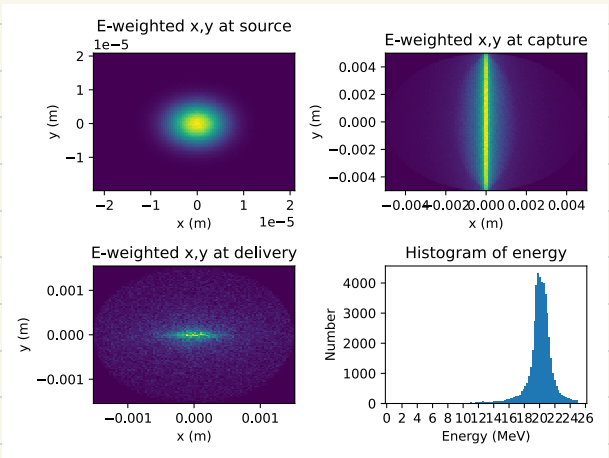
LION beam line simulation. 08Sep23

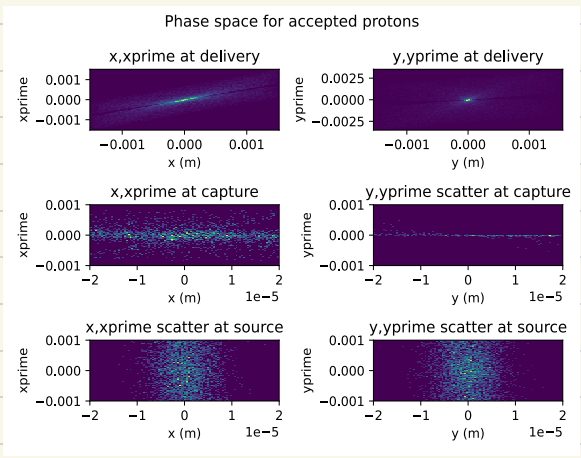
Using LIONbeam and associated code in LhARA_optics. Parameters:

Stage	Section	Element	Type	Parameter	Value	Unit	Comment
1	Source	Source	Parameterised TNSA	SourceMode	0		Gaussian kinetic energy
1	Source	Source	Parameterised TNSA	SigmaX	0.000004	m	Gaussian width, x
1	Source	Source	Parameterised TNSA	SigmaY	0.000004	m	Gaussian width, y
1	Source	Source	Parameterised TNSA	Emin	1	MeV	Minimum of energy distribution
1	Source	Source	Parameterised TNSA	Emax	25	MeV	Maximum of energy distribution
1	Source	Source	Parameterised TNSA	nPnts	1000		Number of points to sample for integration of PDF
1	Source	Source	Parameterised TNSA	MinCTheta	0.999556		Maximum theta for flat cos theta
1	Capture	Drift		Length	0.05034	m	Length of first drift
1	Capture	Aperture	Elliptical	RadiusX	0.0015	m	Half aperture in x of elliptical colimator
1	Capture	Aperture	Elliptical	RadiusY	0.00075	m	Half aperture in y of ellipseof elliptical colimator
1	Capture	Drift		Length	0.01	m	Gap between colimator and first quad
1	Capture	Fquad		Length	0.04	m	Length of focusing quad
1	Capture	Fquad		Strength	332	T/m	Strength of focusing quad
1	Capture	Aperture	Circular	Radius	0.005	m	Aperture of quad
1	Capture	Drift		Length	0.02577	m	Gap between colimator first (F)quad and second (D)quad
1	Capture	Dquad		Length	0.02	m	Length of defocusing quad
1	Capture	Dquad		Strength	318.5	T/m	Strength of defocusing quad
1	Capture	Aperture	Circular	Radius	0.005	m	Aperture of quad
1	Delivery	Drift		Length	1.72859	m	Main drift from last quad to kapton/aluminium foils
1	Delivery	Drift		Length	0.01	m	Drift from kapton/aluminium foils to collimator
1	Delivery	Aperture	Circular	Radius	0.0015	m	Collimator before "end station"
1	Delivery	Drift		Length	0.02	m	Final drift

Run 10,000,000 events, phase space at source, end of capture (exit of second (D)quad).

Still need to check that the parameters are correct.





Second try: use Riddhi's parameters 08Sep23

Stage	Section	Element	Type	Parameter	Value	Unit	Comment
1	Source	Source	Parameterised TNSA	SourceMode	0		Gaussian kinetic energy
1	Source	Source	Parameterised TNSA	SigmaX	0.000004	m	Gaussian width, x
1	Source	Source	Parameterised TNSA	SigmaY	0.000004	m	Gaussian width, y
1	Source	Source	Parameterised TNSA	Emin	1	MeV	Minimum of energy distribution
1	Source	Source	Parameterised TNSA	Emax	25	MeV	Maximum of energy distribution
1	Source	Source	Parameterised TNSA	nPnts	1000		Number of points to sample for integration of PDF
1	Source	Source	Parameterised TNSA	MinCTheta	0.999691		Maximum theta for flat cos theta
1	Capture	Drift		Length	0.06034	m	Length of first drift
1	Capture	Aperture	Elliptical	RadiusX	0.003	m	Half aperture in x of elliptical colimator
1	Capture	Aperture	Elliptical	RadiusY	0.0015	m	Half aperture in y of ellipseof elliptical colimator
1	Capture	Drift		Length	0.001	m	Gap between colimator and first quad
1	Capture	Fquad		Length	0.04	m	Length of focusing quad
1	Capture	Fquad		Strength	332	T/m	Strength of focusing quad
1	Capture	Aperture	Circular	Radius	0.005	m	Aperture of quad
1	Capture	Drift		Length	0.02577	m	Gap between colimator first (F)quad and second (D)quad
1	Capture	Dquad		Length	0.02	m	Length of defocusing quad
1	Capture	Dquad		Strength	318.5	T/m	Strength of defocusing quad
1	Capture	Aperture	Circular	Radius	0.005	m	Aperture of quad
1	Delivery	Drift		Length	1.72859	m	Main drift from last quad to kapton/aluminium foils
1	Delivery	Drift		Length	0.01	m	Drift from kapton/aluminium foils to collimator
1	Delivery	Aperture	Circular	Radius	0.0015	m	Collimator before "end station"
1	Delivery	Drift		Length	0.02	m	Final drift