

An update of Energy deposition around an e-driven positron source

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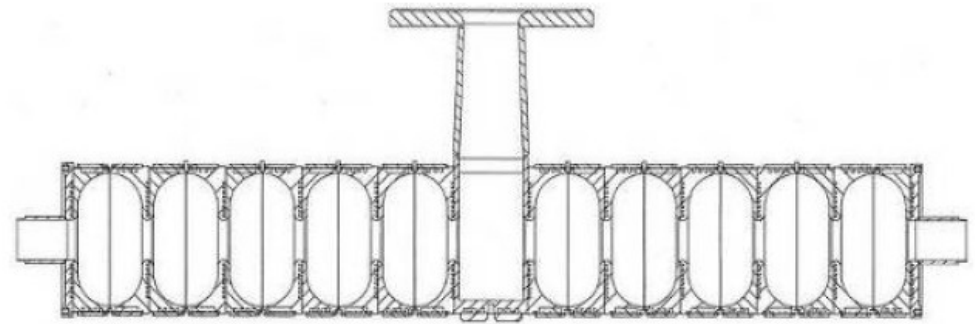
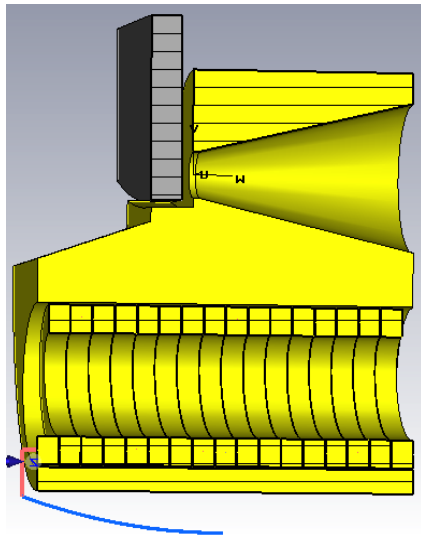
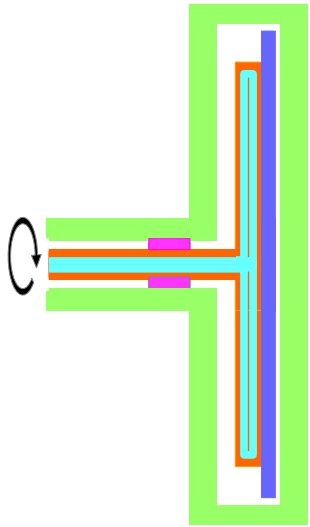
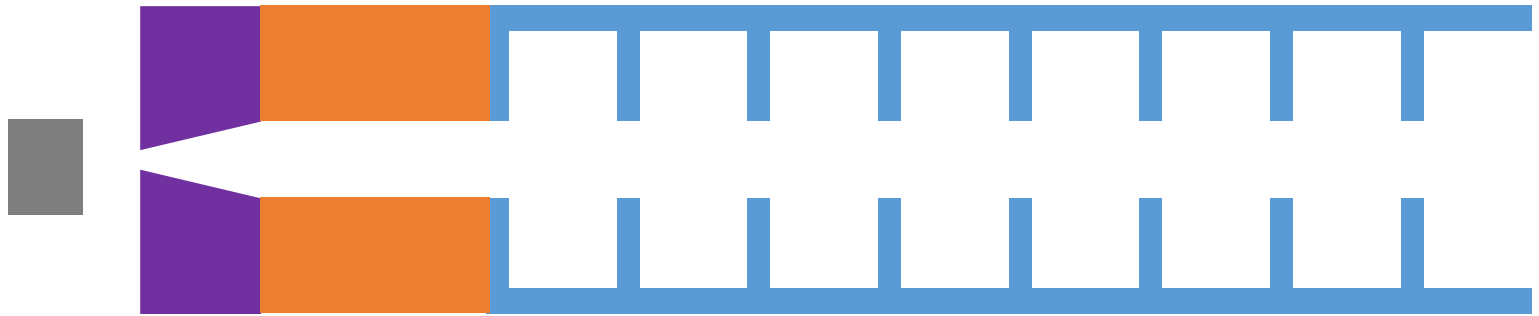
Sorry for not attending the workshop in person

PosiPol2017
September 2017
Novosibirsk

Contents

- Parameters
- Geometry
- Results
- Further issues?

Geometry



Rotating Target

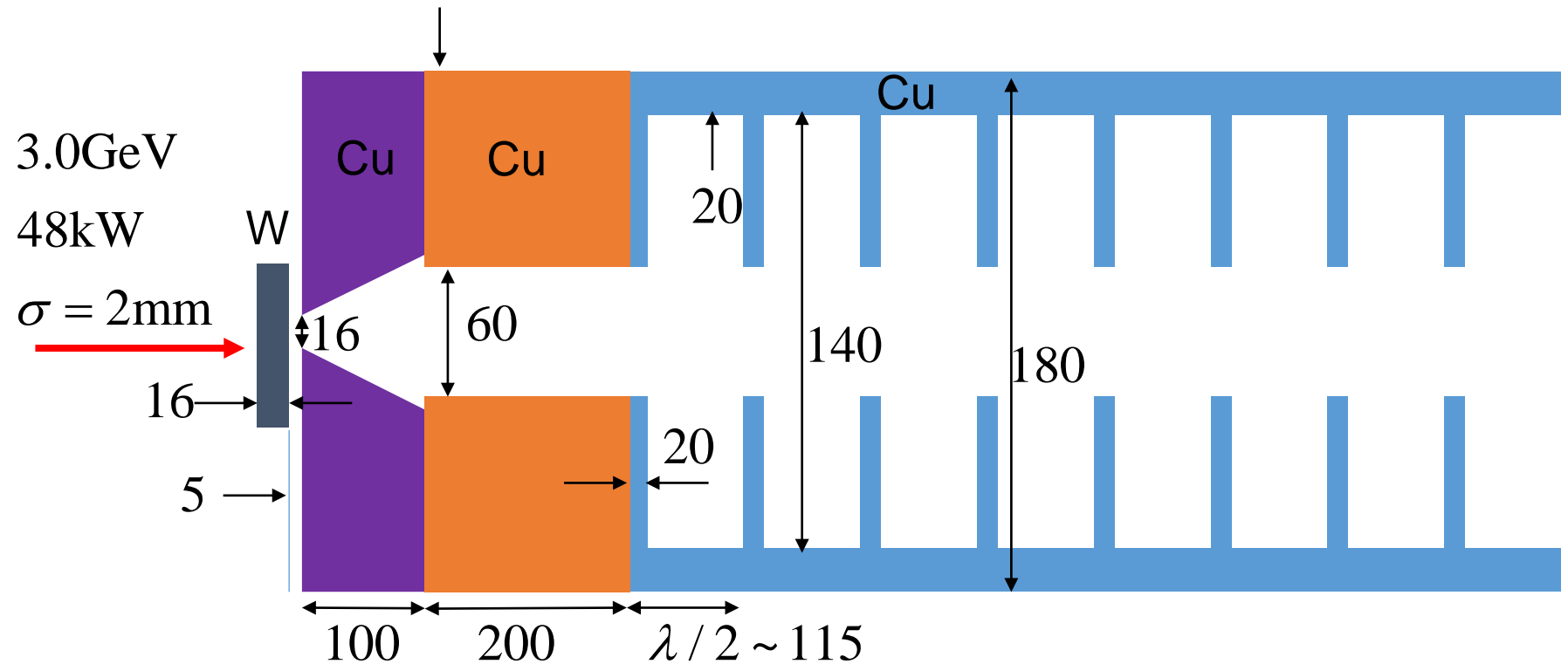
Flux Concentrator

capture linac

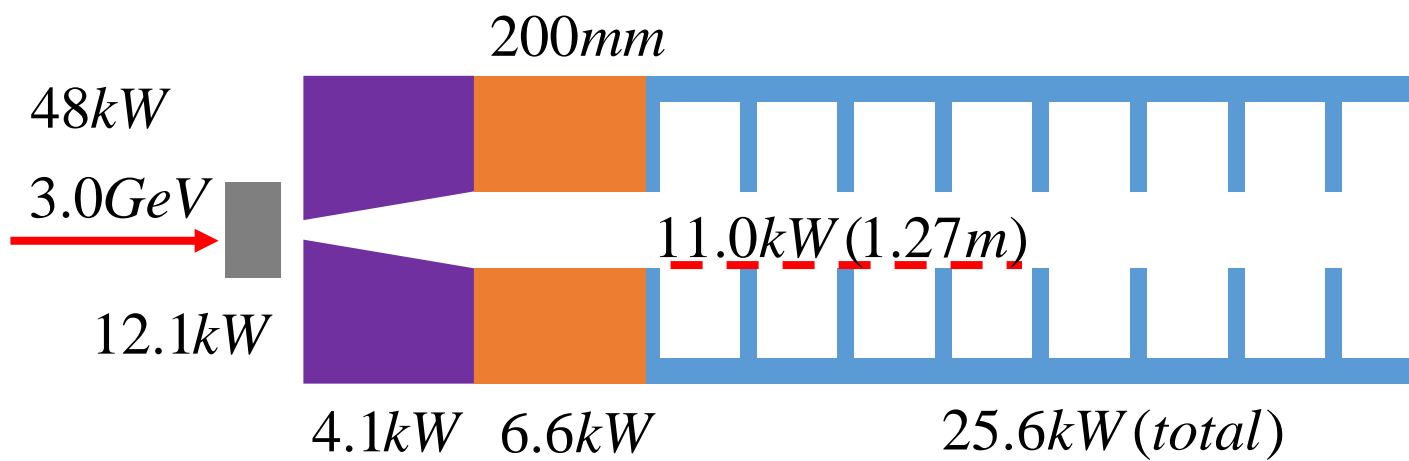
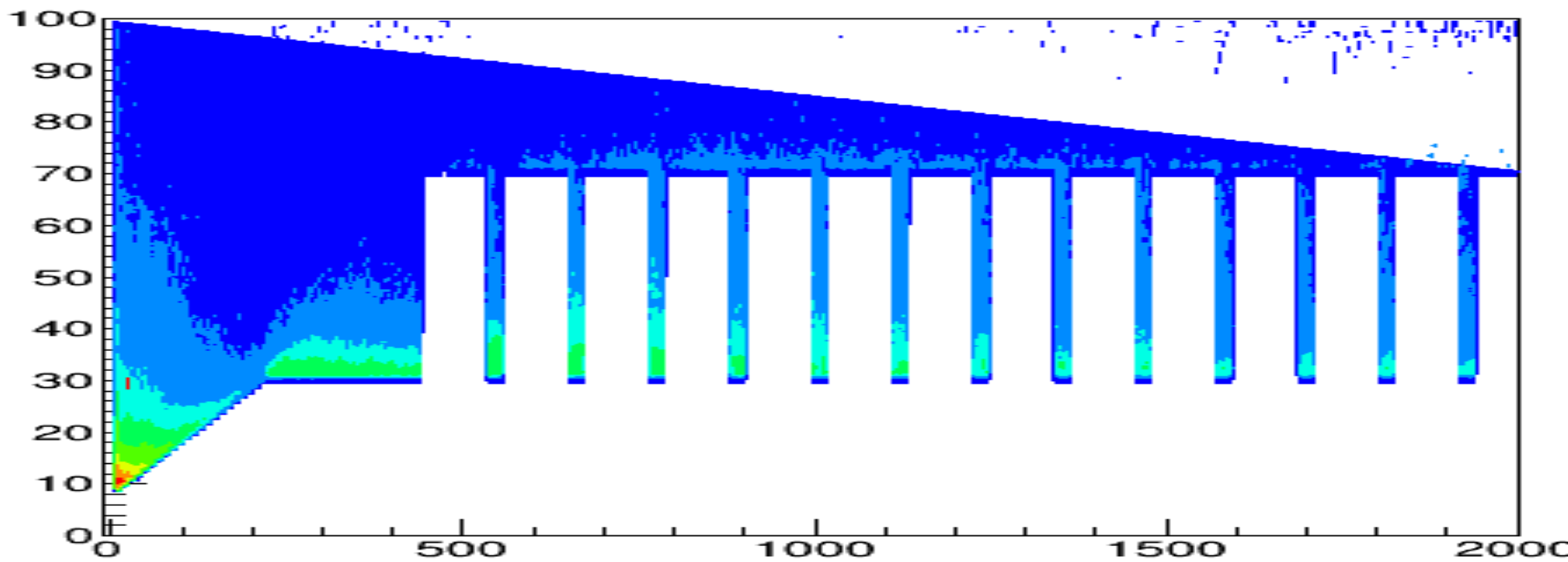
Parameters and geometry in Geant4

3120 bunches

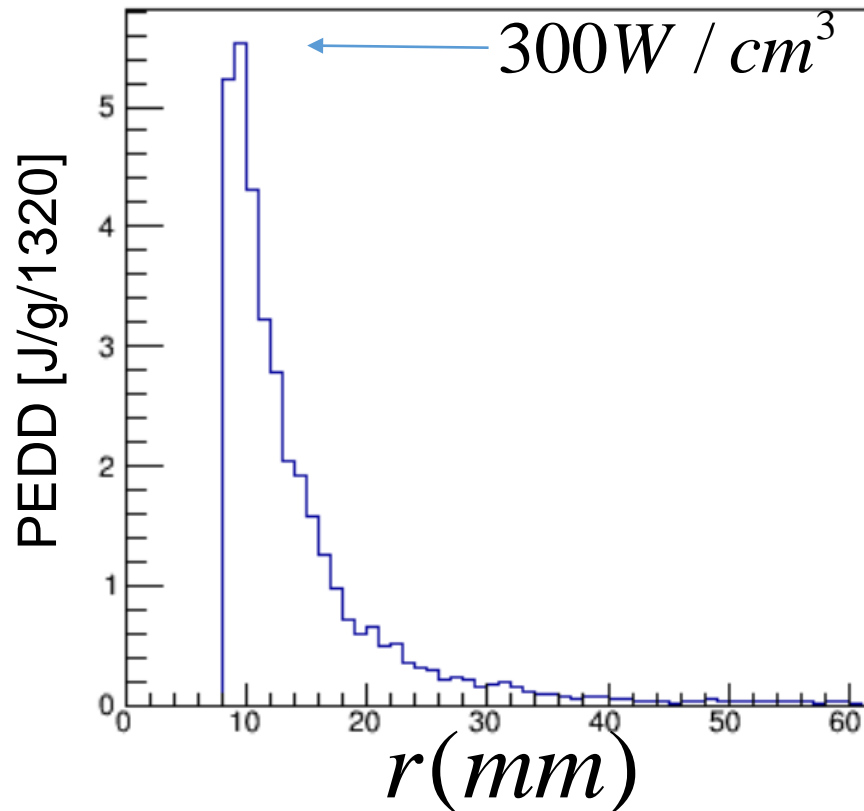
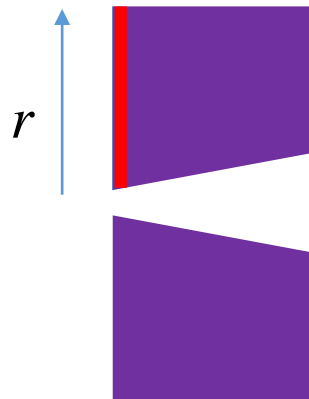
Ee	e-	e-/bunch	Beam Power	Total thickness
GeV	mm	nC	kW	kW
3.0	2	2.4	48	12.1



Summary of the calculation



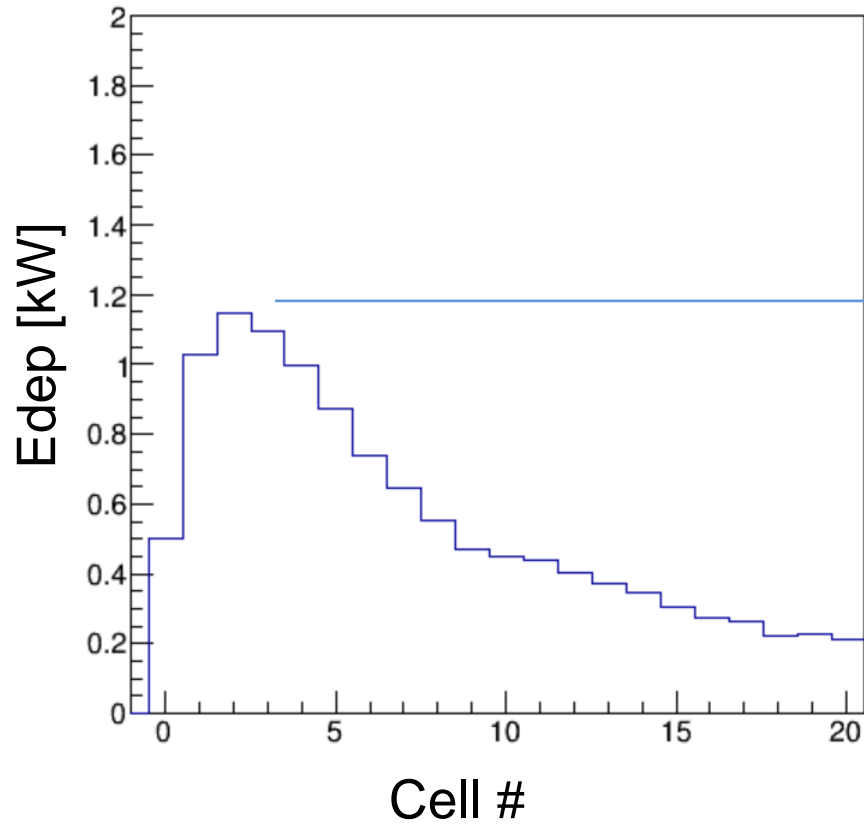
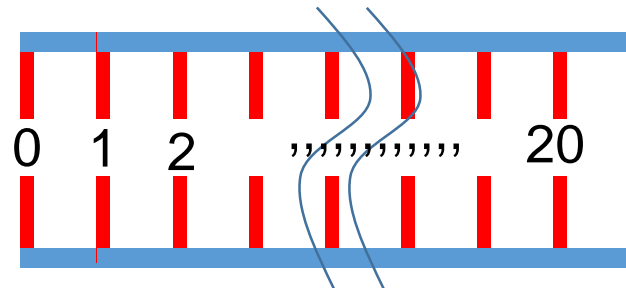
PEDD(1320 bunches) in FC



Less than the limit for Cu (7~12 J/g)*
with 1320 bunches (~ 64ms).

*TESLA-FEL-2006-05

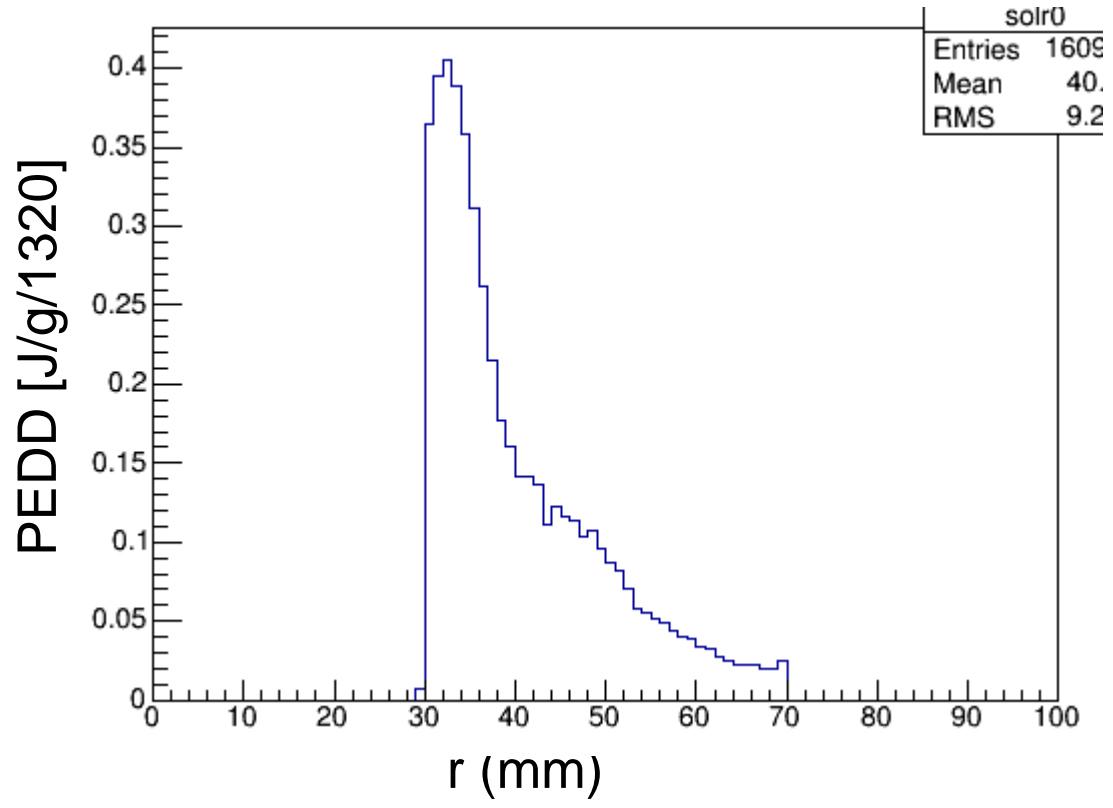
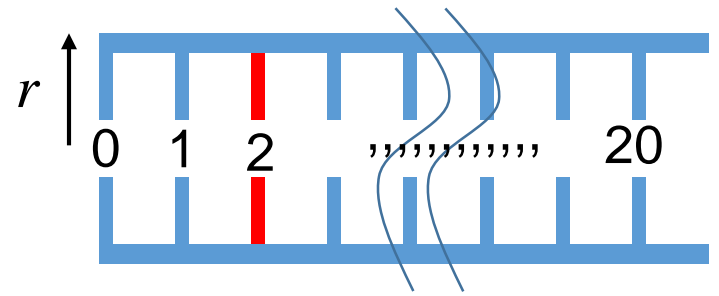
Energy deposit in irises the capture linac



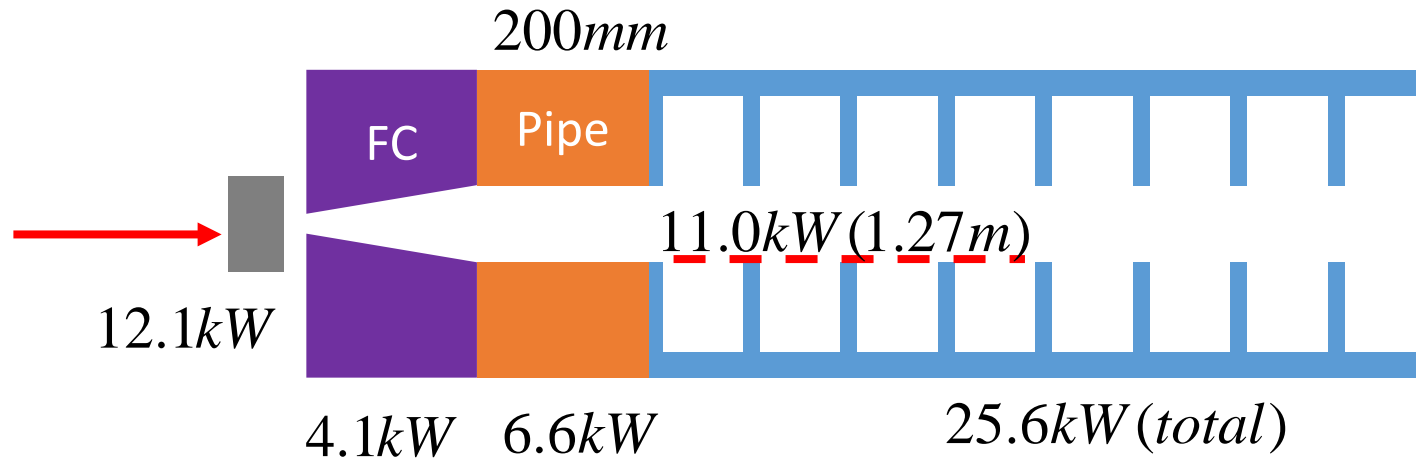
Detuning $-38.2\text{kHz}/7.4\text{kW}$ in an iris
(an estimate from SLAC-PUB-11767)

$38.2 \times 1.2/7.4 = 6.2 \text{ kHz}$
,at the worst estimate,
is less than the bandwidth of 44 kHz

Energy deposit in irises the capture linac



Summary of the energy deposition



Target	16.3kW	
Pipe	6.6kW	
Flux Concentrator	4.1kW (beam) + 14kW (ohmic)	
	PEDD=6J/g(1320bunch)=0.3kW/cm ³	
Capture Linar	25.6kW (total)	3.32kW (RF) per 9Cell (tube)
	11.0kW (beam) + 3.32kW (RF) in first 9Cell	

Prospects

- Energy deposition issues are much relaxed and does not seem to be an issues for e-driven target.
 - An engineering design of the cooling system is necessary and a discussion with a company started.
- Further considerations may needed and planned
 - Effect of secondary particles on operation of the capture linac
 - Neutron hits on Ferro fluid sealing