EDS simulation:

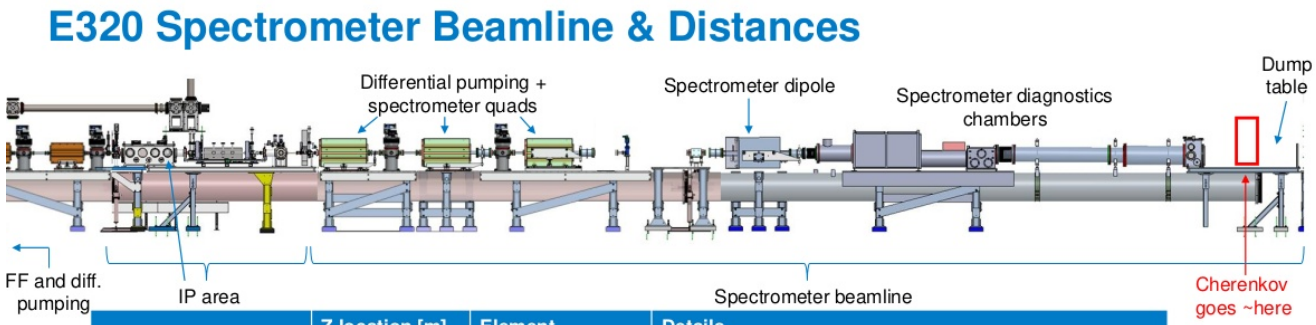
E320 setup

Evan Ranken

20.02.24

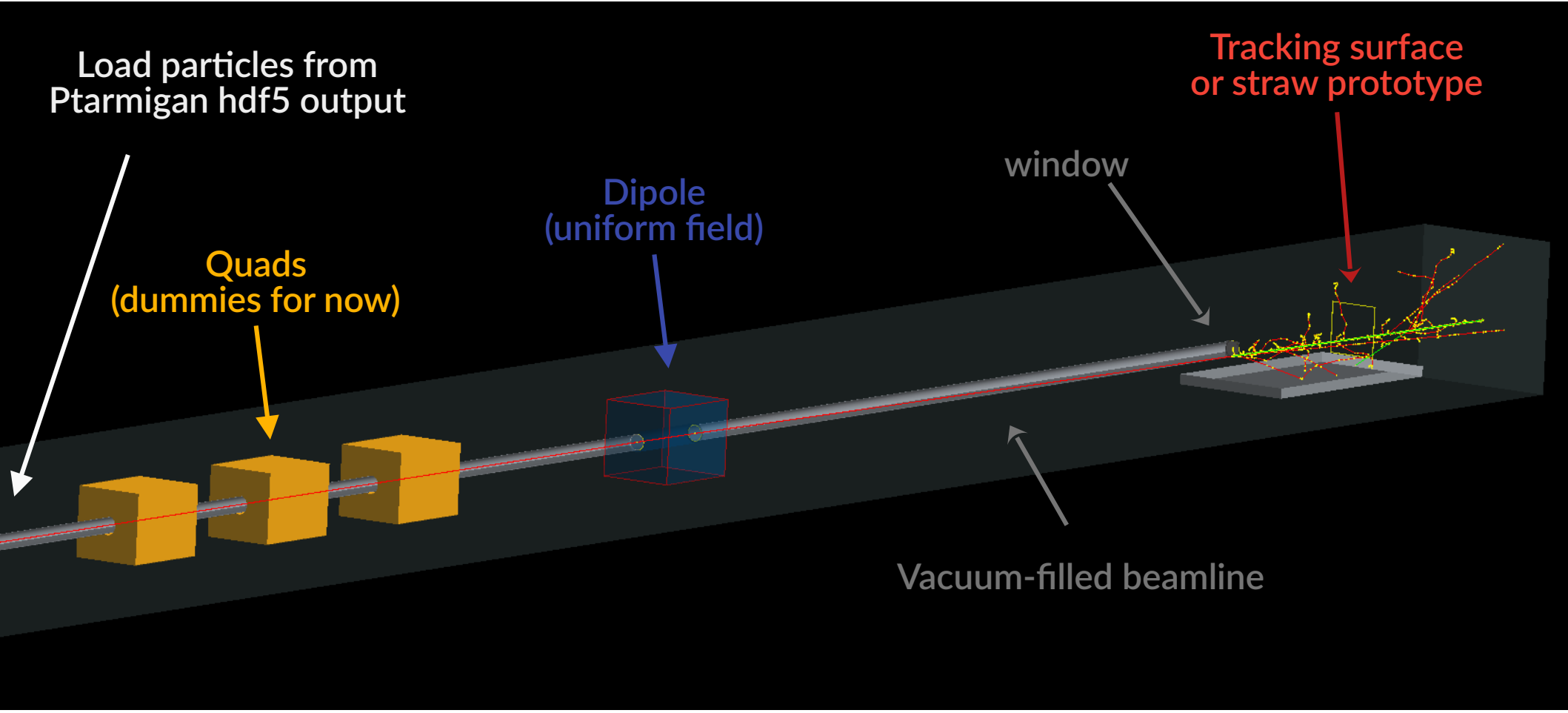
E320 EDS simulation

- Based on early setup from Antonios
- Using parameters from Ruth's 2023 study for ptarmigan + E320:



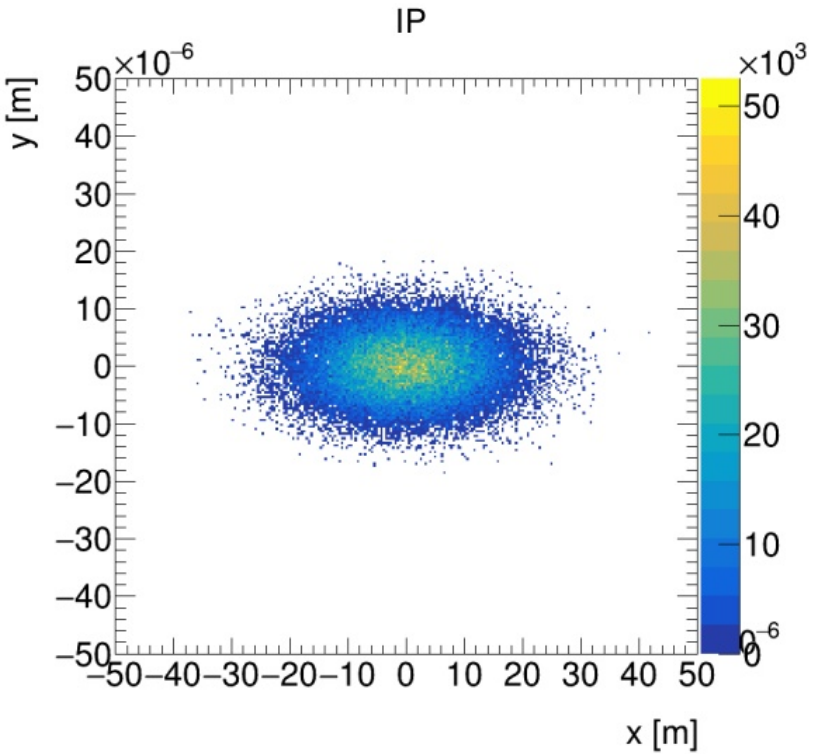
	Z location [m]	Element	Details
Compton IP	~1992.8	e-beam/laser IP	
Q0D quad	1996.98	Quad	Length = 1 m, Integrated gradient $B'L = -14$ T (**)
Q1D quad	1999.21	Quad	Length = 1 m, Integrated gradient $B'L = 22$ T (**)
Q2D quad	2001.43	Quad	Length = 1 m, Integrated gradient $B'L = -14$ T (**)
Spec. Dipole	2005.94	Dipole	Length = 0.98 m, Integrated field $BL = 0.26$ Tm (**)
Vacuum exit window	2015.54	Window	5mm thick aluminum, 6 in. wide
Dump shield	2027.3	Gap	2 in. wide gap in lead wall, 4 in. thick
Dump Entrance	2028.0	Gap	2.5 in. gap in shielding
Dump	2028.6	Beam stop	Water cooled copper block - shielded by 8 in.+ lead, 11in. + borated polyethelyne

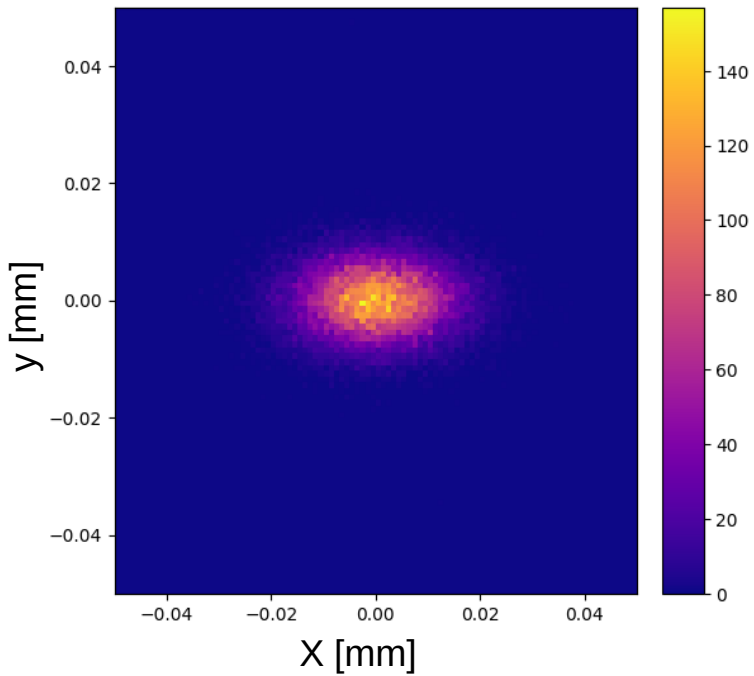
Setup


Load particles from
Ptarmigan hdf5 output
Quads
(dummies for now)
Dipole
(uniform field)
window
Tracking surface
or straw prototype
Vacuum-filled beamline

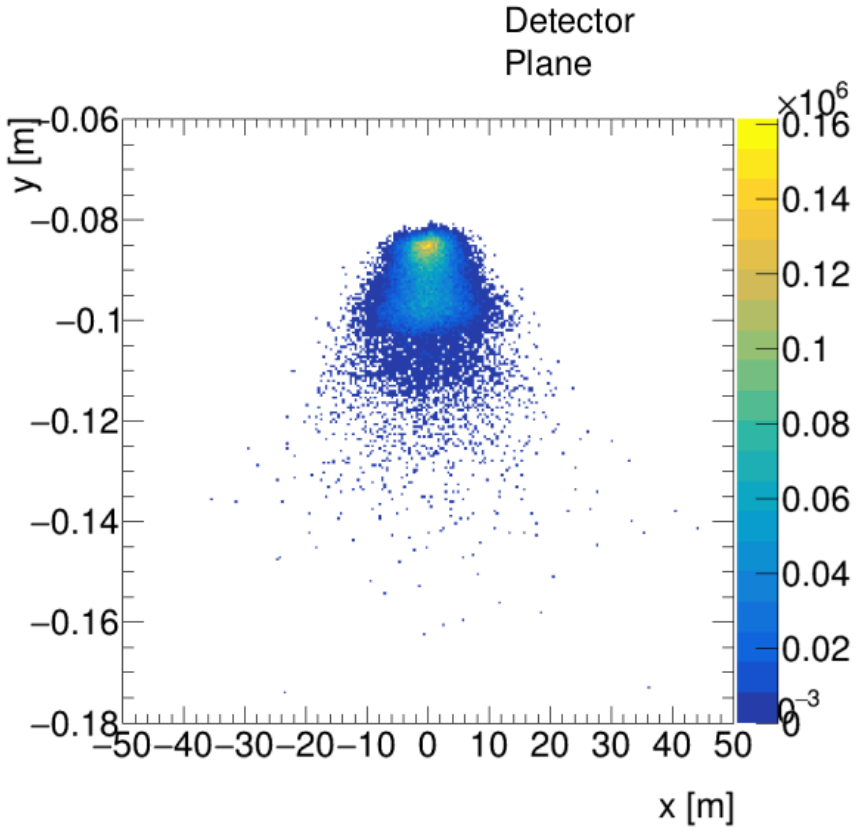
Tracking surface @ IP

Generated with a0 = 1

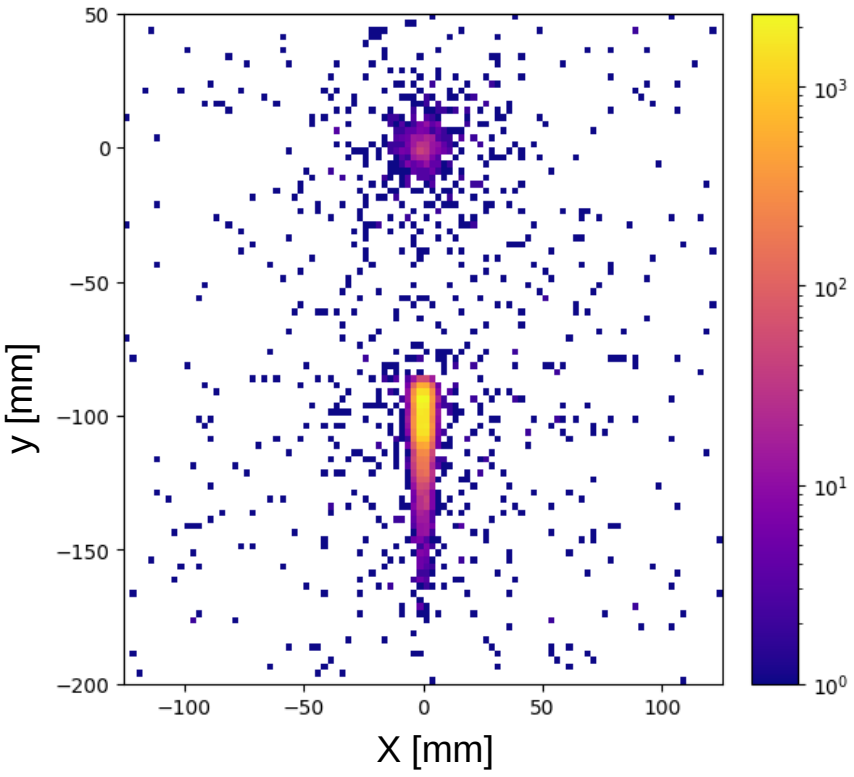




Tracking surface @ detector

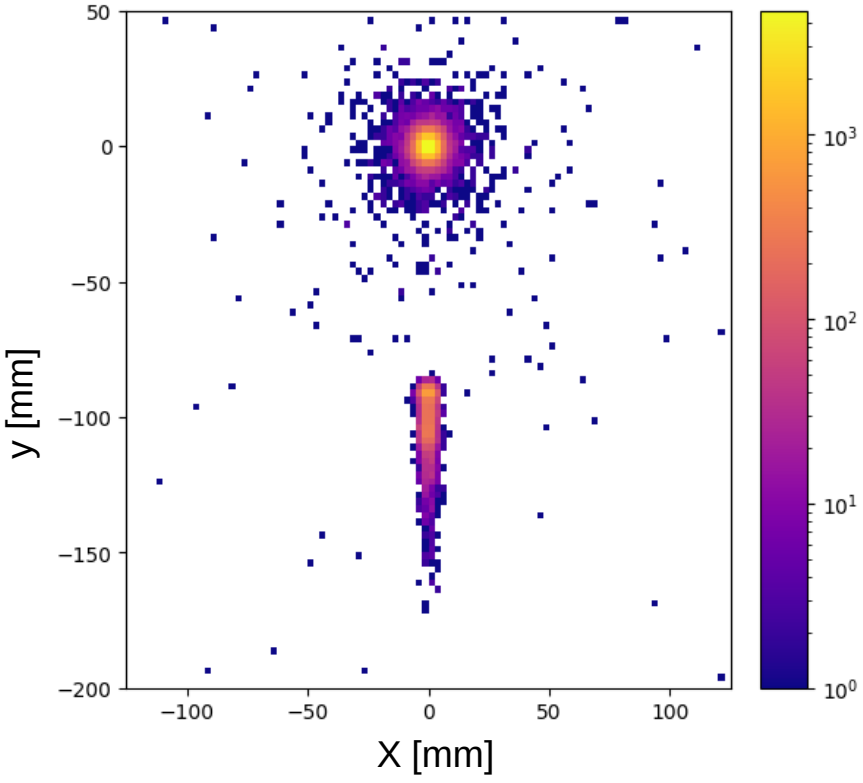


*missing quad effects

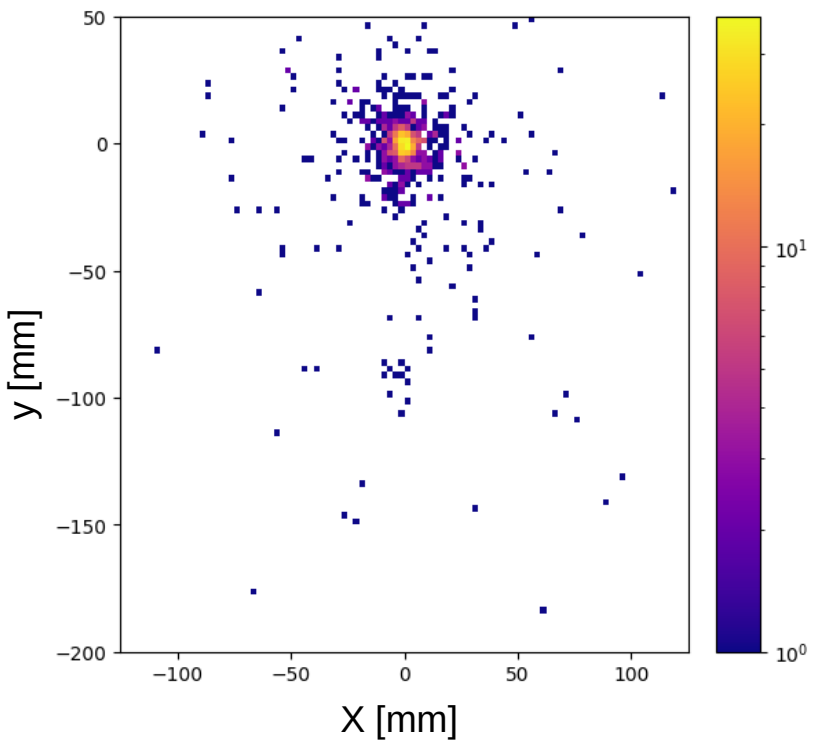


Tracking surface @ detector

Photon hits:



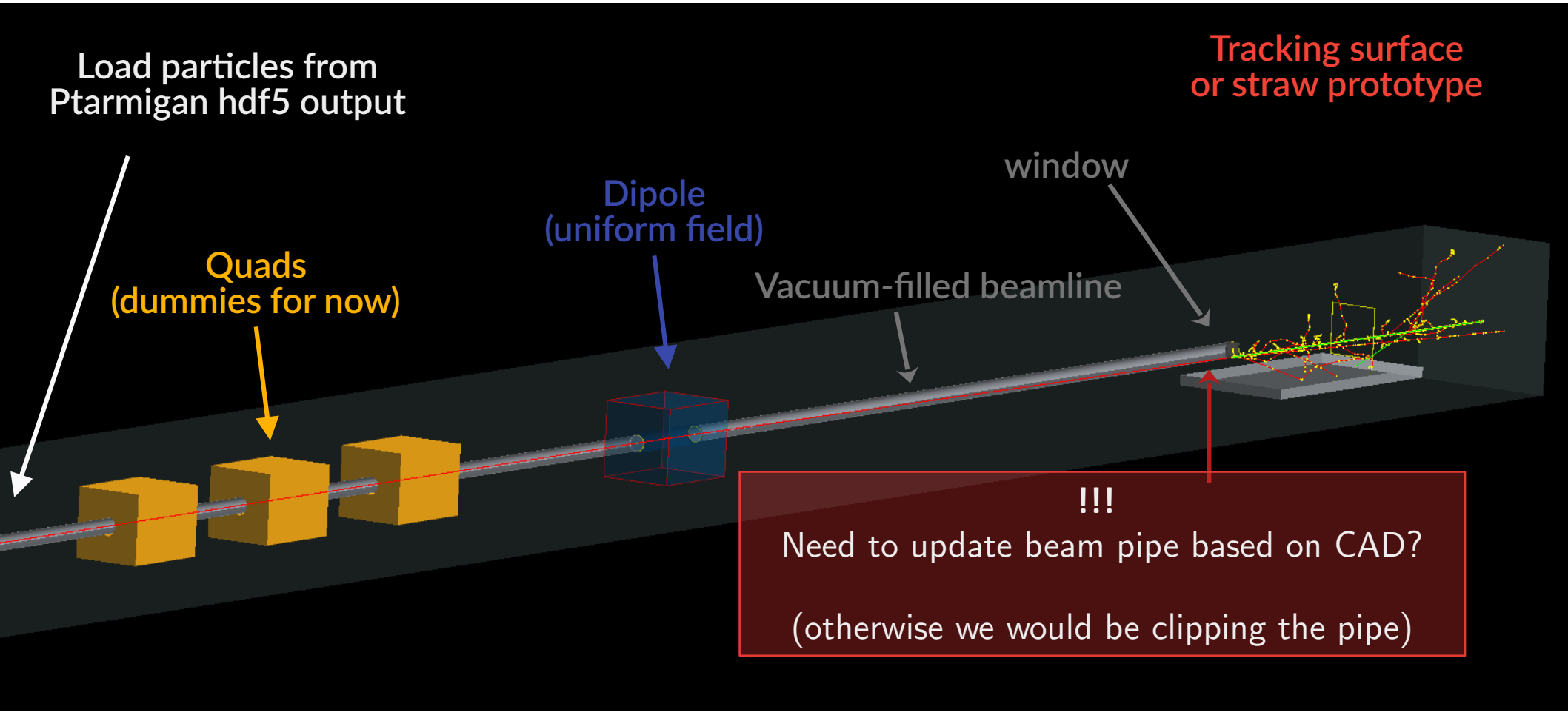
Positron hits



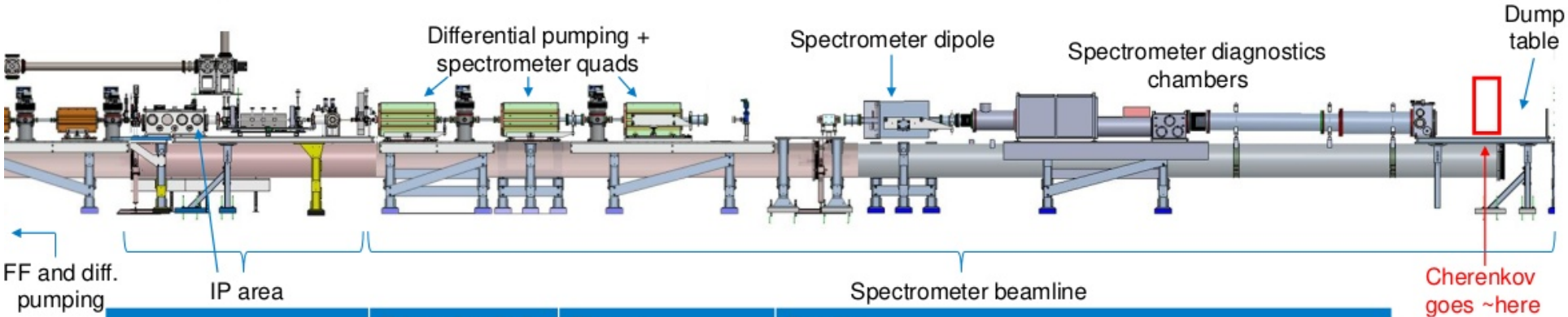
- Tracking surface saved position, momentum, PDG ID, more
- What is needed? Can...
  - Add quadrupole fields (approximate)
  - Plot various things (different a0, etc)
  - Swap in detector, plot straw traversal distance instead of hits

Backup

Setup


Load particles from
Ptarmigan hdf5 output
Tracking surface
or straw prototype
window
Dipole
(uniform field)
Quads
(dummies for now)
Vacuum-filled beamline
!!!
Need to update beam pipe based on CAD?
(otherwise we would be clipping the pipe)

E320 Spectrometer Beamline & Distances



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