Additional Absorbers in IR3

	λ_{in} [cm]	X_R [cm]	λ_{pair} [cm]
Carbon	43	21	28
Copper	15	1.43	1.9

λ_{in} - proton mean free path to inelastic interaction

λ_{pair} - photon mean free path to e^+e^- pair production

X_R - radiation length

Length to absorb a high energy electromagnetic shower

$> 15X_R$ (for carbon > 300 cm)

Simulations

STRUCT –

map of proton interactions in the collimator jaws, map of off-momentum protons lost in DS3

MARS –

cascade development, energy deposition, map of particles downstream of Q7R

EDD – power deposition density per unit of cleaning rate

QL = 5 mW/cm^3 – quench limit

CRQ = QL / EDD - cleaning rate to quench one of SC magnets Q6, Q7, B8, Q8

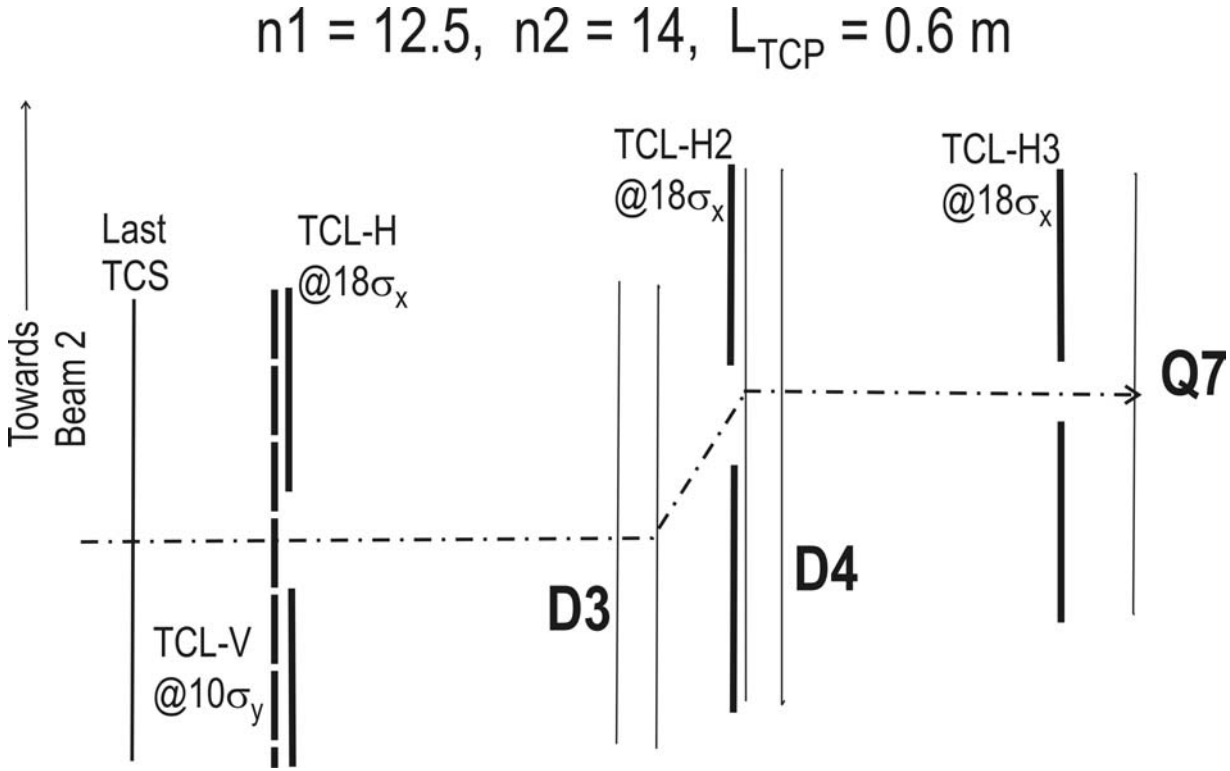
BLTQ = 3x10^{14} protons / CRQ - the beam lifetime corresponding to CRQ

Baseline – no additional absorbers,

L_{TCP} = 0.2 m

SC magnet	BLTQ [hours]
MCBCV	150
Q6	18.3
Q7	18.3
B8A	15
B8B	35.5
Q8	9.0

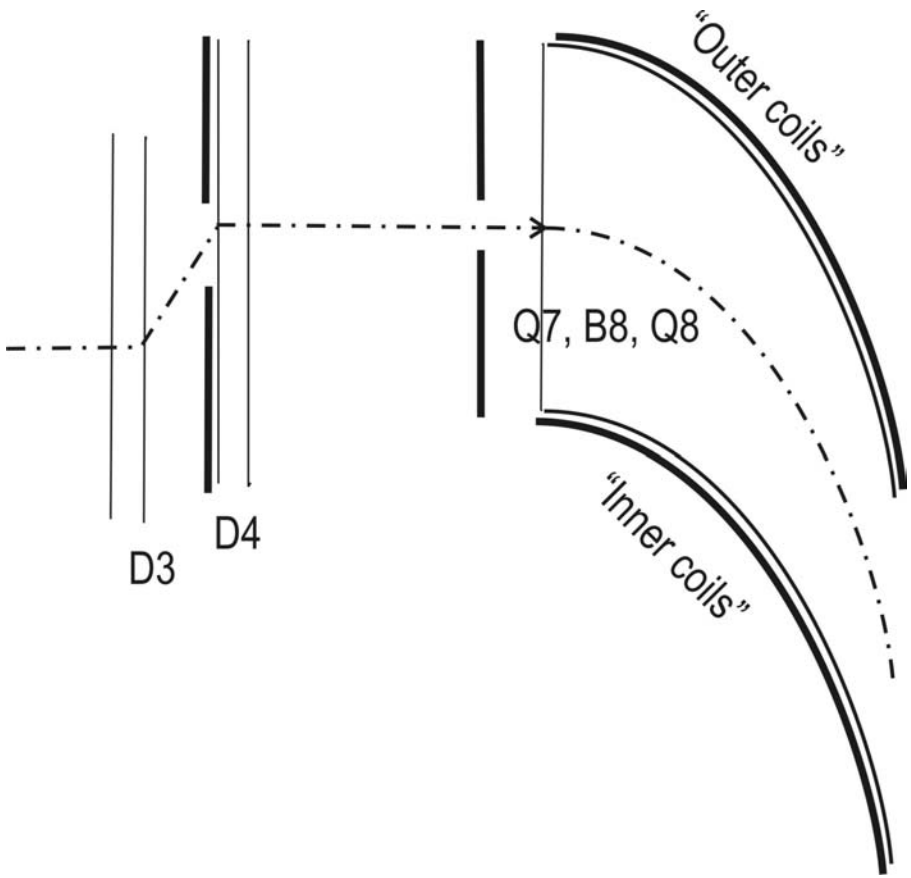
The proposed absorbers (TCL type)



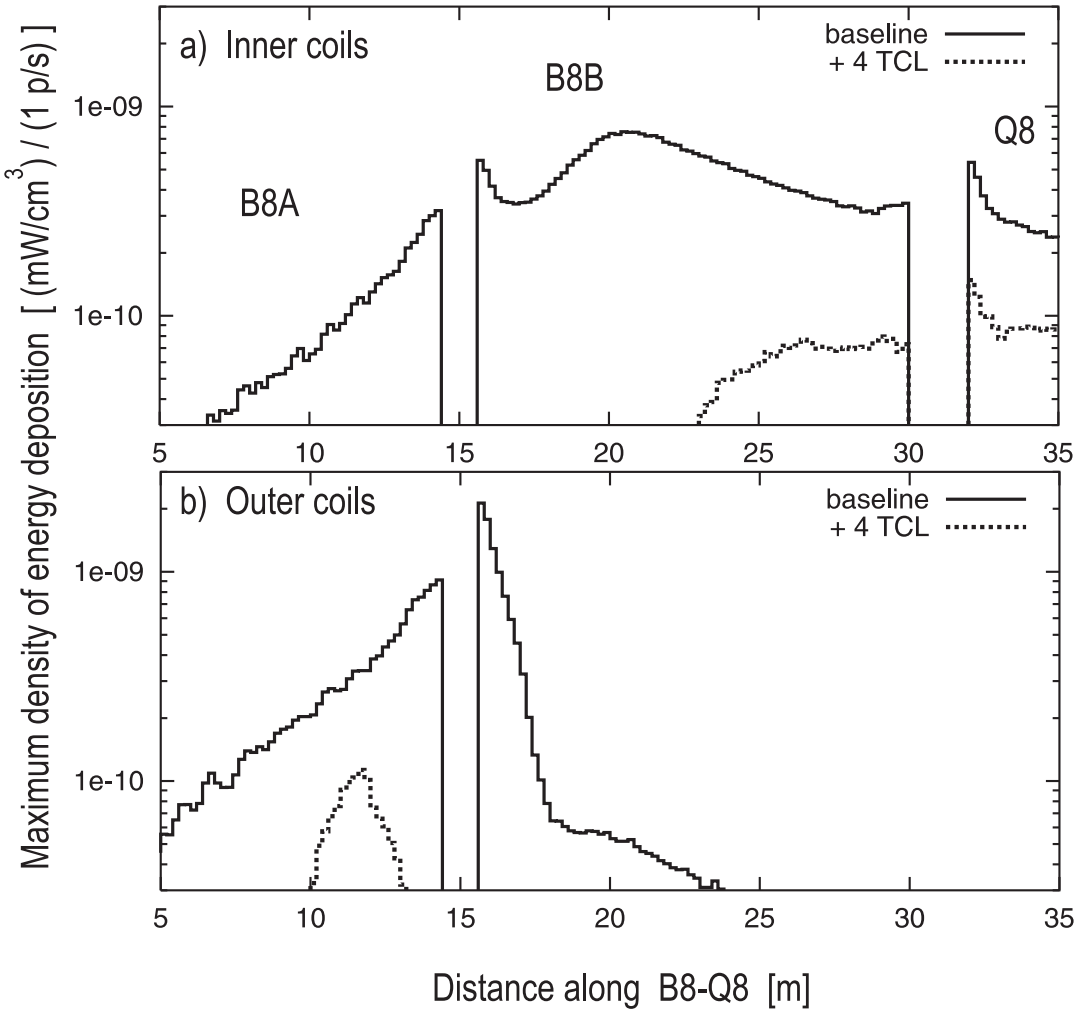
Relative rates of inelastic interactions

	L_{TCP} = 0.2 m	L_{TCP} = 0.6 m
TCP.6L3	0.4613	0.6850
TCSG.5L3	0.0436	0.0280
TCSG.4R3	0.3347	0.1904
TCSG.A5R3	0.0949	0.0568
TCSG.B5R3	0.0655	0.0398

Dogleg / DS scheme



Maximum EDD in the coils of the DS magnets



+ 3 TCL (without TCL-H3 near Q7), L_{TCP} = 0.6 m

SC magnet	BLTQ [hours]
MCBCV	1.2
Q6	0.3
Q7	0.38
B8A	3.0
B8B	4.5
Q8	3.7

+ 4 TCL, L_{TCP} = 0.6 m

SC magnet	BLTQ [hours]
MCBCV	1.2
Q6	0.3
Q7	0.21
B8A	1.8
B8B	1.3
Q8	2.5

n1 dependence