

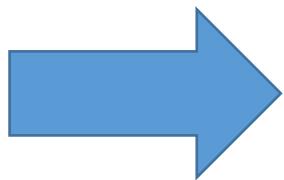
Radiation Dose for Targets

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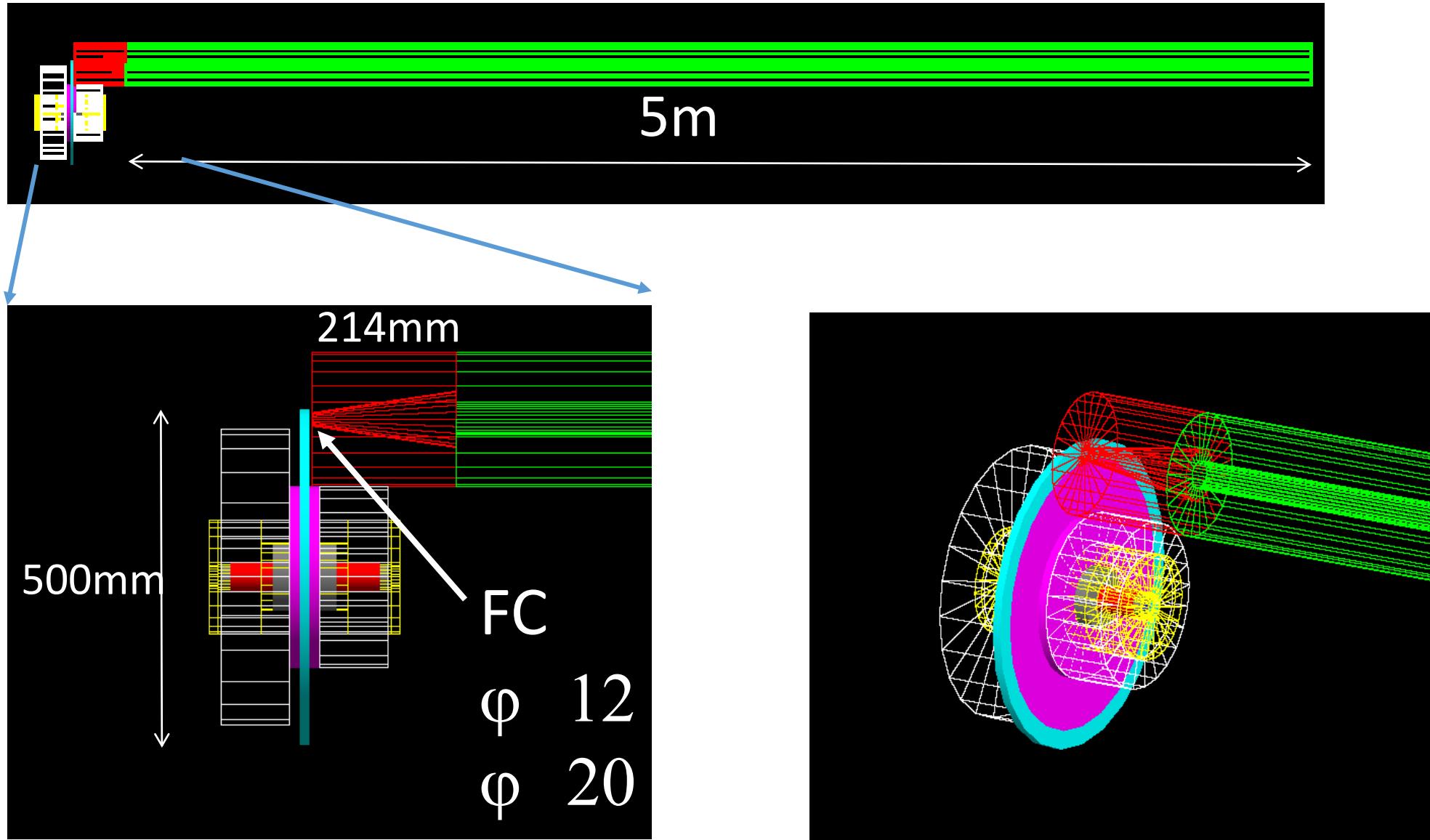
Issues

- Radiation dose / energy deposit to;
 - Target, AMD devise, Solenoid section, Ferofluid
- must be estimated;
 - radiation damages to materials
 - cooling
 - not just total heat load; PEDD is important too.



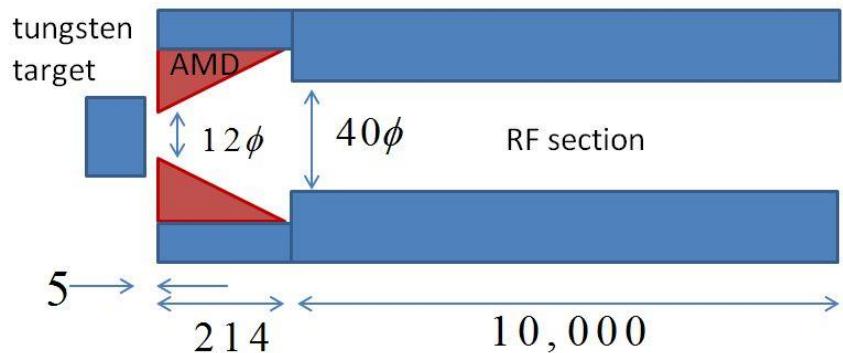
Put geometry into the simulation
Target, AMD, Solenoid, Ferofluid, Shiedlind

Geometry



Target and Capture

- Same as NIM paper+



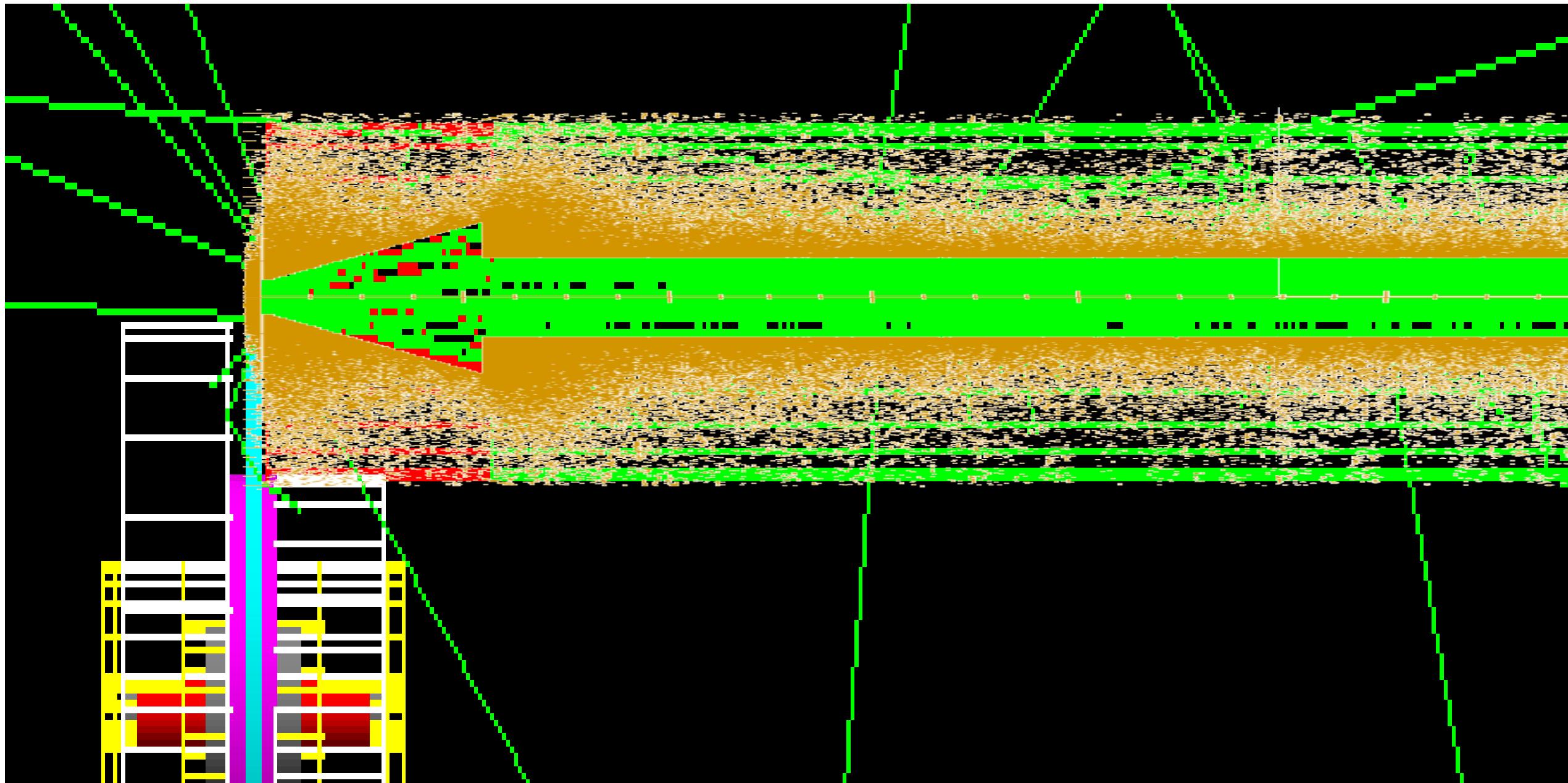
- FC

$$B_z(z - z_0) = \frac{B_0}{1 + \mu(z - z_0)} + B_{sol}$$

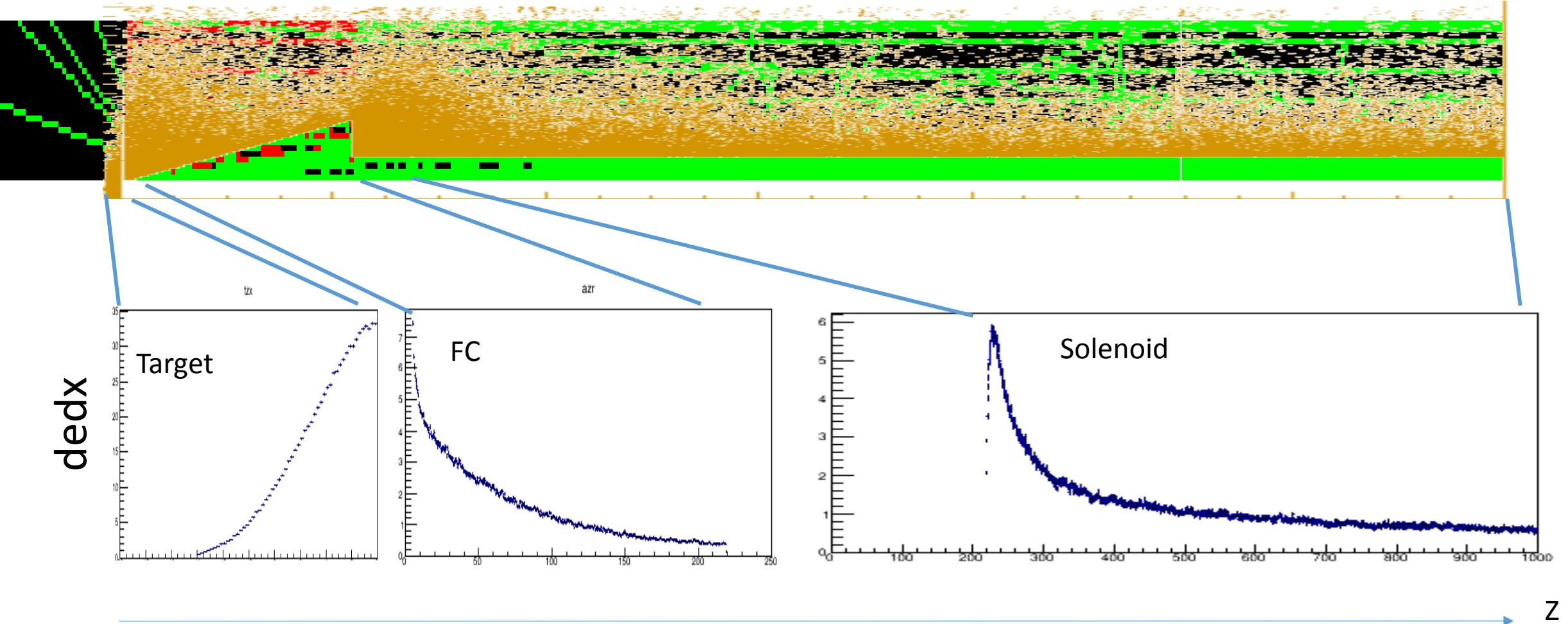
$$\begin{aligned} B_0 &= 7 \text{ T} \\ B_{sol} &= 0.5 \\ \mu &= 60.1/\mu \end{aligned}$$

- RF 25MeV/m

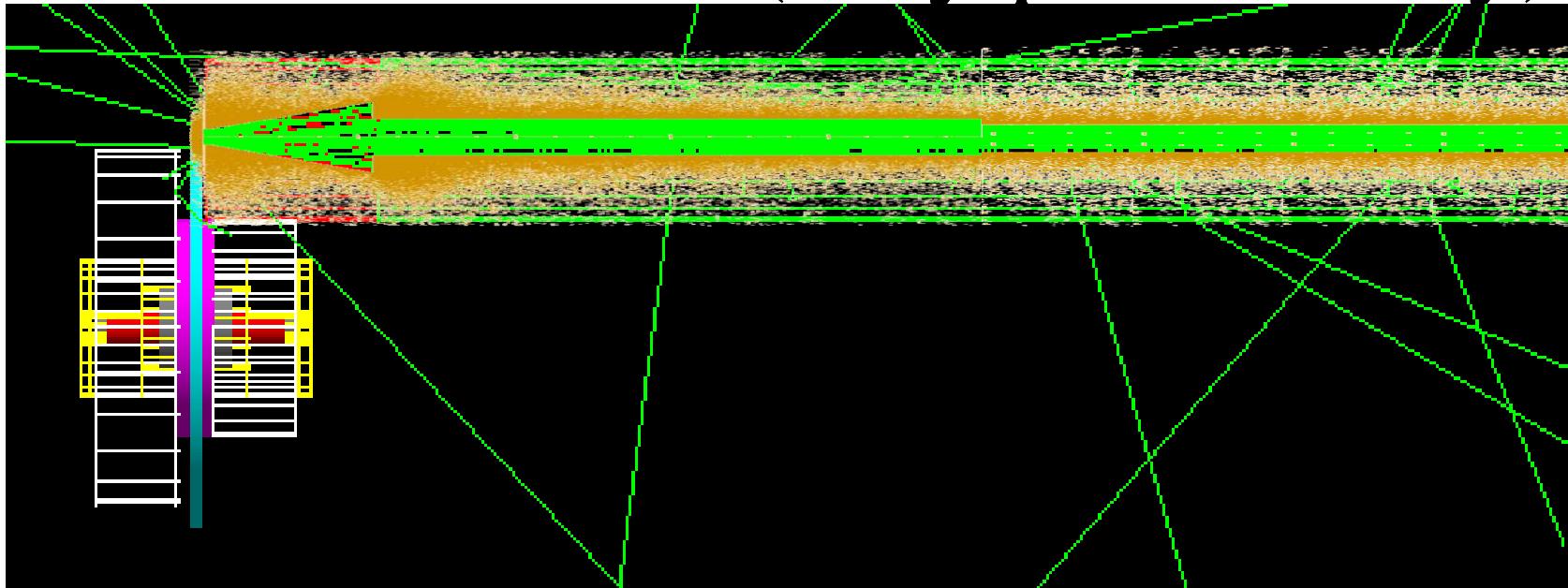
Hit distribution



Longitudinal Distributions



Some Numbers (very preliminary)



		Total MeV/electron	Total kW	PEDD (J/g for 132 bunches)
FC φ 12 mm	Target	848	36	22
	FC	889	38	4.5
	Solenoid(5m)	3430	145	0.21
FC φ 20 mm	Target	862	36	22
	FC	658	27	1.0
	Solenoid(5m)	3706	157	0.22

Summary and Outlook

- Radiation estimates with realistic geometry;
 - must be input to mechanical design
- To go further
 - need realistic design
 - AMD, Solenoid are just solid bricks with holes.
 - Chicane for electron bump
 - a half of energy deposit in the solenoid comes from electron
- Results depend on capture efficiency
 - Particularly in the AMD device