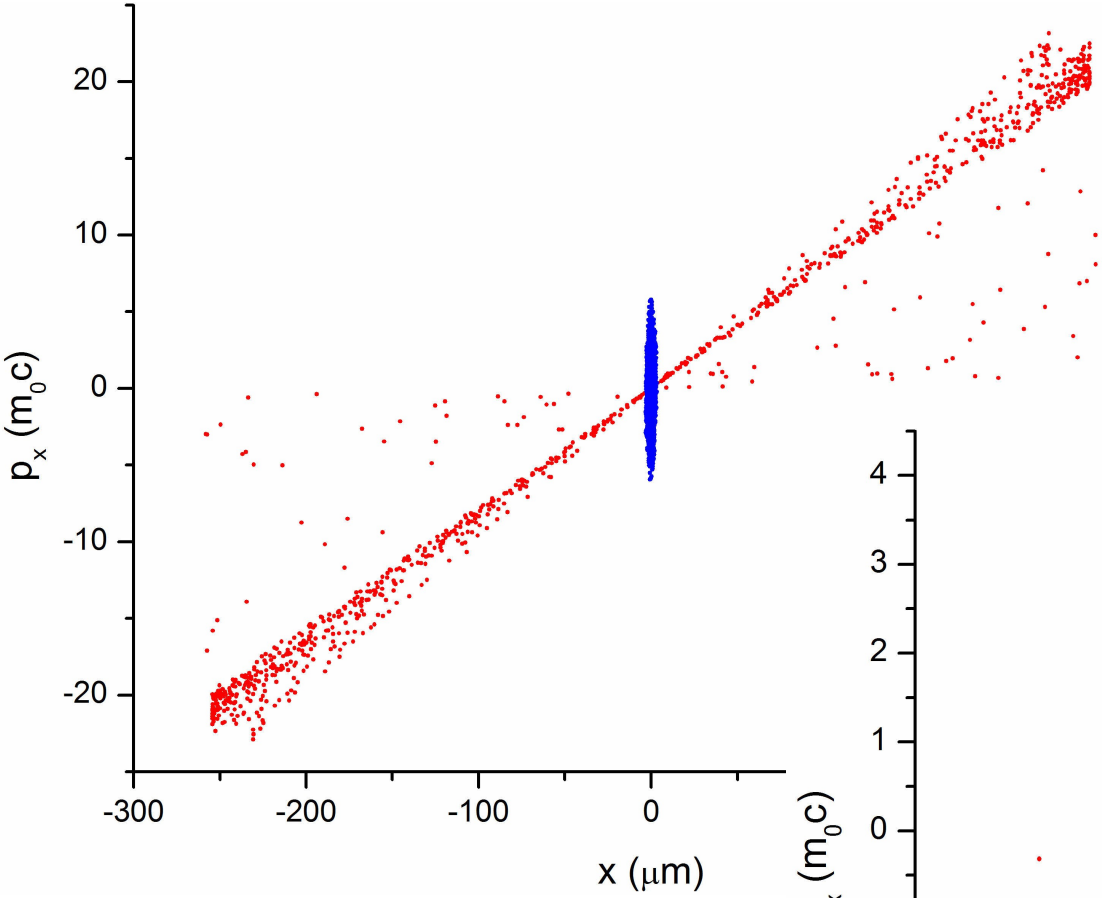
Final* beam LPS

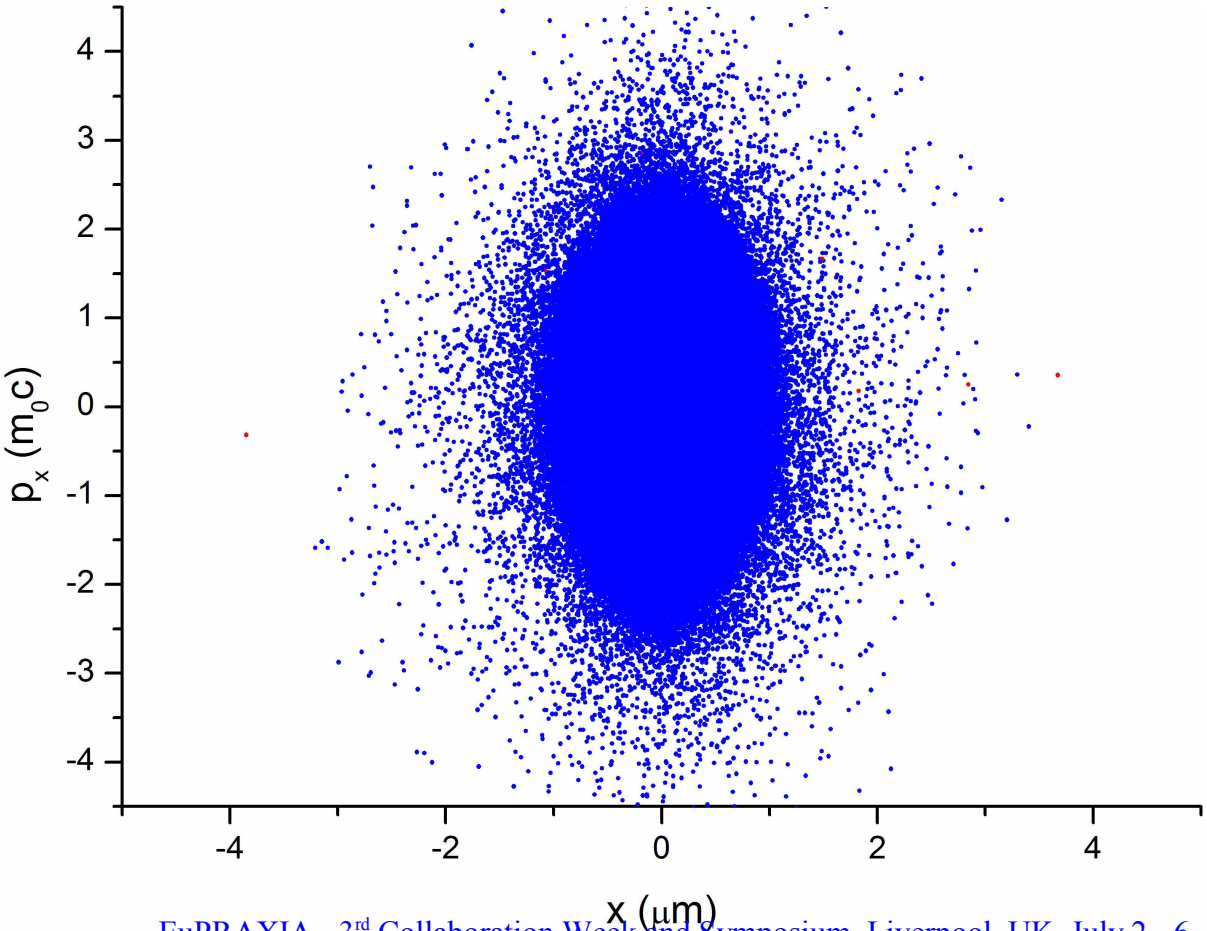


* not @ plasma exit!

< 1% charge loss

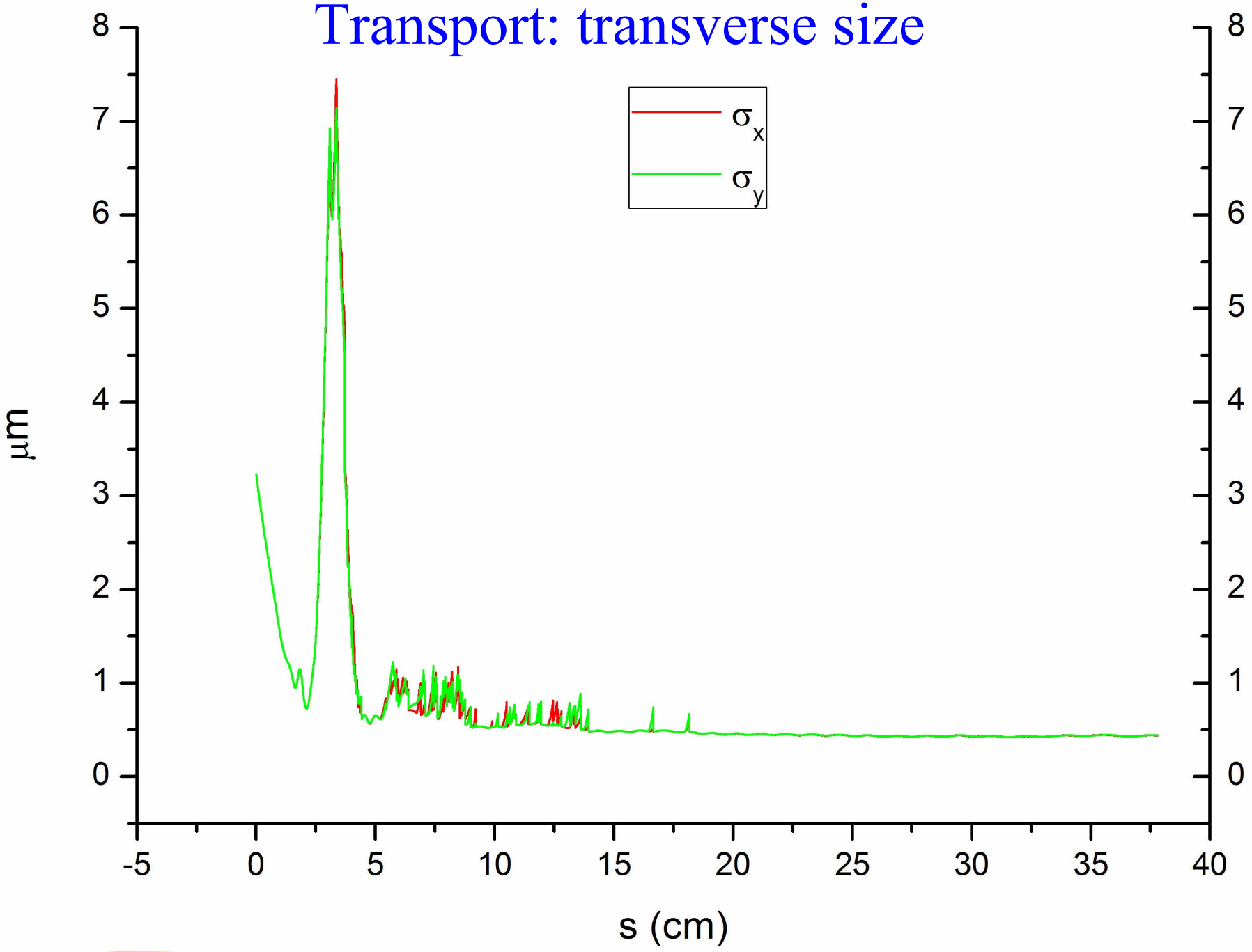
Final* beam: transverse phase space



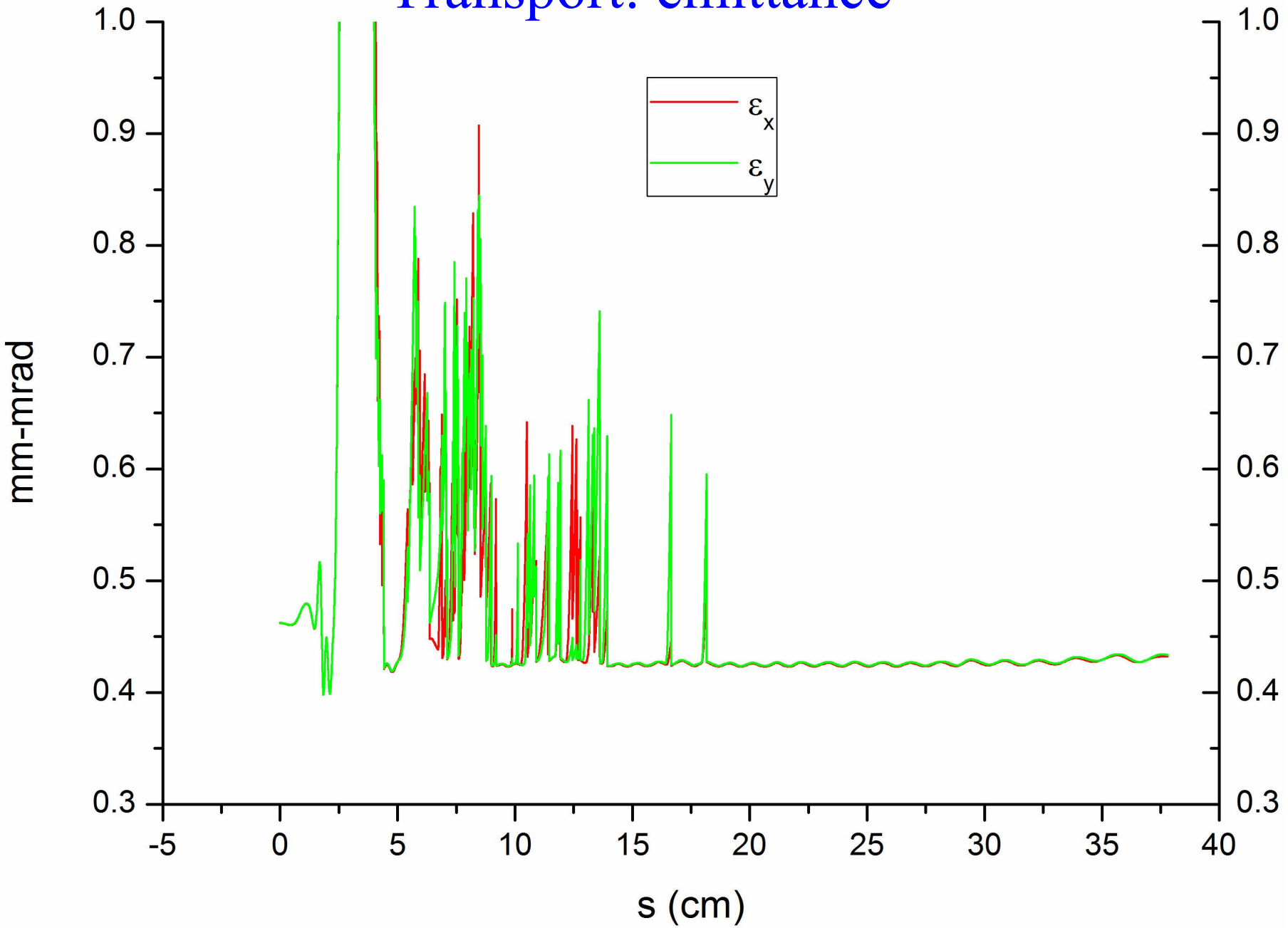


* not @ plasma exit!

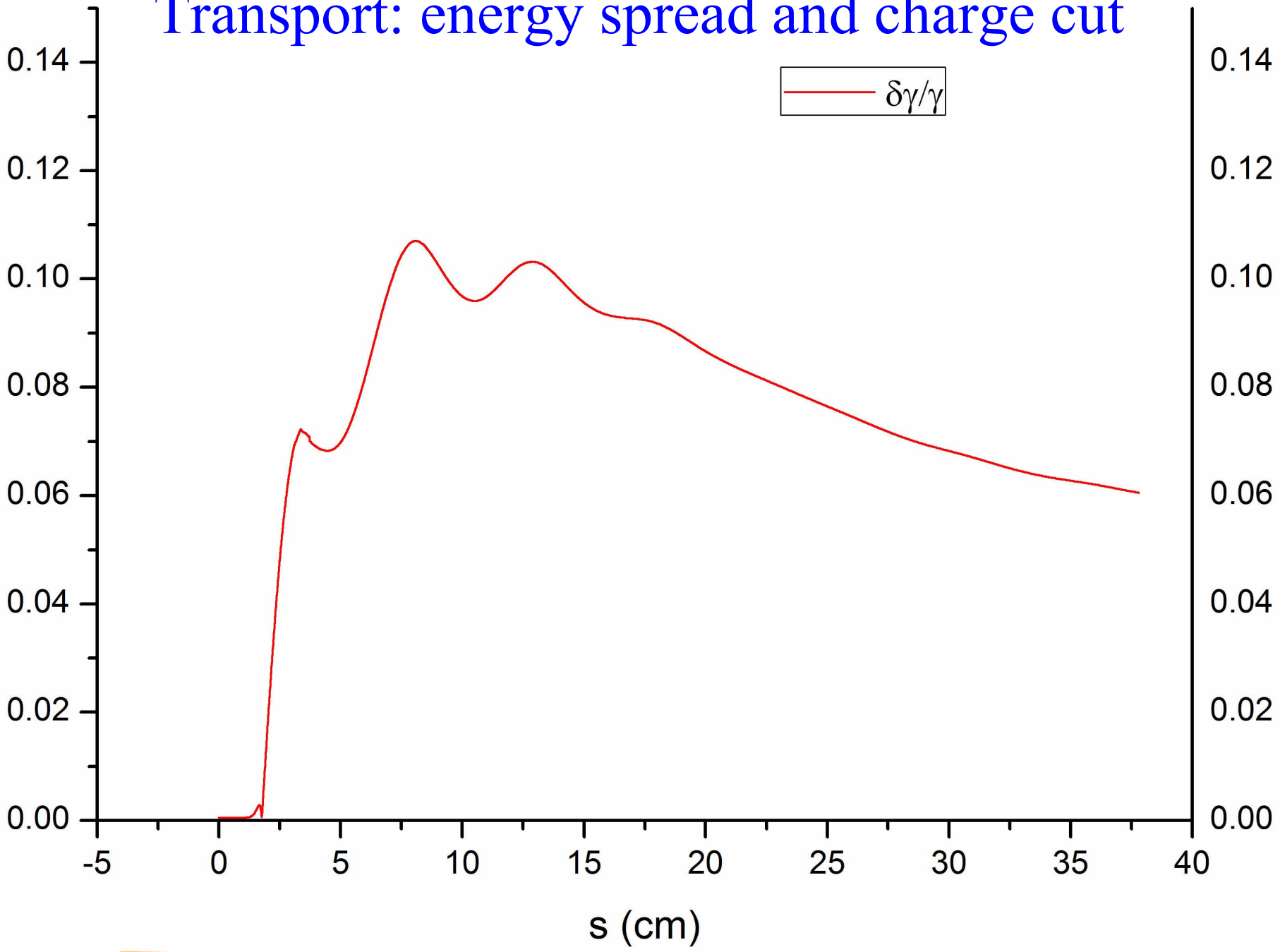
Transport: transverse size



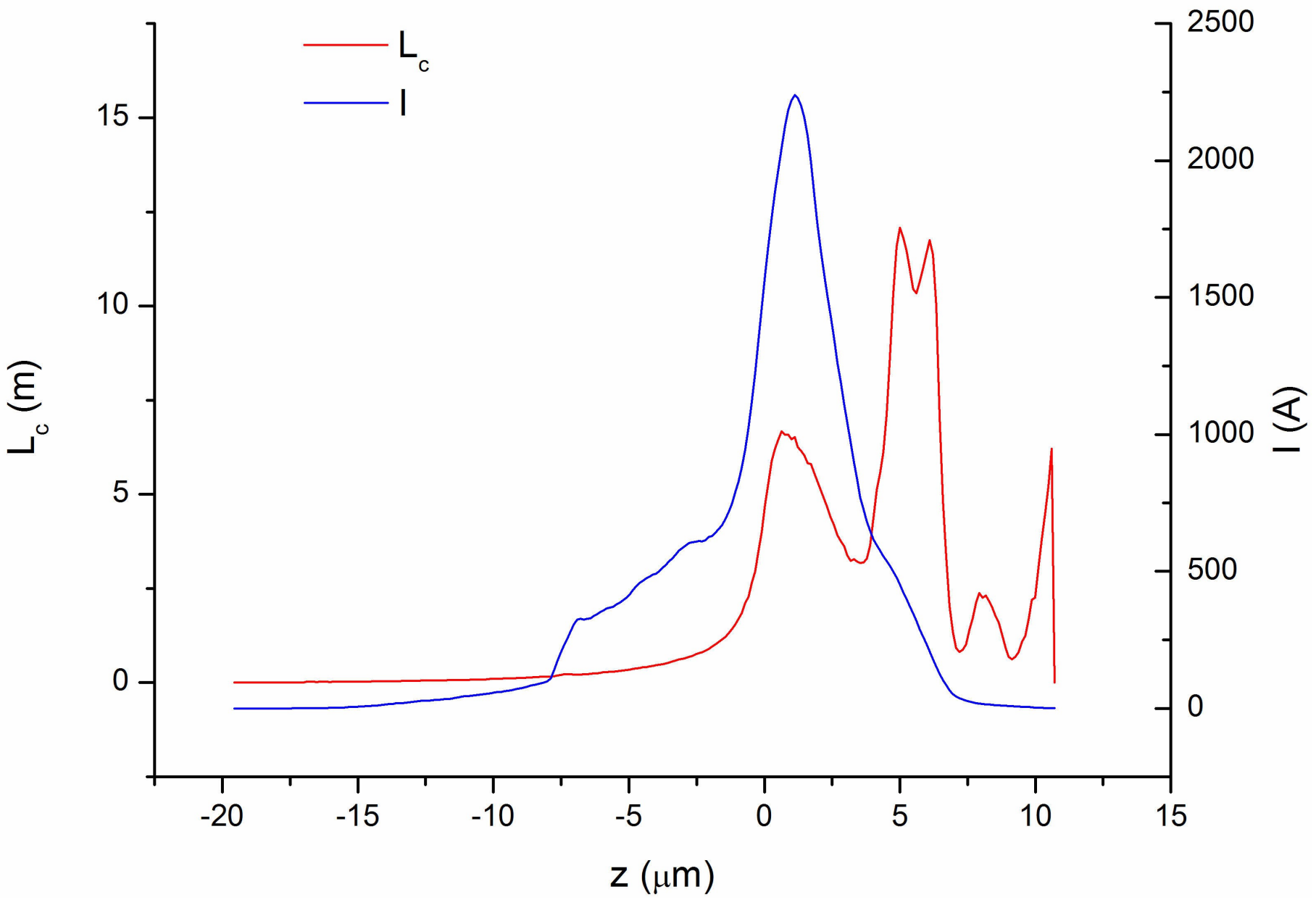
Transport: emittance



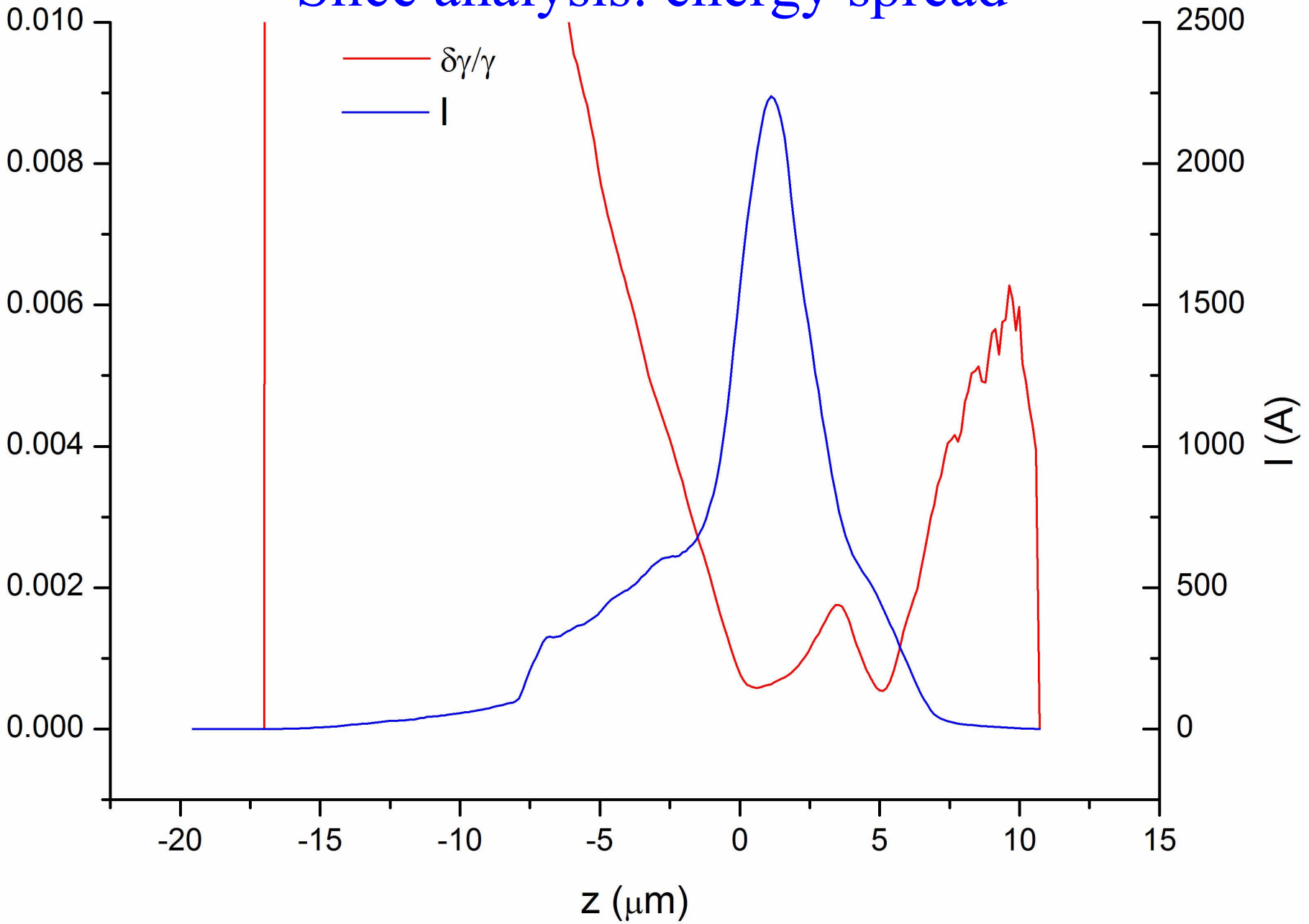
Transport: energy spread and charge cut



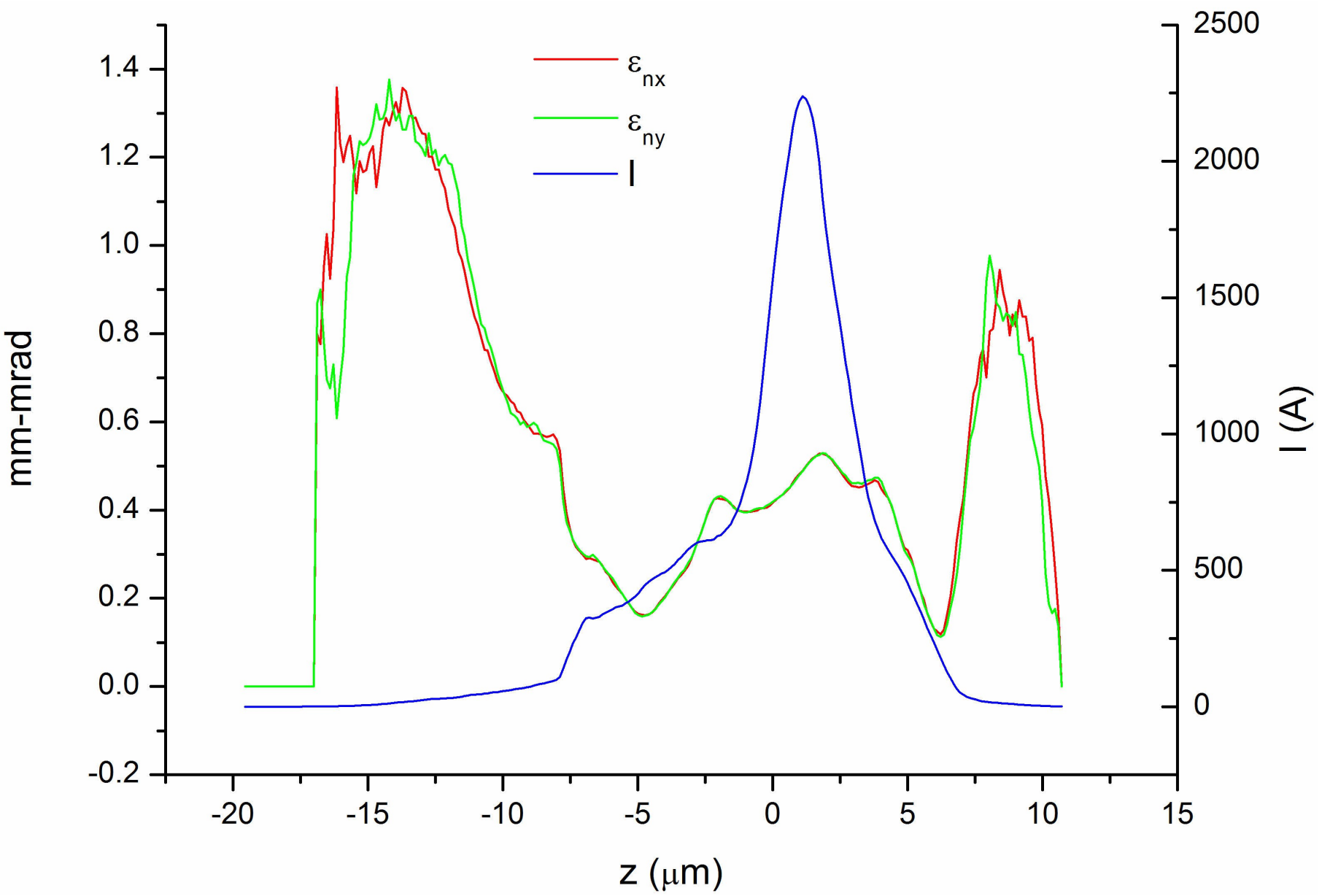
Slice analysis: chromatic length



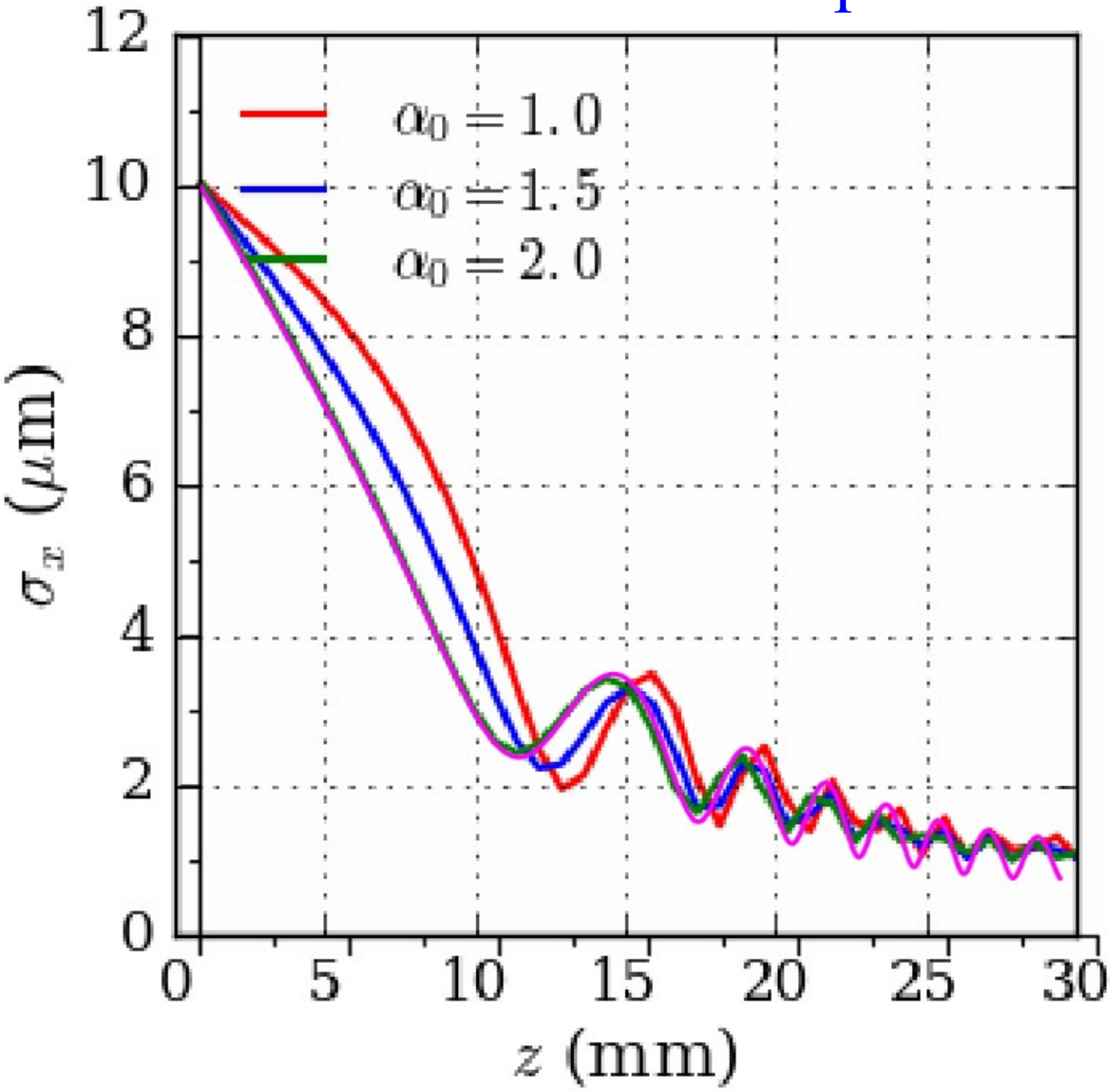
Slice analysis: energy spread



Slice analysis: emittance



Code comparison



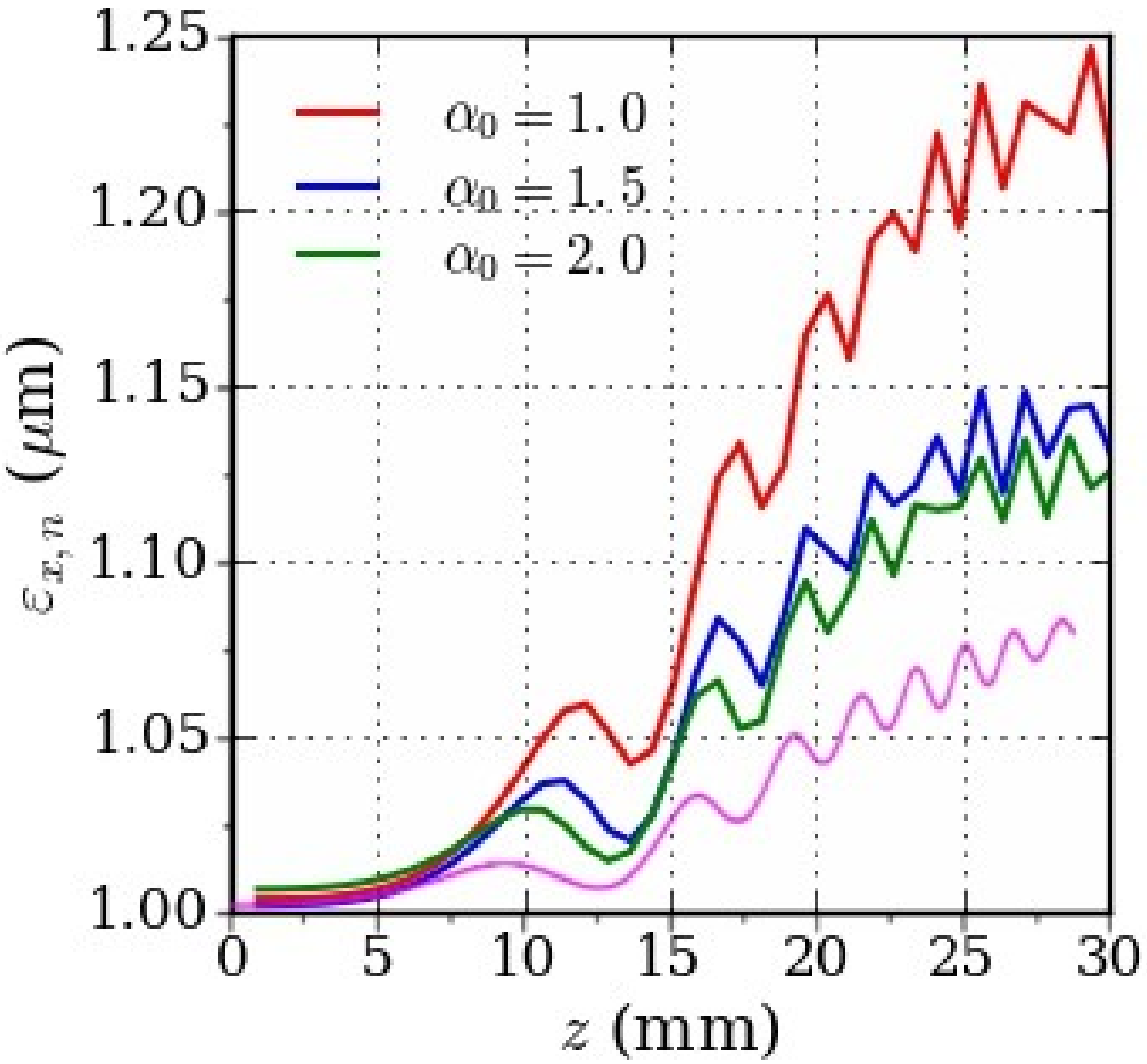
PIC

LI Xiangkun and Nghiem Phu Anh Phi

Hybrid

A.R.R.

Code comparison



PIC

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Hybrid

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