



WP6 Progress

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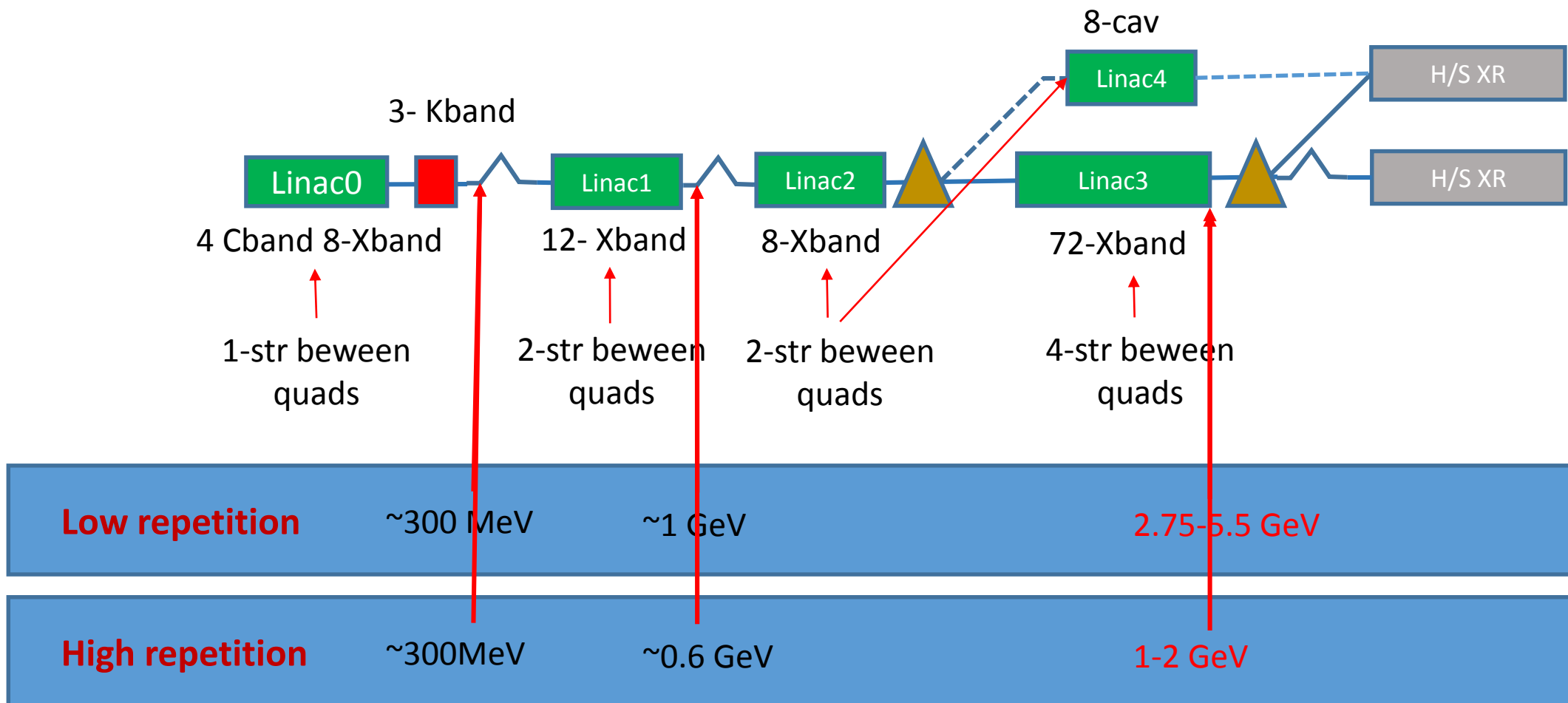


Beam Parameters

Parameter	Unit	Hard X-rays			Soft X-rays		
Beam Energy	GeV	5,5	3,9	2,75	1,95	1,37	0,97
Photon Energy Range	keV	16 - 8	8 - 4	4 - 2	2 - 1	1 - 0.5	0.5 - 0.25
Minimum Peak Current *	kA	5.0	2.5	1.5	0.925	0.65	0.35
RMS Slice Energy Spread	%	0.01	0.014	0.02	0.028	0.04	0.056
Normalised Emittance	mm-mrad	0.2					
Bunch Charge	pC	75					

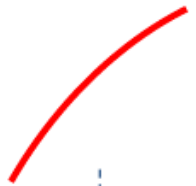


Linac layout (C+X-band based injector)

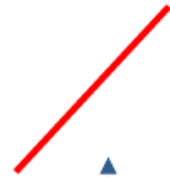




Linear chirp + 2nd order curvature



Linear chirp



Deceleration in 3rd harmonic cavity



2nd order curvature



+

=

curvature removed



h_1 is the linear chirp induced by the chirper cavity

$$h_1 = -\frac{eV_{RF}k_{RF}}{E_{1c}} \sin \varphi_{RF}$$

Harmonic linearization

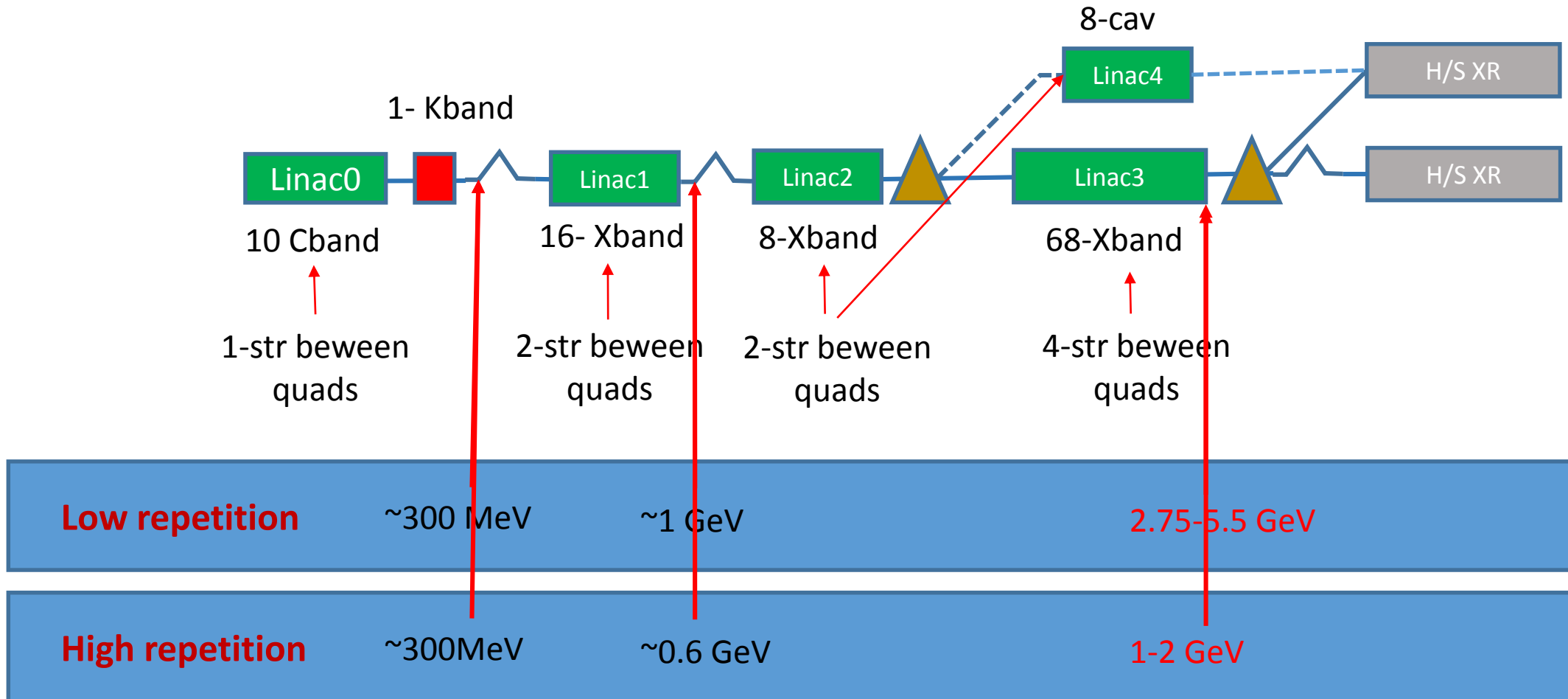
$$E_H = -k_H eV_H \cos \varphi_H$$

$$\varphi_H \approx -\pi$$

The total voltage necessary in Cband based injector ~30 MV
The total voltage necessary in case of Cband based injector ~10 MV

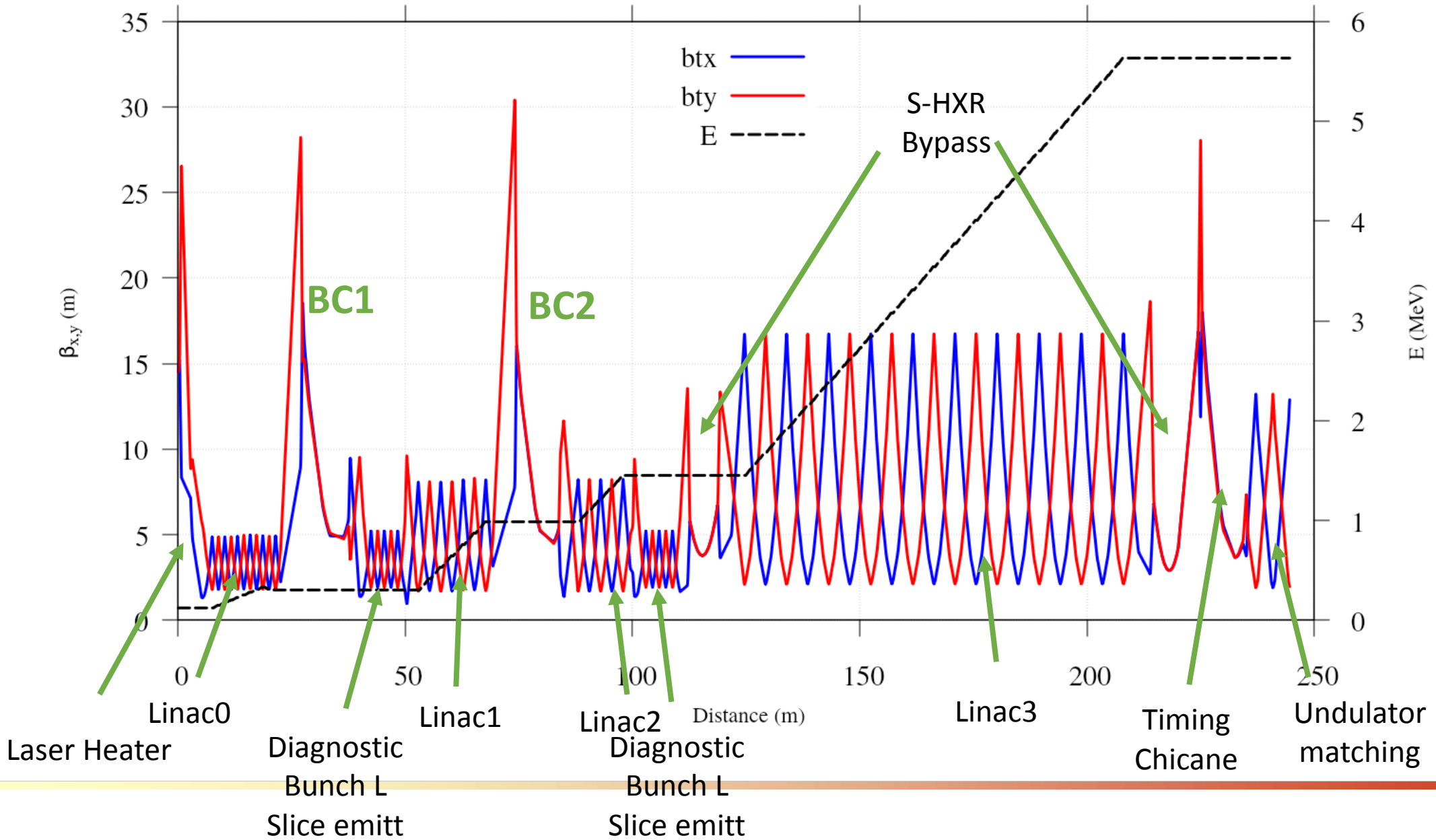


Linac layout (C-band based injector)



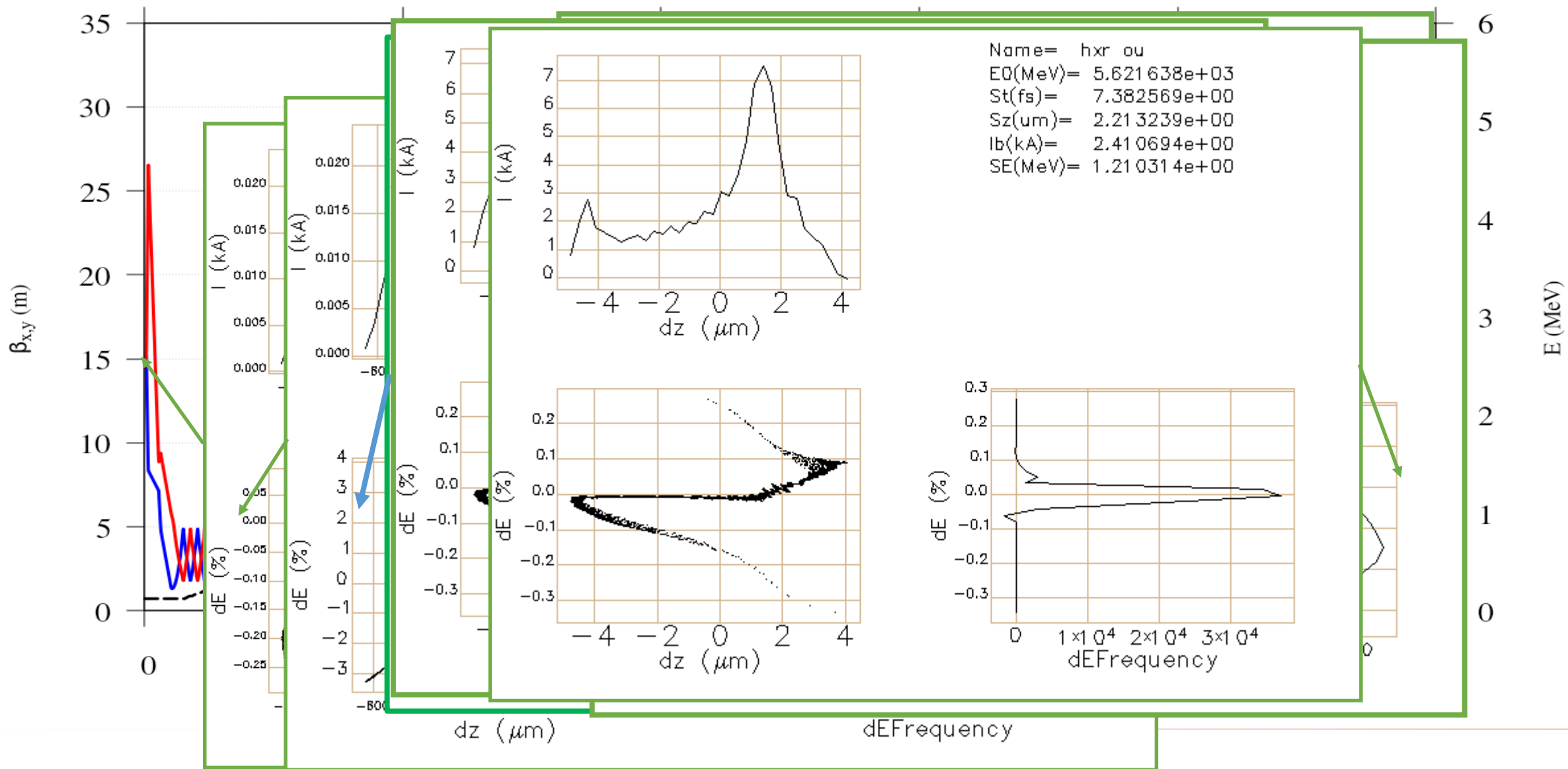


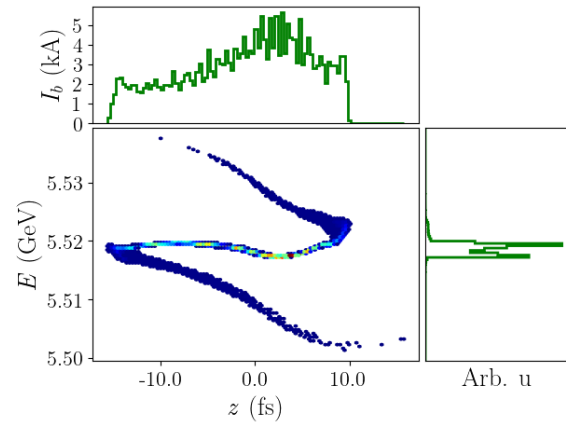
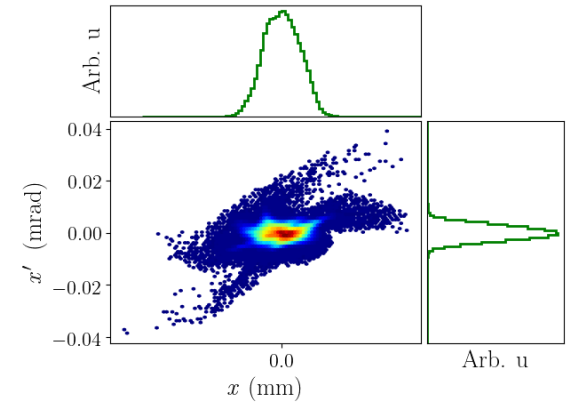
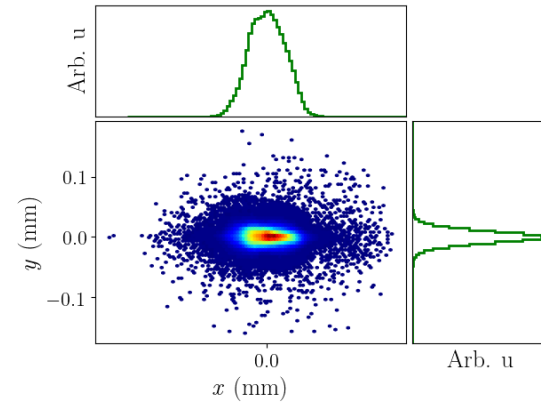
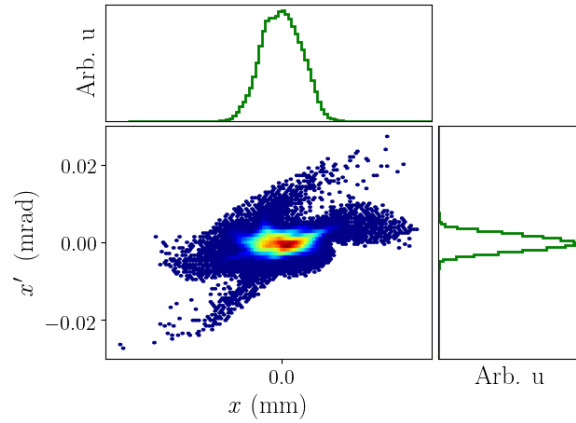
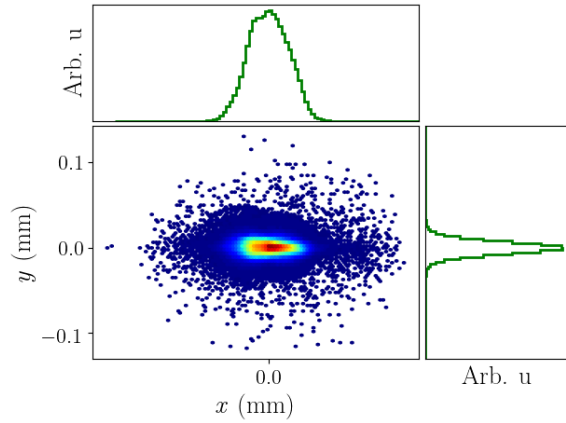
Twiss Functions Along Hard Xray



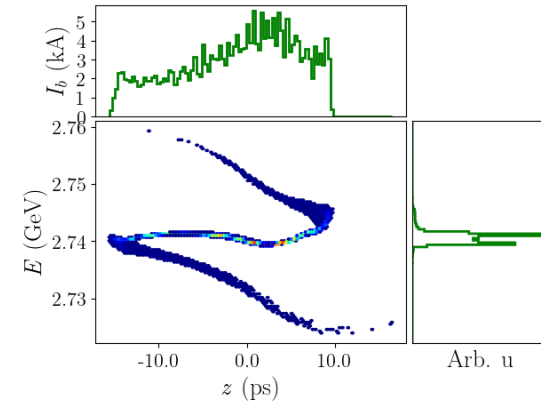


Phase Space Evolution





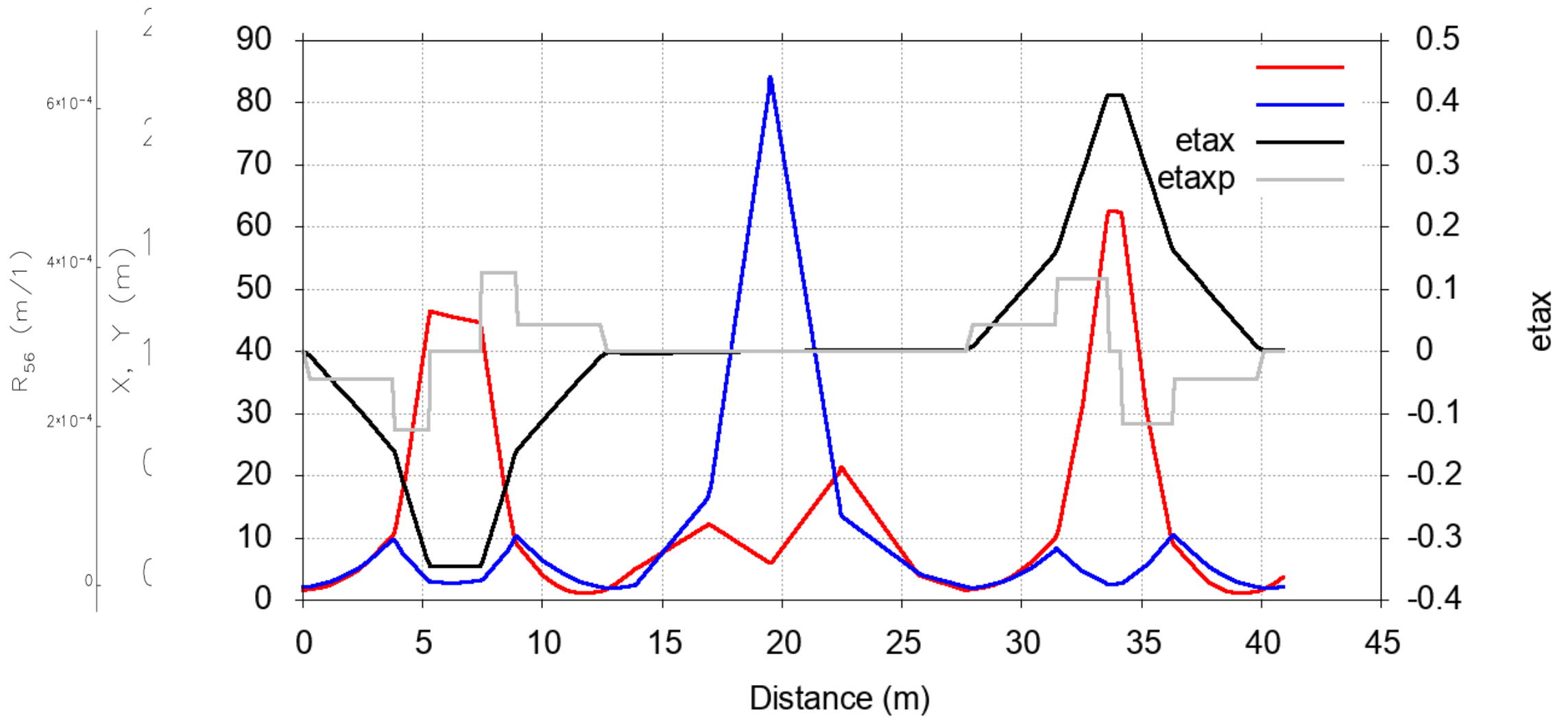
Parameter	Unit	Value
E	GeV	5.52
$\varepsilon_{n,x}$	μmrad	0.263
$\varepsilon_{n,y}$	μmrad	0.133
ε_z	MeV.ps	7.49
σ_x	mm	0.013
σ_y	mm	0.008
σ_z	ps	6.628
σ_E	MeV	1.13
$\Delta E/E$	%	0.021



Parameter	Unit	Value
E	GeV	2.74
$\varepsilon_{n,x}$	μmrad	0.261
$\varepsilon_{n,y}$	μmrad	0.133
ε_z	MeV.ps	7.40
σ_x	mm	0.018
σ_y	mm	0.011
σ_z	ps	6.553
σ_E	MeV	1.14
$\Delta E/E$	%	0.042

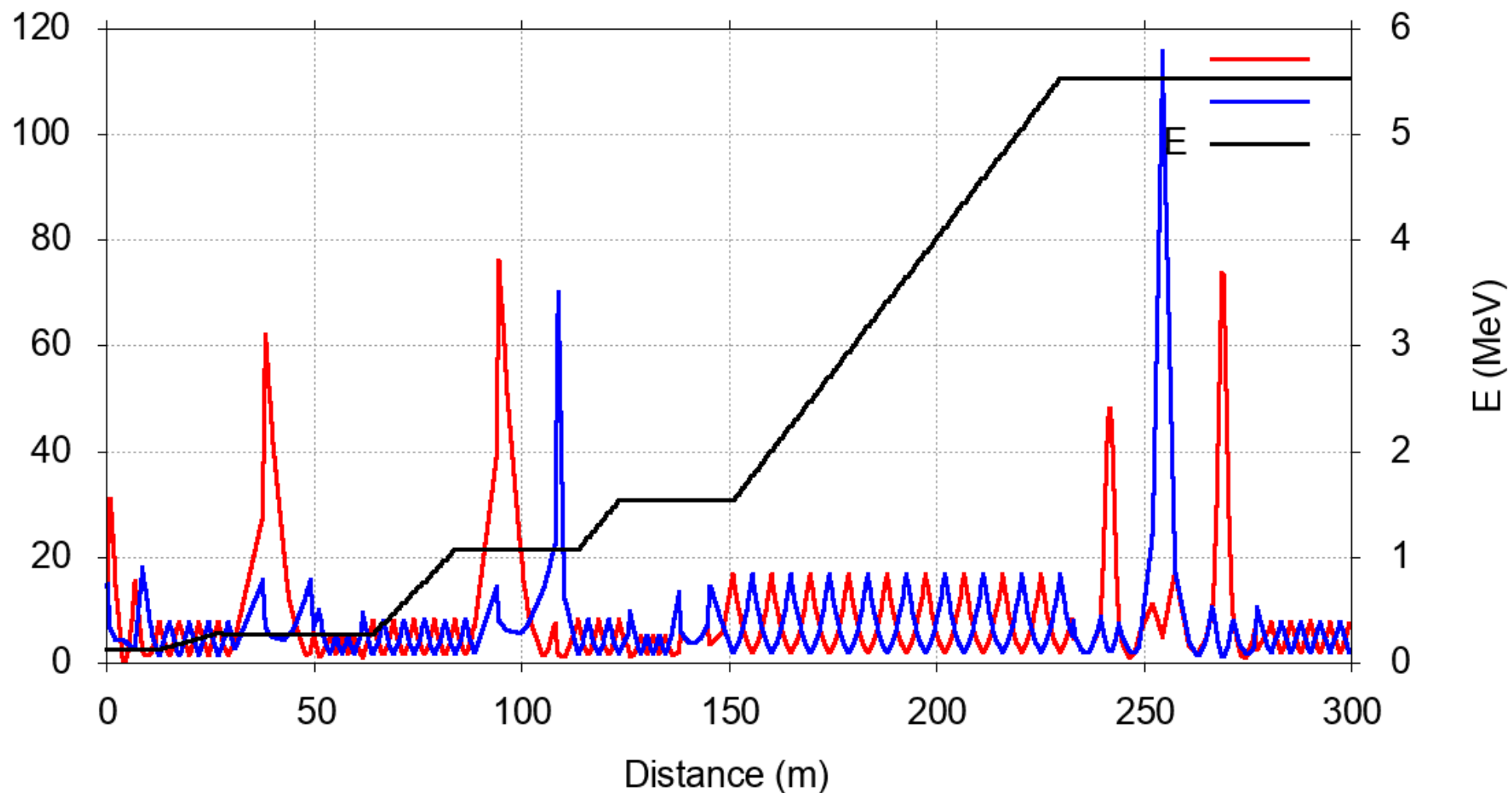


Spreader line



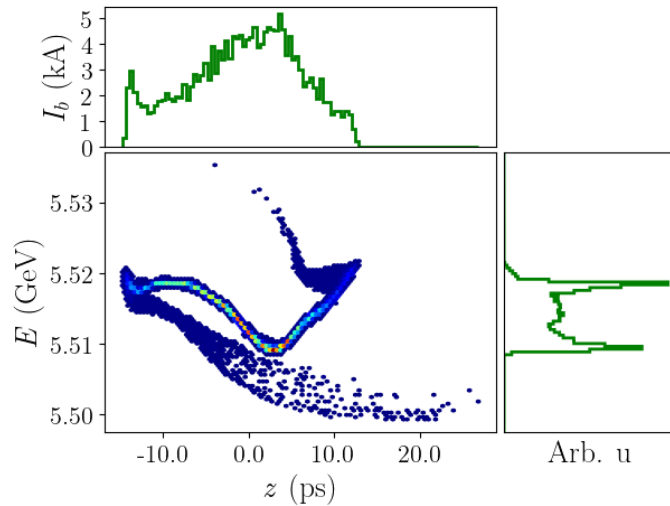
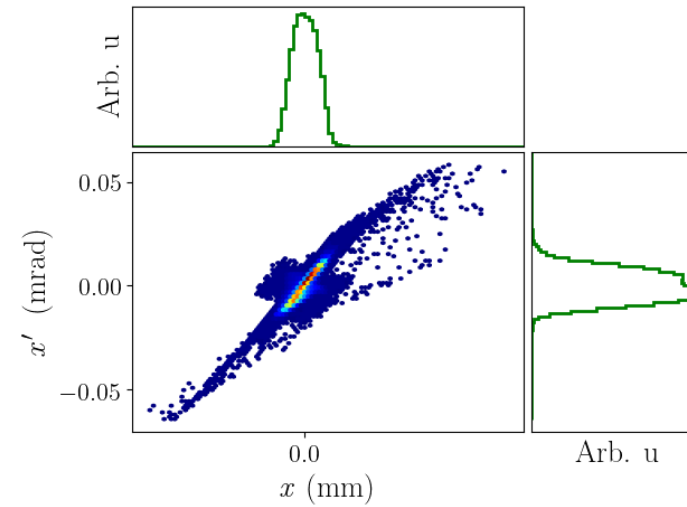
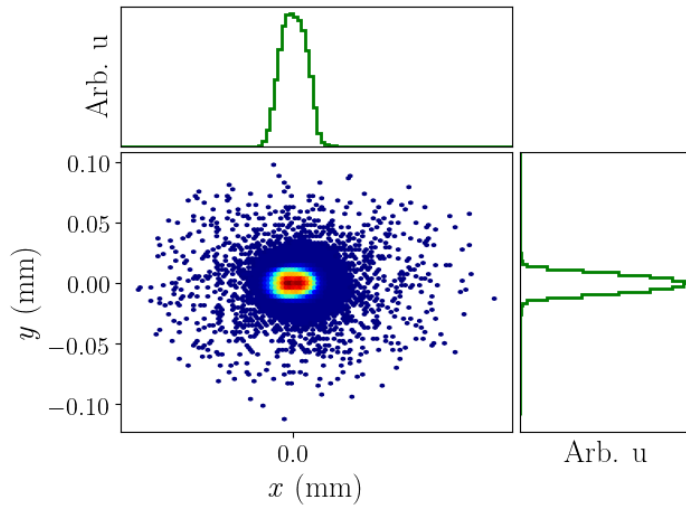


S2E Spreader line





Phase space after Spreadee



Parameter	Unit	Value
E	GeV	5.51
$\varepsilon_{n,x}$	μmrad	0.396
$\varepsilon_{n,y}$	μmrad	0.134
ε_z	MeV.ps	18.66
σ_x	mm	0.012
σ_y	mm	0.007
σ_z	ps	6.492
σ_E	MeV	3.42
$\Delta E/E$	%	0.062



What are missing?

- Different beam energy operation are in progress
- ...



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