

Reproducing LhARA stage 1 BDSIM results

WP6 LhARA meeting

9/02/2026

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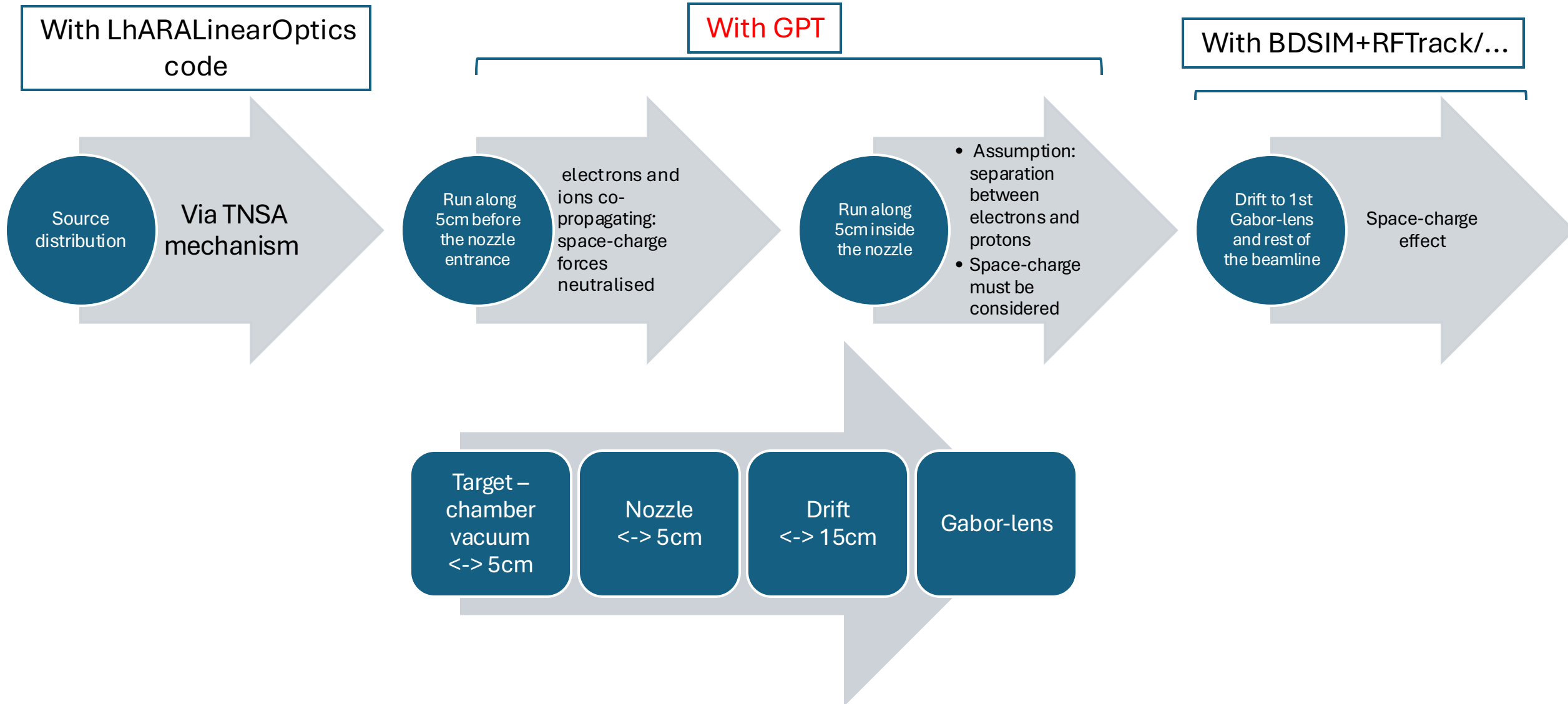
Proton source definition (from CDR draft)

	Previous	Current
rpmax (sin(α)) (Angle cutoff)	0.005 ($\neq \sin(2.75^\circ) = 0.05$)	0.191 ($= \sin(11^\circ)$)? (p.60: envelope angular divergence of 11°)
E_laser	10J	70J
E_proton_ref	15 MeV	15 MeV
Kmax (max K energy emitted)	None	25 MeV
Thickness	5e-6 m	4e-7 m
Duration	4e-14s	2.8e-14s
Laser Power (P)	2.5e14 W	2.5e15 W
Laser Intensity (I)	4e20 W/cm ²	4e20 W/cm ²
Laser spot radius (sqrt(P/(I* π)))	1.5e-6 m	5.6e-6 m

Current values: CDR => [80] N. Dover et al. LhARA linear optics documentation. Report LhARA-TN-07.

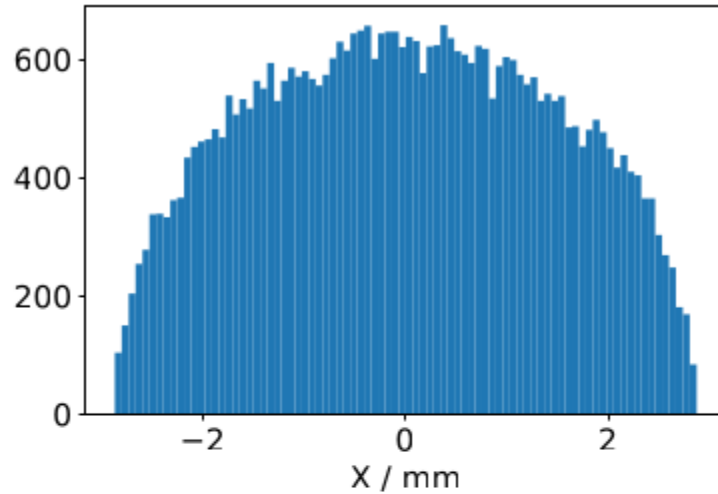
<https://ccap.hep.ph.ic.ac.uk/trac/raw-attachment/wiki/Research/LhARA/Documents/LhARA-TN-2024-07.pdf>. (CDR p.13)

Simulation workflow



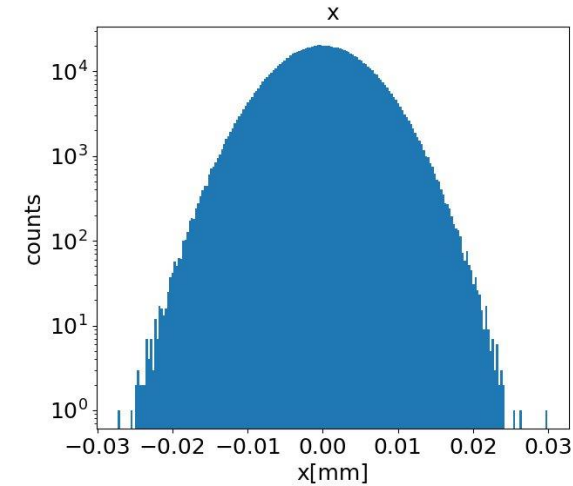
Source distribution at the exit of the nozzle **without GPT**

CDR

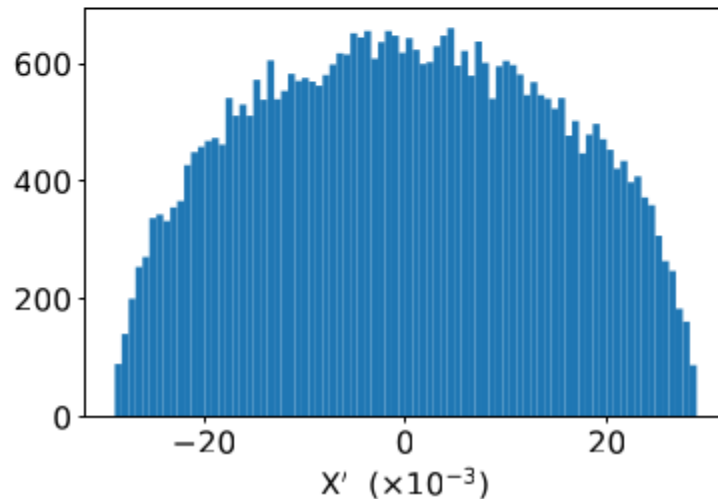


Errors with
units?

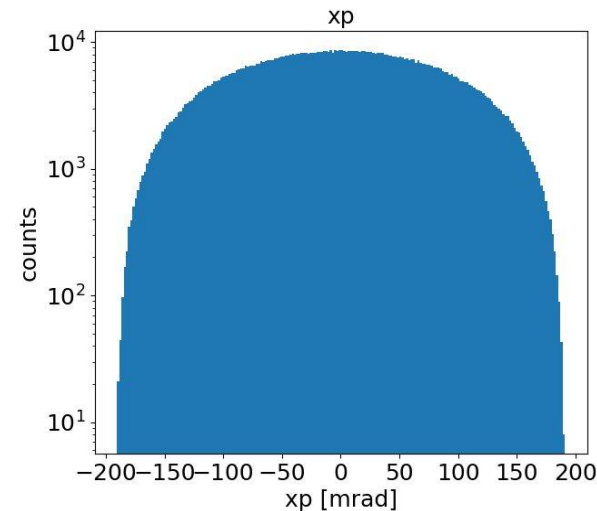
/100



Shorter
beam size to
 $25 \mu\text{m}$

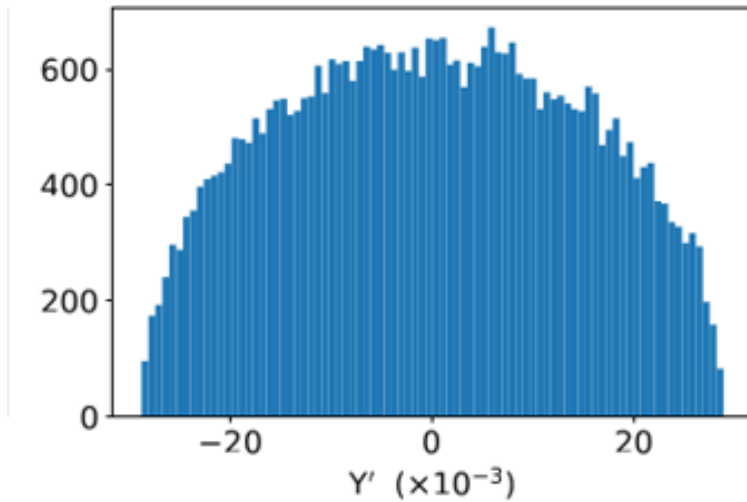
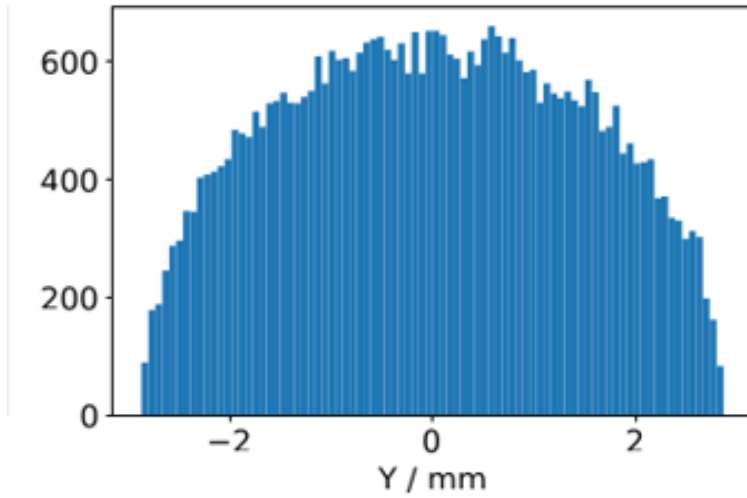


*10



Larger angle
to 11°

CDR

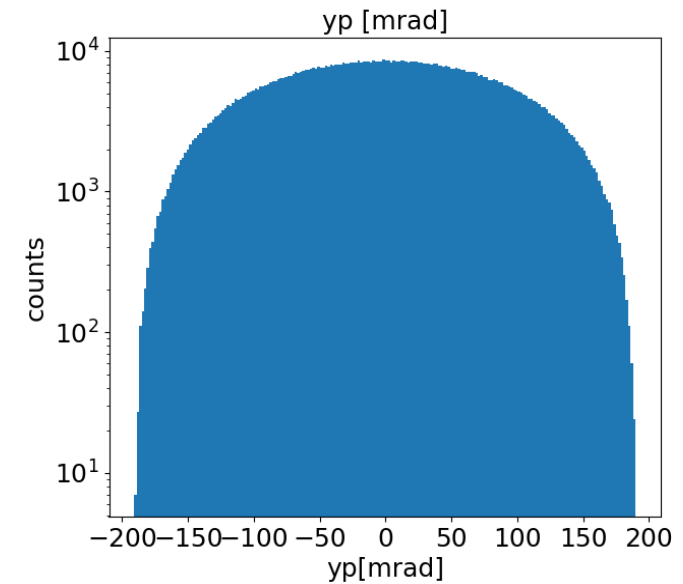
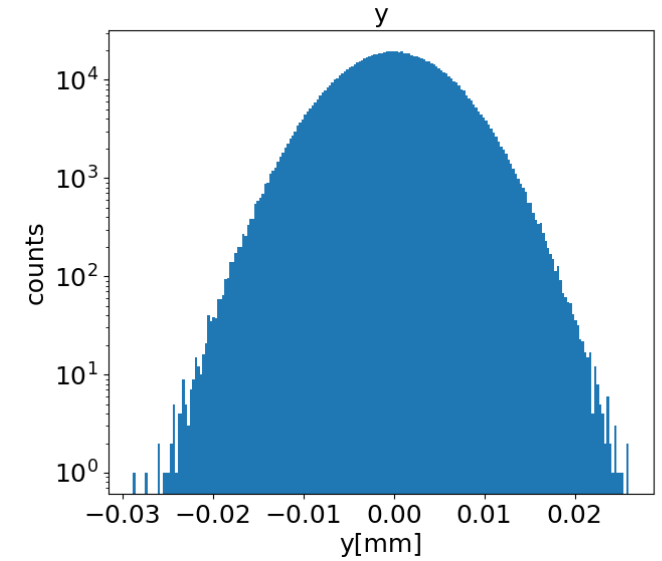


Errors with units

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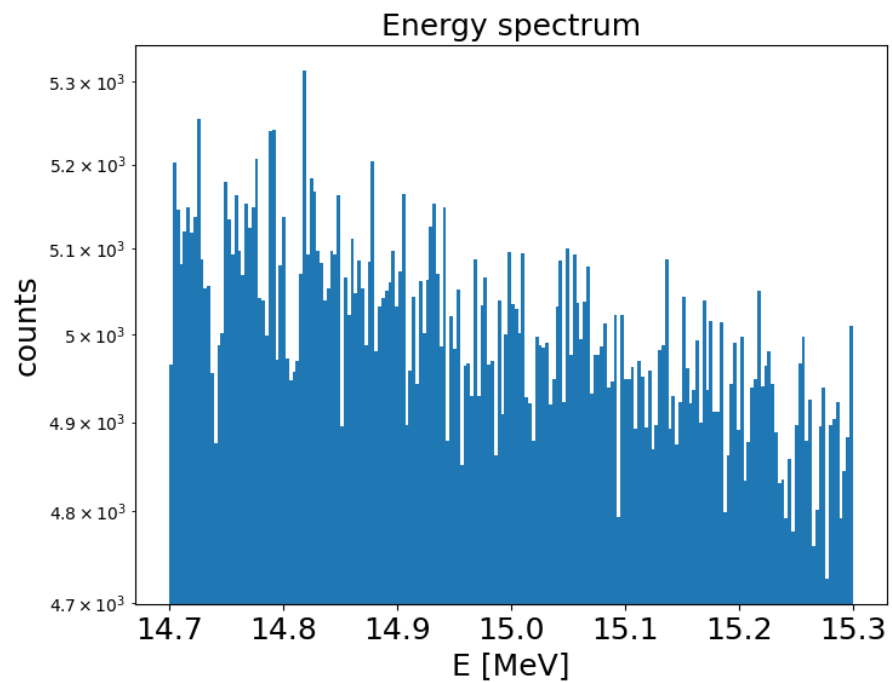
Myself



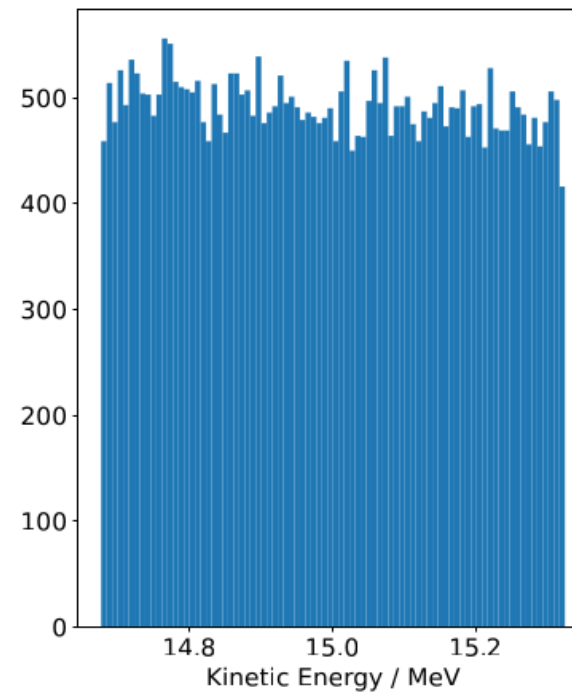
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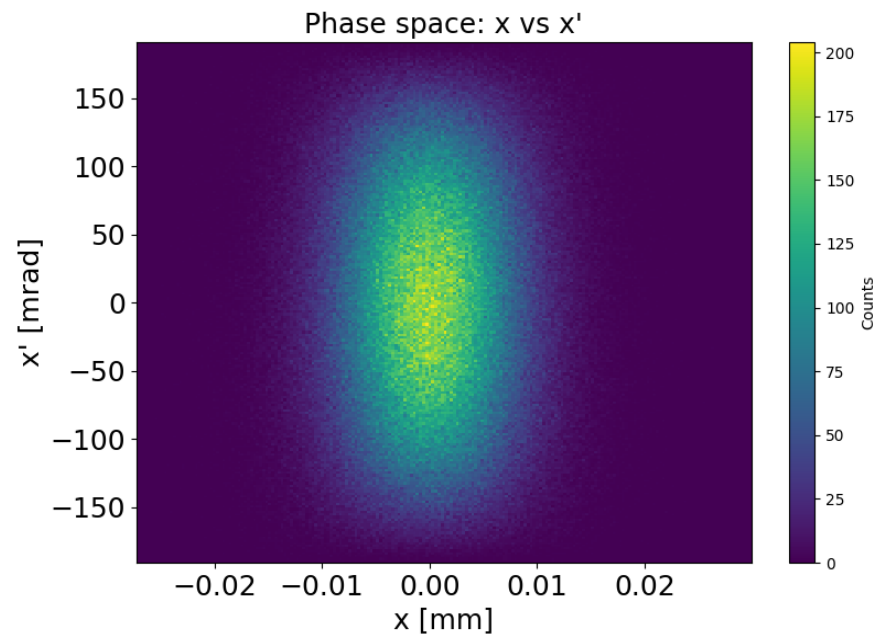
Myself



CDR

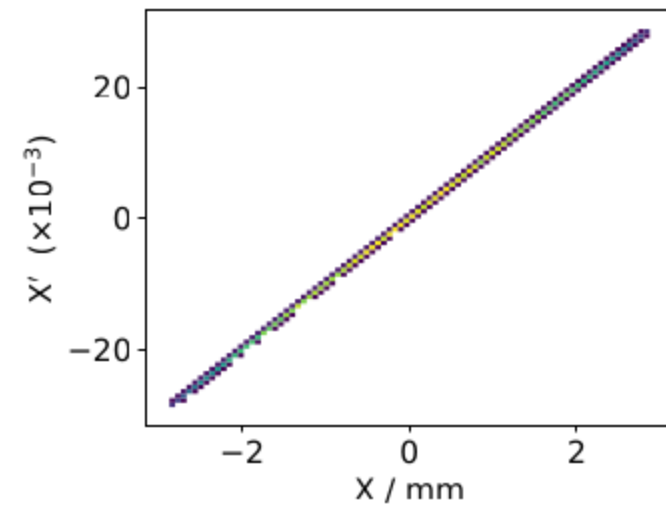


Myself

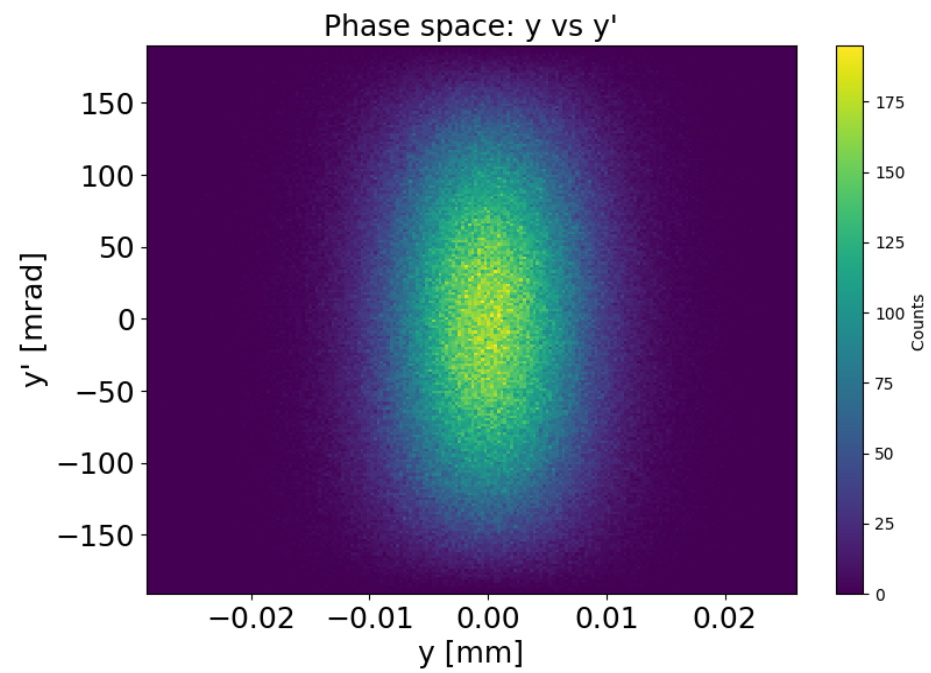


No rotation of the phase space here

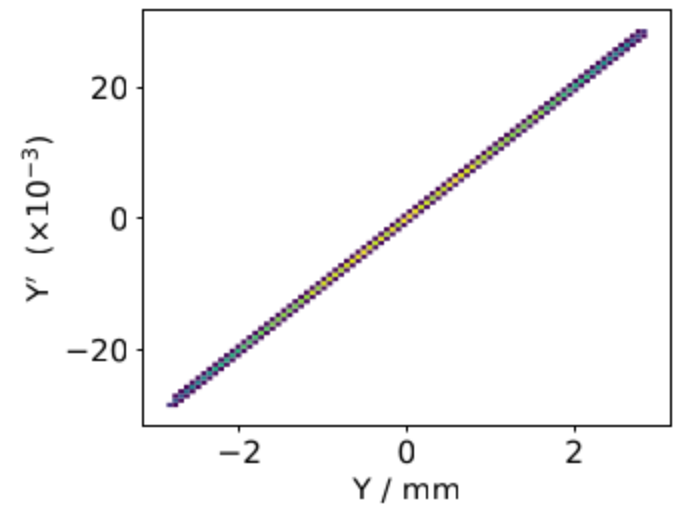
CDR



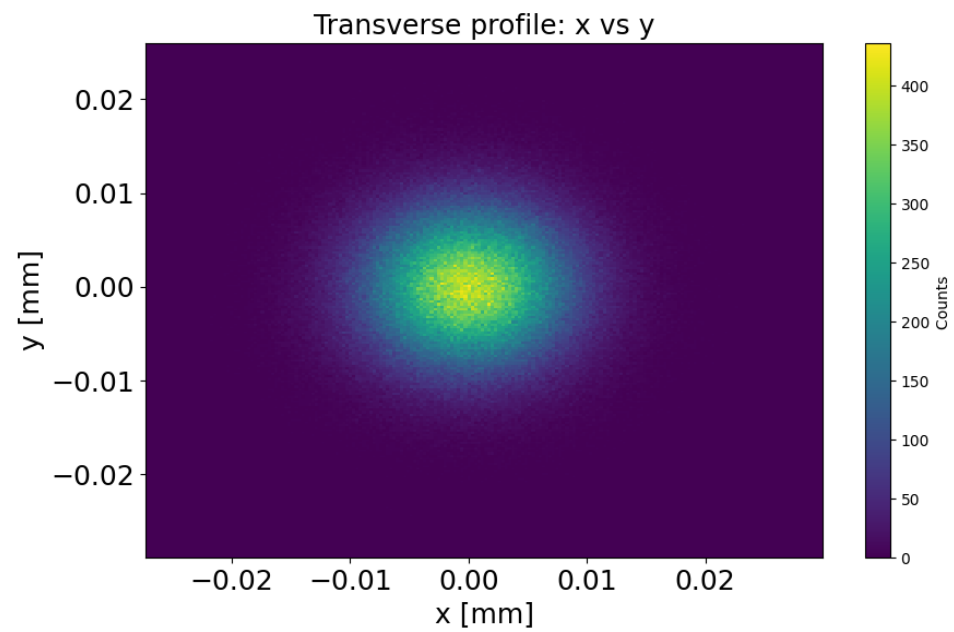
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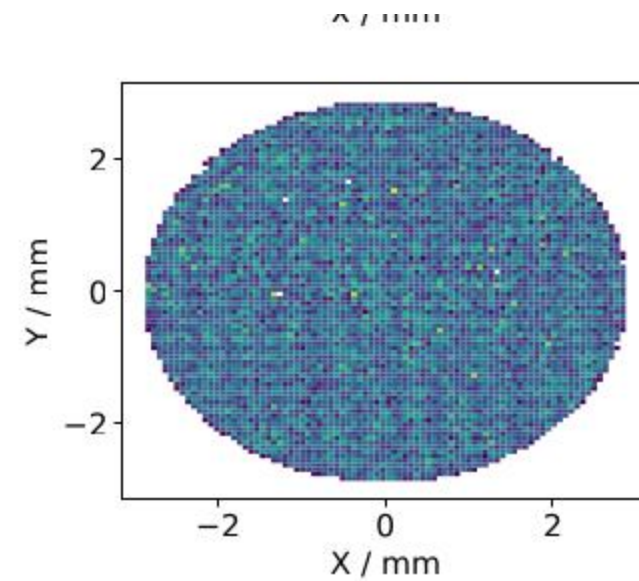
CDR



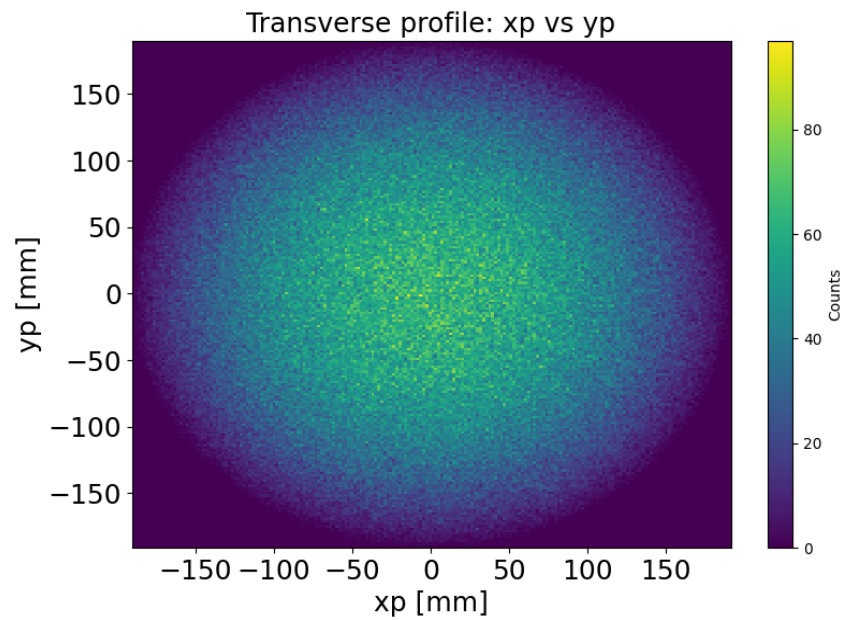
Myself



CDR



Myself



CDR

