Rad-BhaBha Losses with sf11 final focus layout

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SuperB

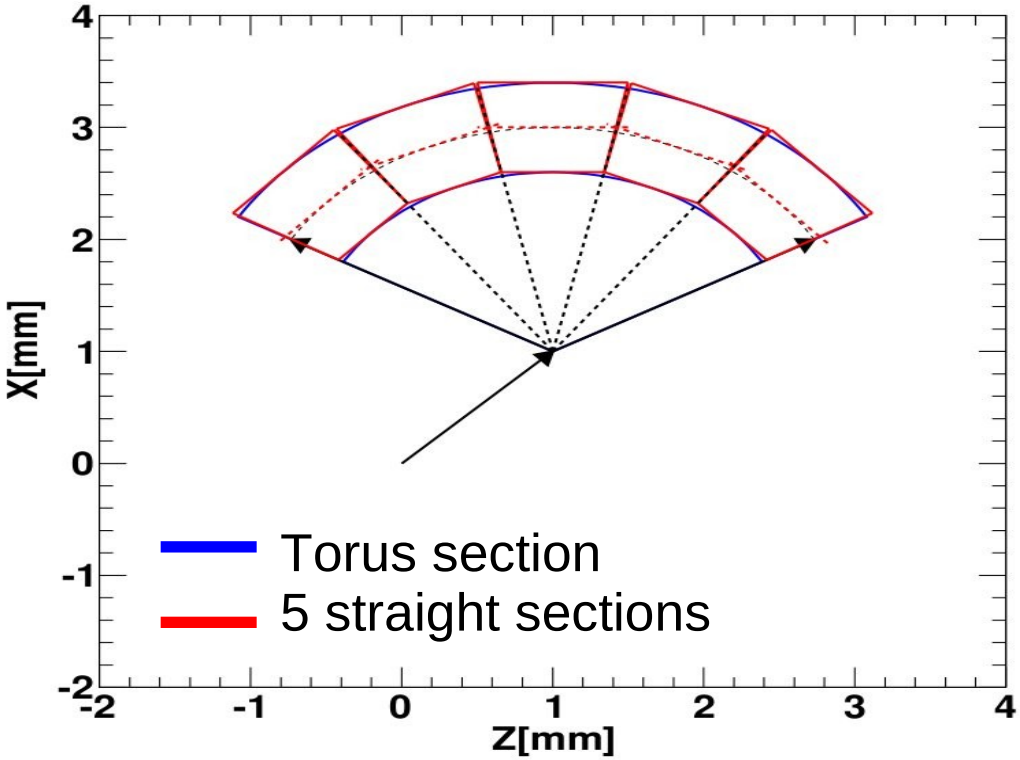
Outline

- **The new Final Focus:**
  - New pipes model near by the bending magnets
  - New Tungsten shield

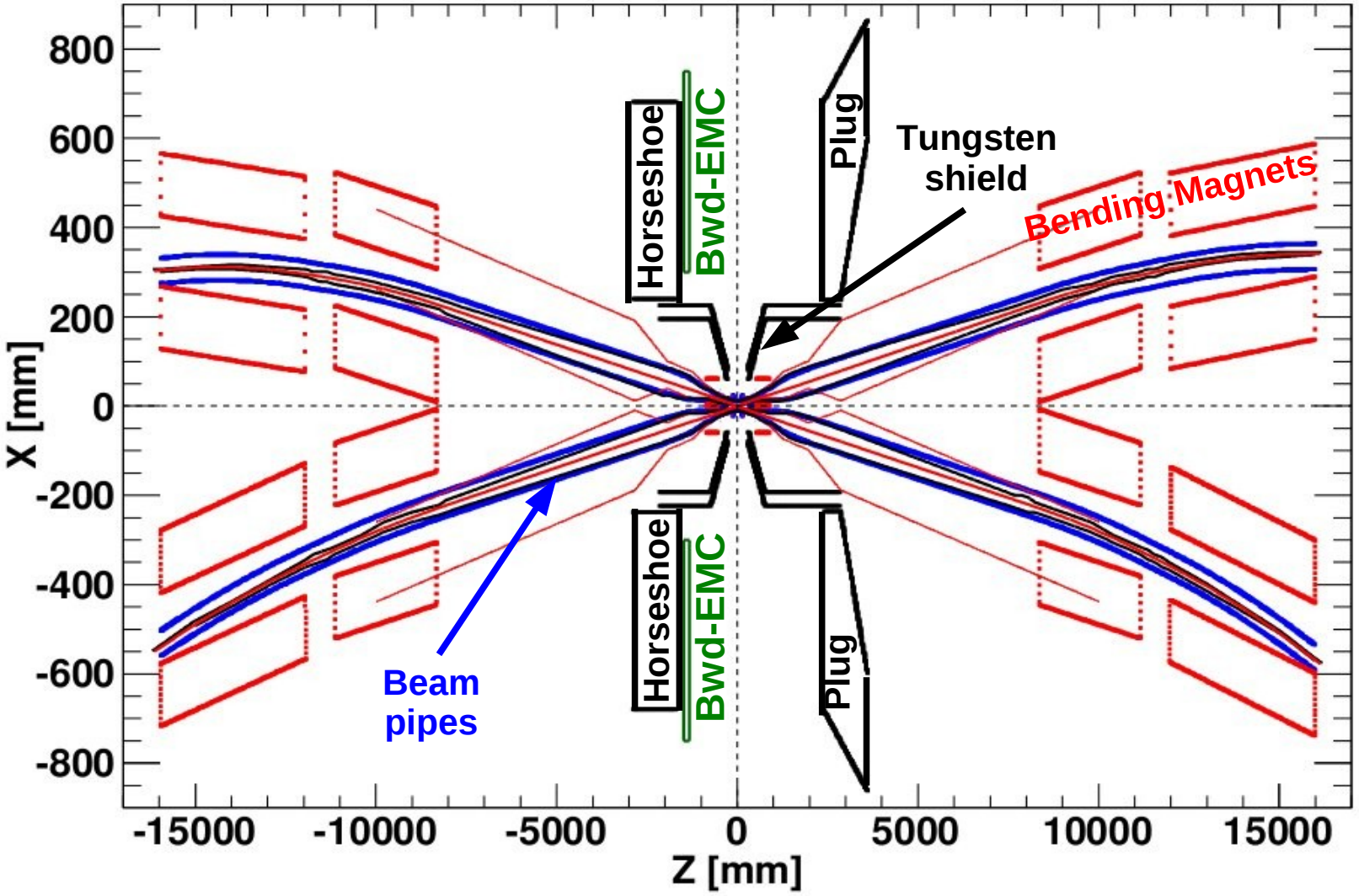
- **Rad-Bhabha losses at the beam pipes**

New Beam pipes (I)

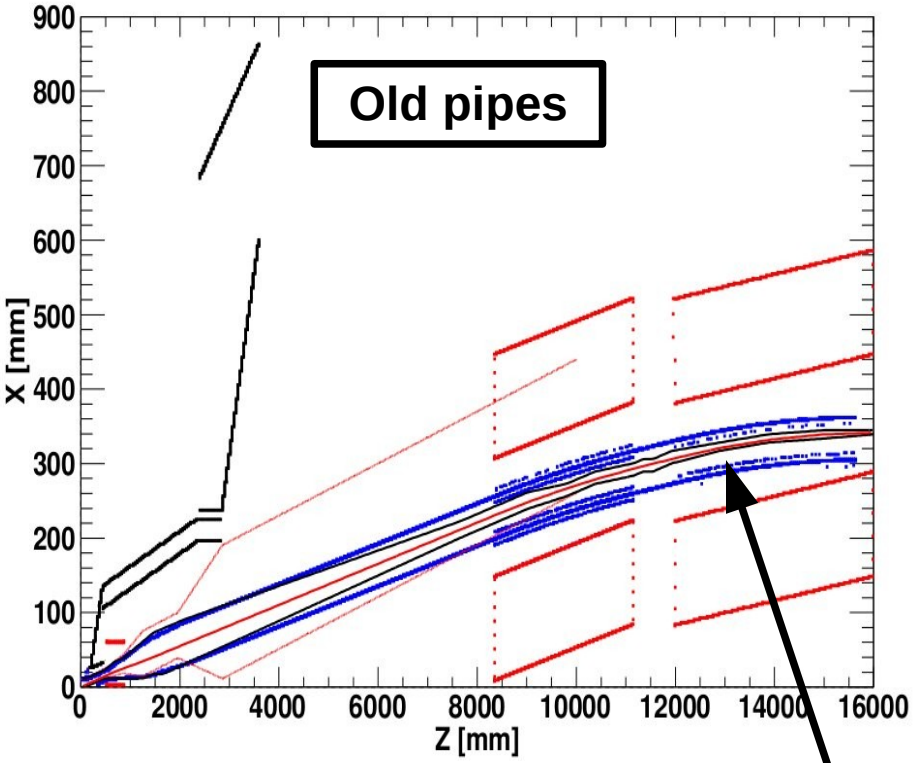
- **Previously:**
  - Pipes inside bending magnets modeled as torus
  - Torus gives some navigation problems when testing geometry with Geant4
- **Currently:**
  - Pipes inside bending magnets are modeled as the union of straight pipe sections (3) that follows the bending curvarure

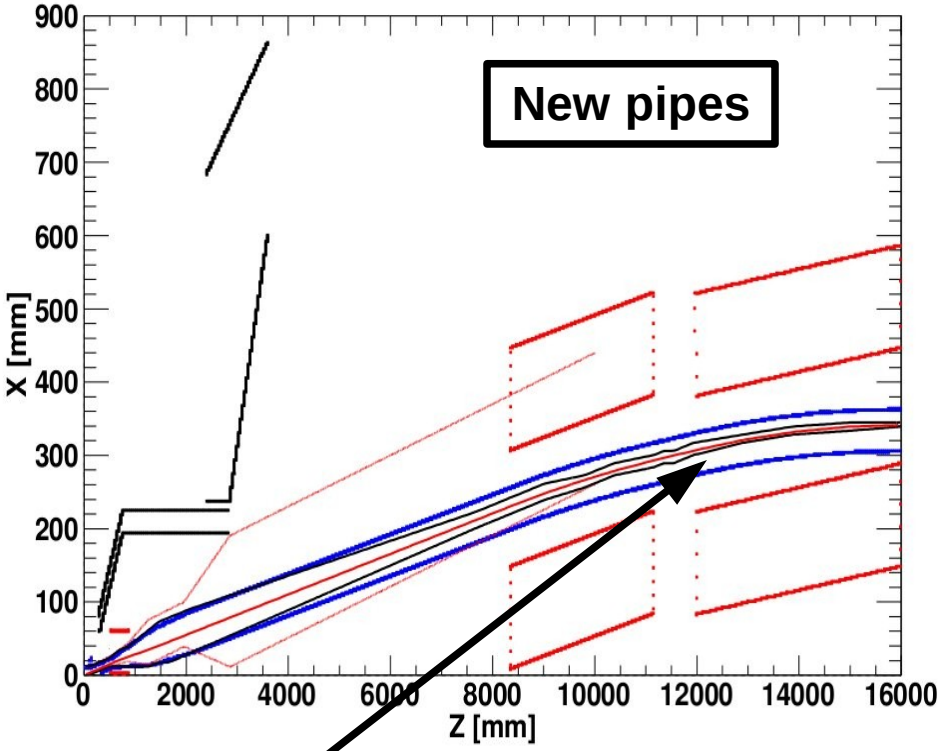


New Beam pipes (II)



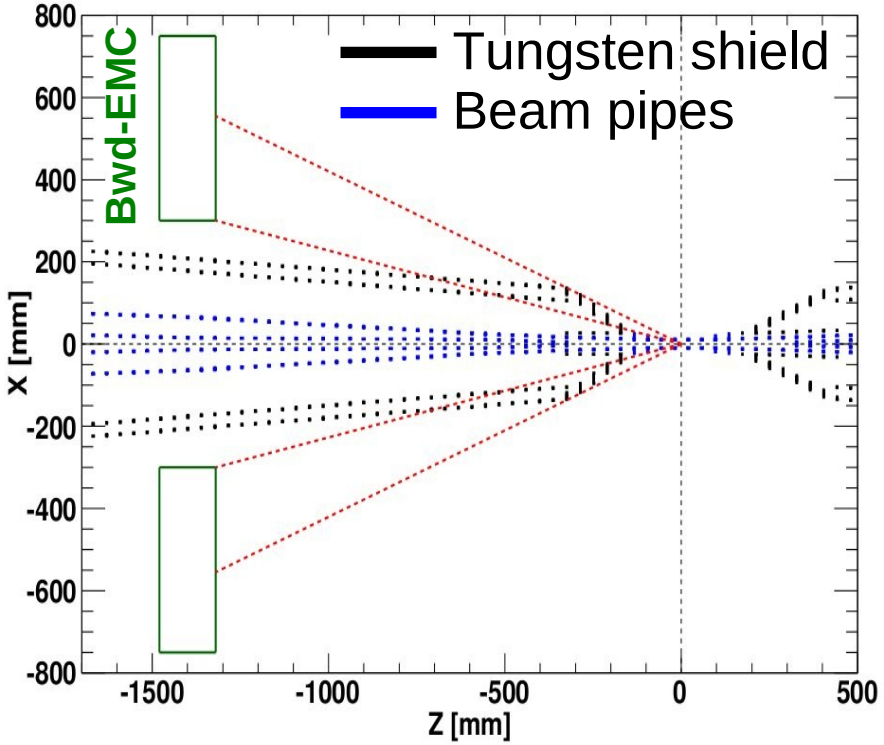
New Beam pipes (III)

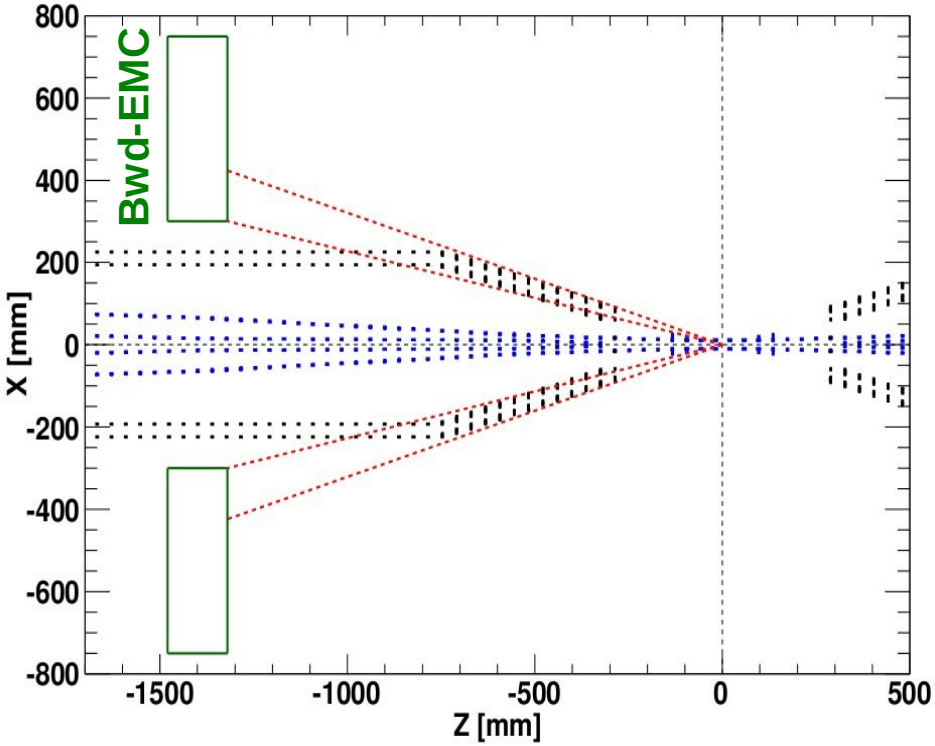




New pipes gives no navigation problems

New Tungsten Shield

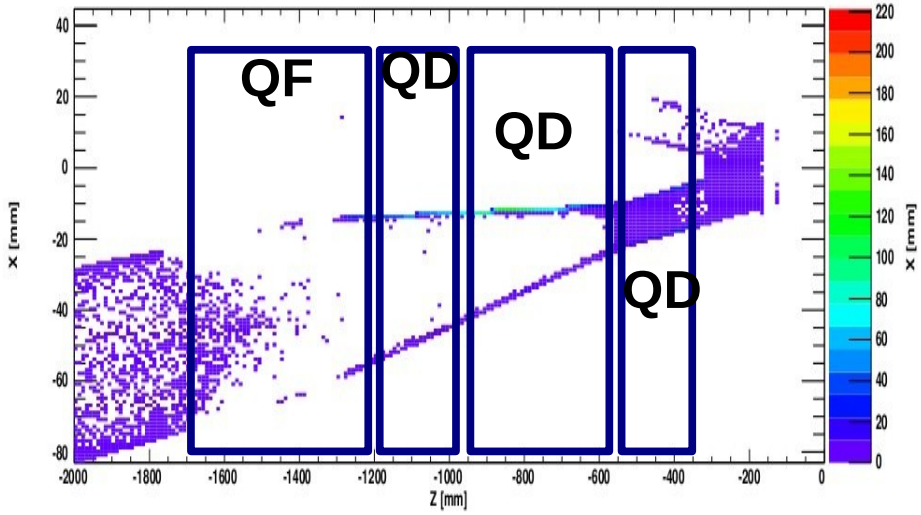


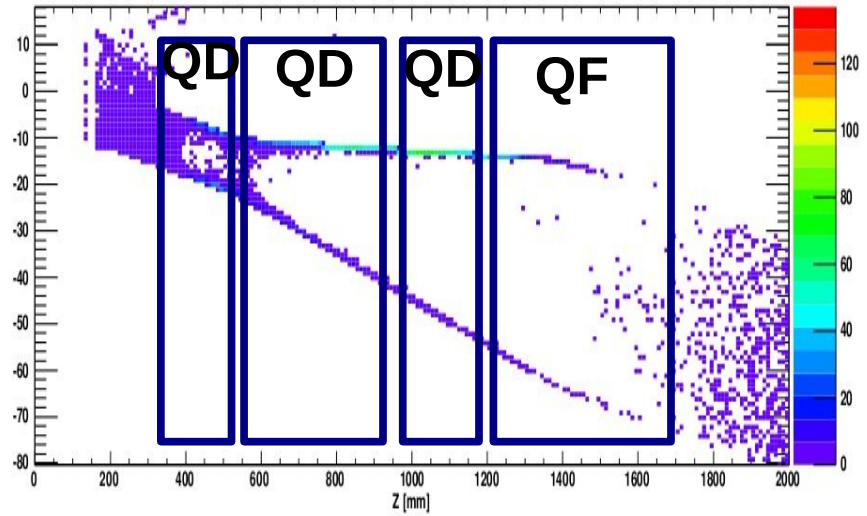


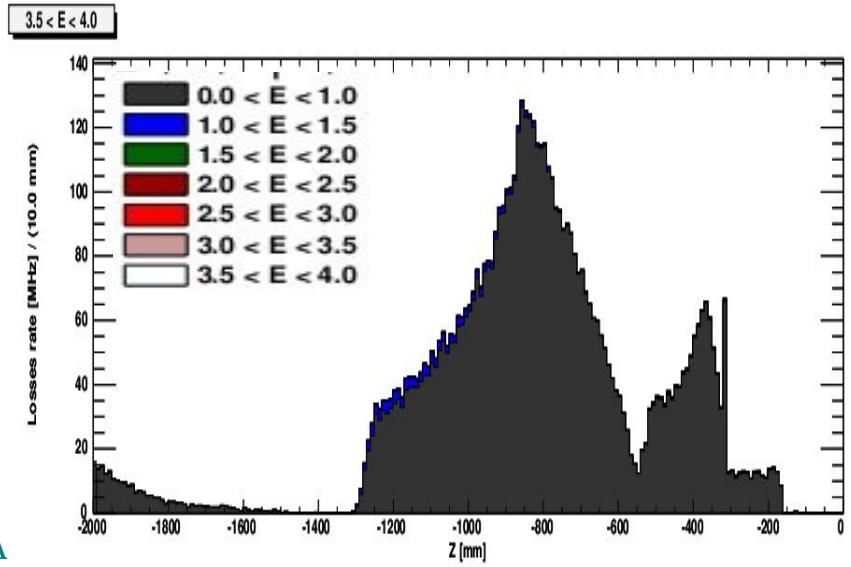
- **Previously:**
  - Conical shape (polycone)
  - Shielded above 300mrad on bwd-side
- **Currently:**
  - Cone (300mrad angle) and straight pipe
  - Now shield is below the 300mrad angular coverage

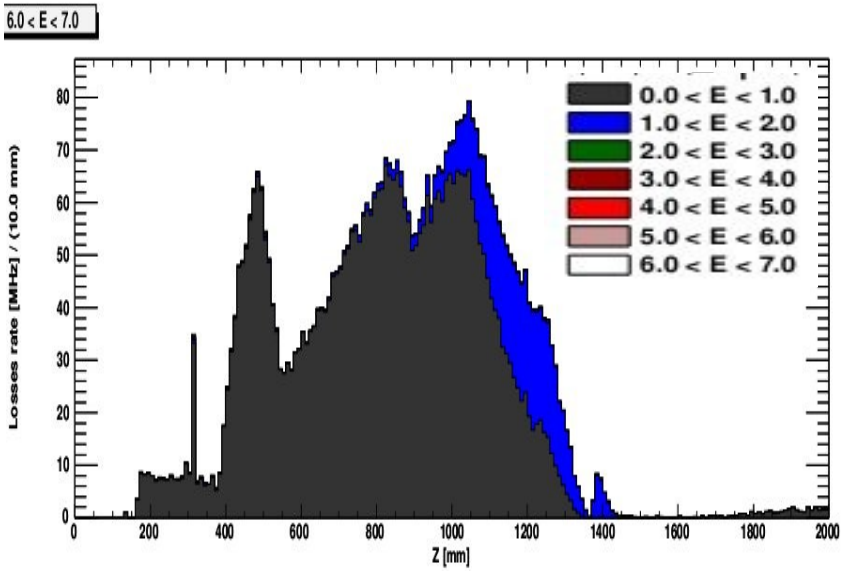
Losses results: v12-sf11 (leptons)

- V12-sf11 layout: HER = e^+ (6.69 GeV) and LER = e^- (4.18 GeV)



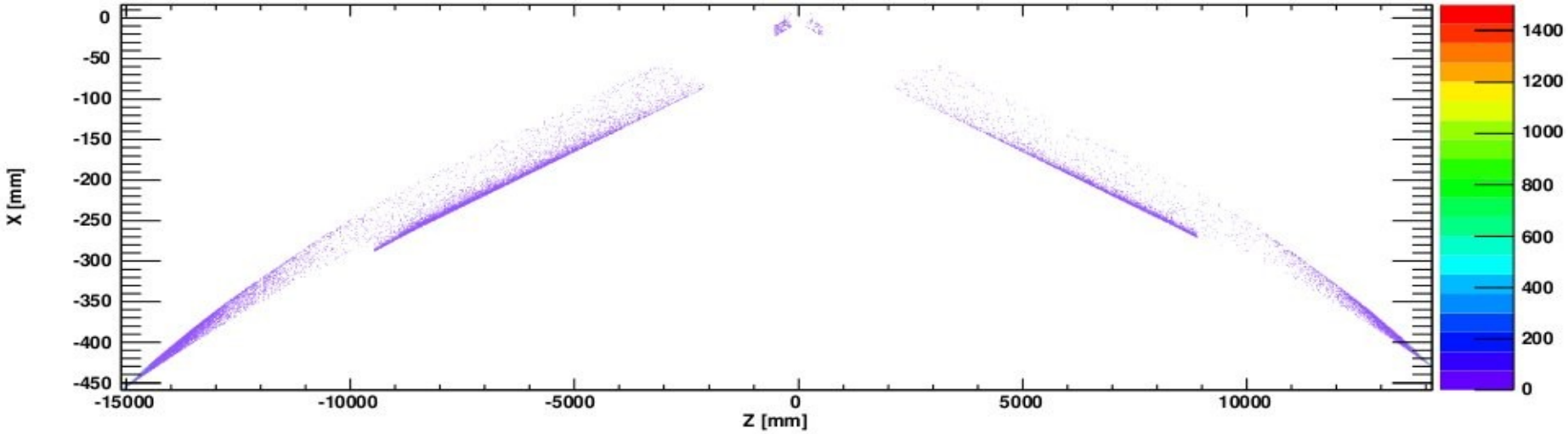


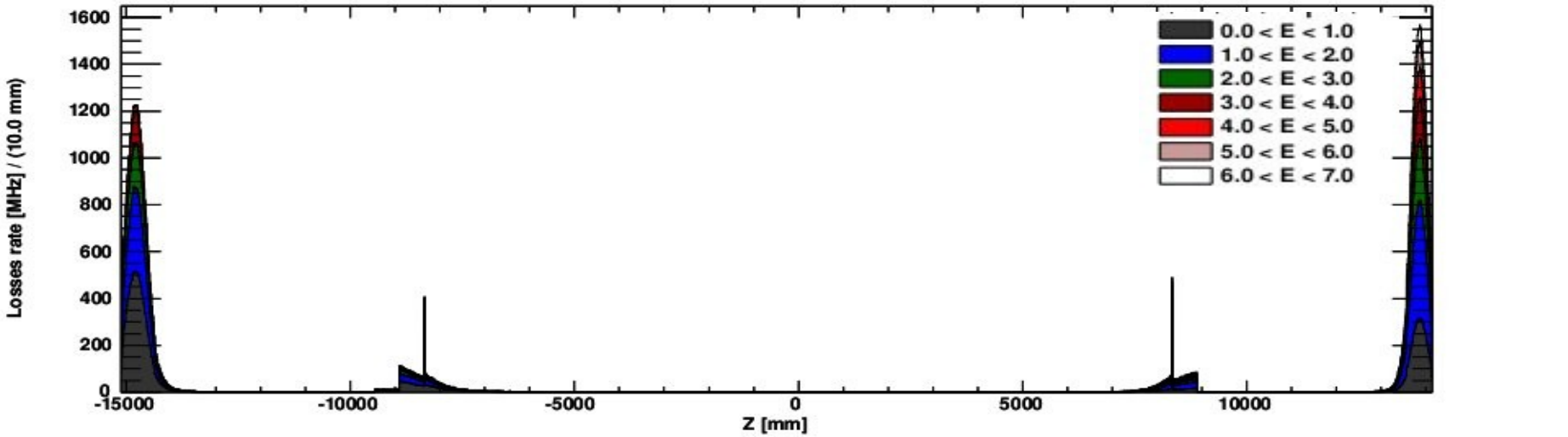




Losses results: v12-sf11 (gamma)

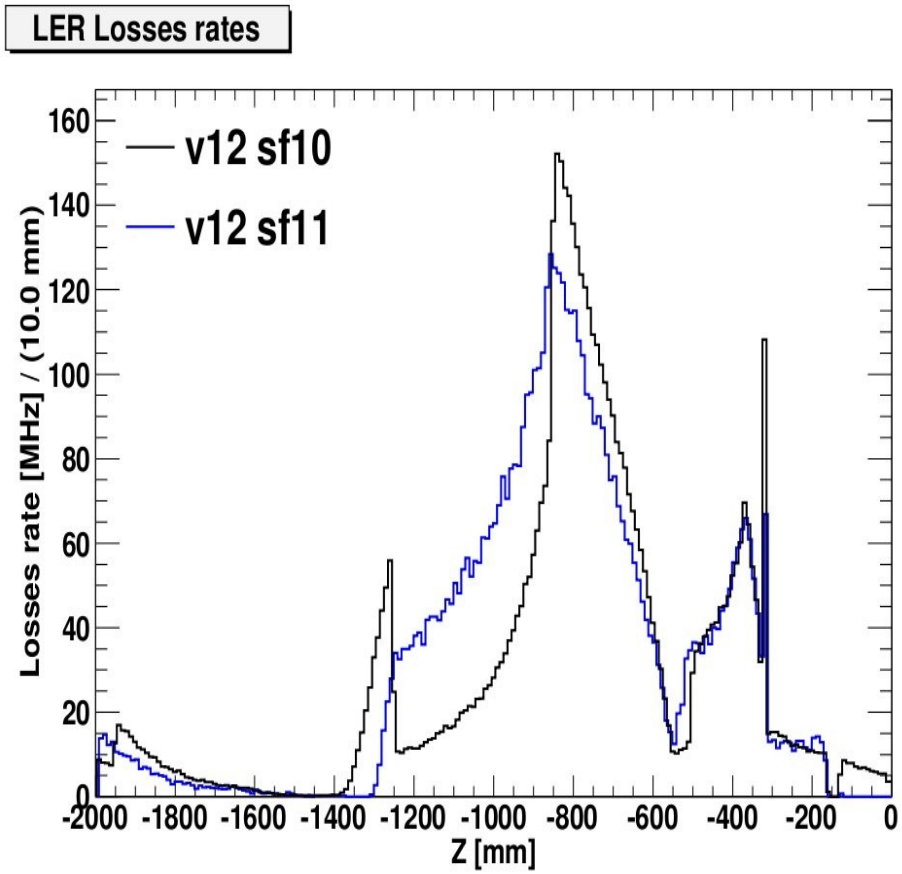
- V12-sf11 layout: HER = e^+ (6.69 GeV) and LER = e^- (4.18 GeV)

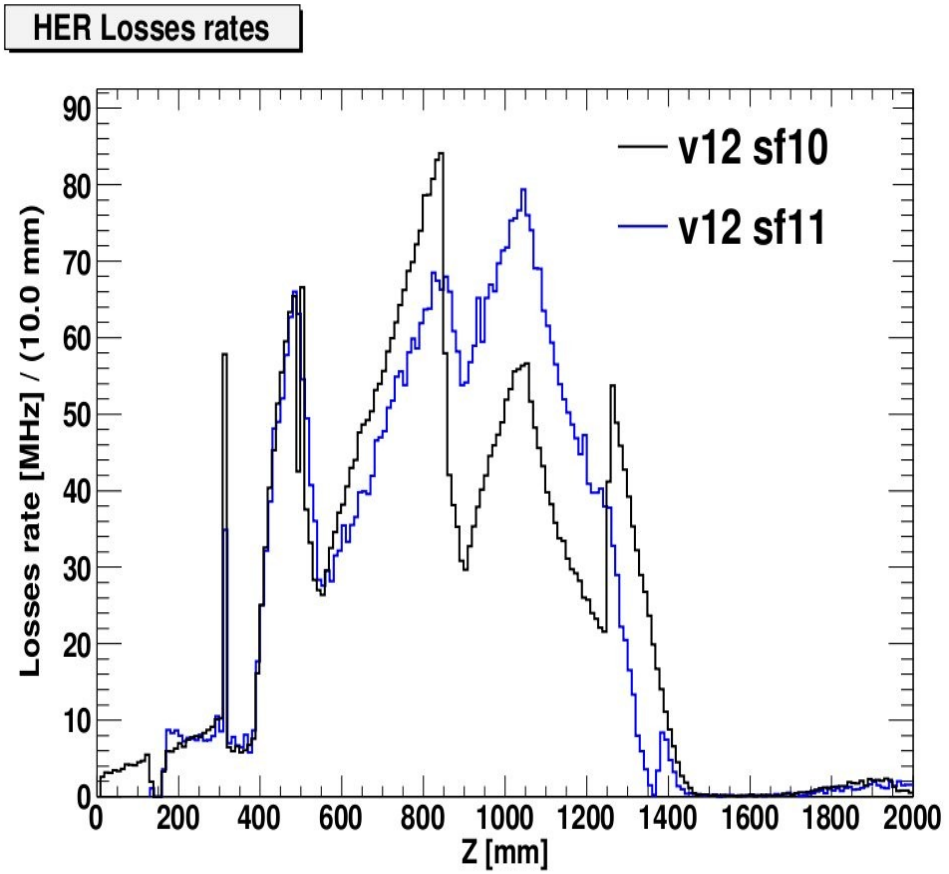




sf10 vs sf11

- **V12-sf11:**
  - Optimized beam pipe shapes from IP up to 16m
  - Lower pipe radii w.r.t sf10 beyond 2m from IP
  - Very similar magnetic modeling as sf10





Comparing the total rates

- Total rates around the IP

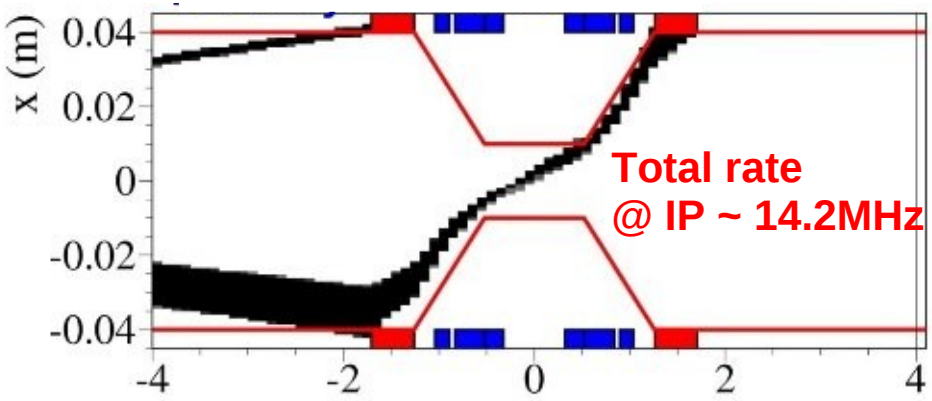
LER rates (MHz) around the IP (-2.0,2.0) m

E range (GeV)	P3	v12 sf11	v12 sf10
(0.0,1.0)	4501.60	6080.05	5619.19
(1.0,1.5)	61.81	129.75	80.80
(1.5,2.0)	12.97	15.13	12.88
(2.0,2.5)	5.25	6.41	5.13
(2.5,3.0)	3.51	3.97	3.75
(3.0,3.5)	3.98	4.48	3.58
(3.5,4.0)	4.37	3.23	2.62
all	4593.50	6243.01	5727.95

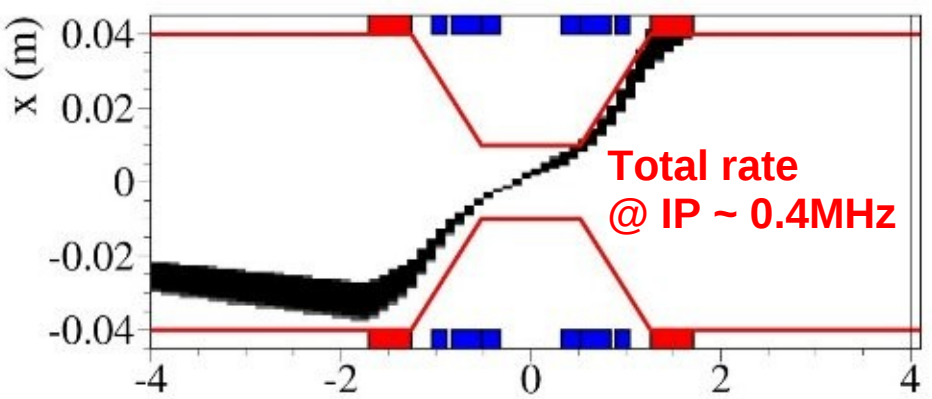
HER rates (MHz) around the IP (-2.0,2.0) m

E range (GeV)	P3	v12 sf11	v12 sf10
(0.0,1.0)	3489.64	4289.28	4215.48
(1.0,2.0)	88.85	683.76	522.91
(2.0,3.0)	7.54	15.64	12.28
(3.0,4.0)	2.03	2.89	3.77
(4.0,5.0)	1.17	2.66	1.89
(5.0,6.0)	1.37	3.00	2.54
(6.0,7.0)	1.70	5.04	4.68
all	3592.31	5002.29	4763.55

LER Touschek Losses



HER Touschek Losses



Summary and outlook

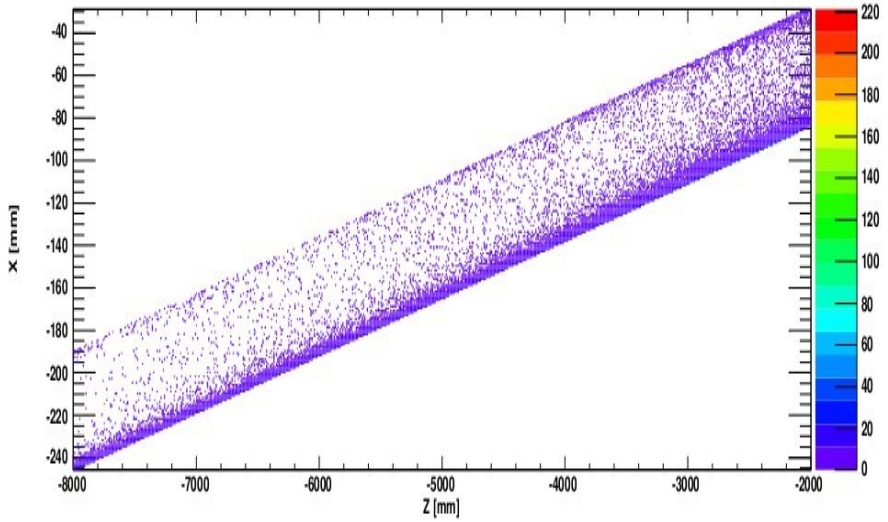
- **New beam pipe model around the bending magnets**
  - Union of straight pipes sections
  - No navigations problems
- **New Tungsten shield**
  - Simpler shape (cone + straight pipe)
  - Below the 300mrad (fwd/bwd) angular coverage of SuperB detector

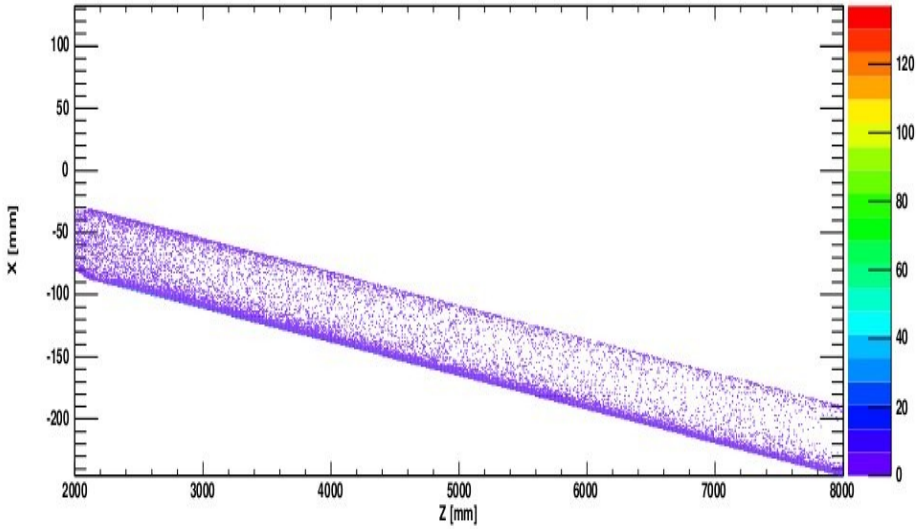
- **Rad-BhaBha losses at beam pipes:**
  - Losses near by IP are mainly to very off-energy particles
  - Losses around IP (-2 to 2 m) is somewhat higher for sf11 w.r.t sf10

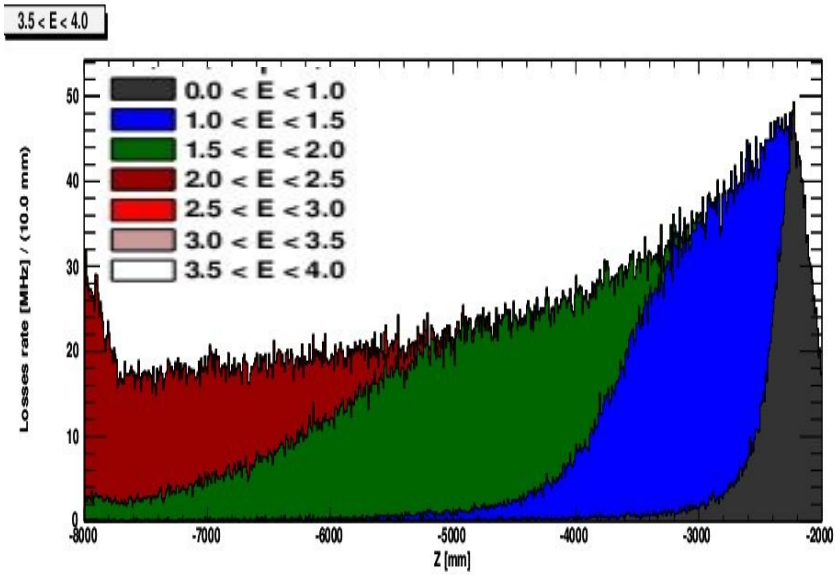
Backup

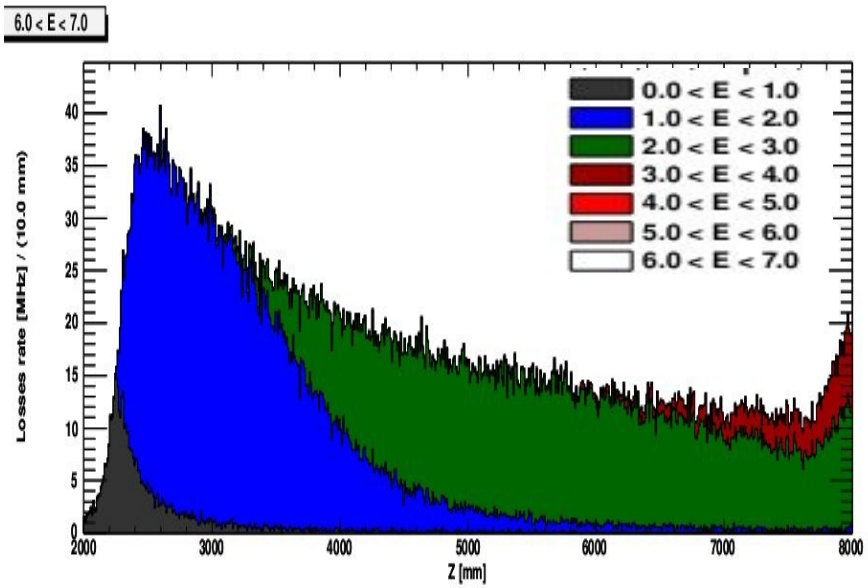
Losses results: v12-sf11 (leptons)

- V12-sf11 layout: HER = e^+ (6.69 GeV) and LER = e^- (4.18 GeV)



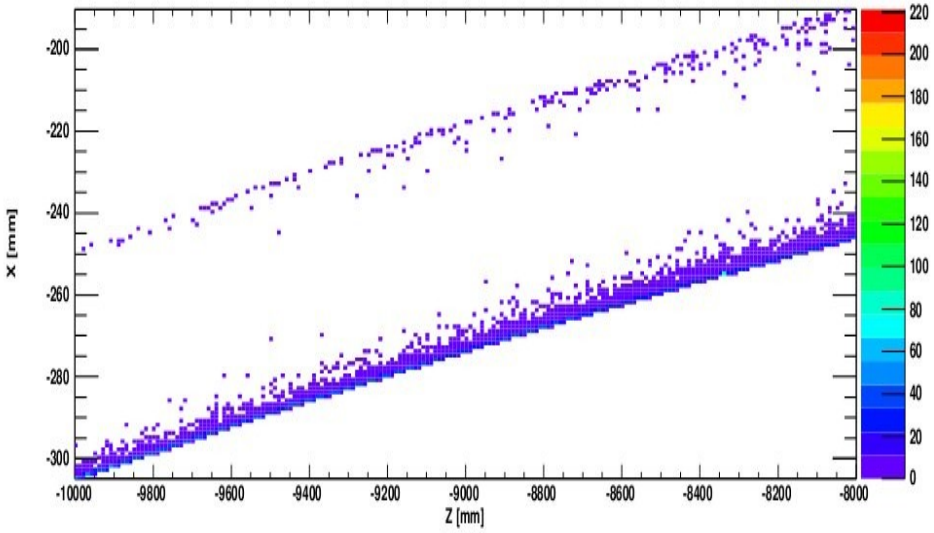


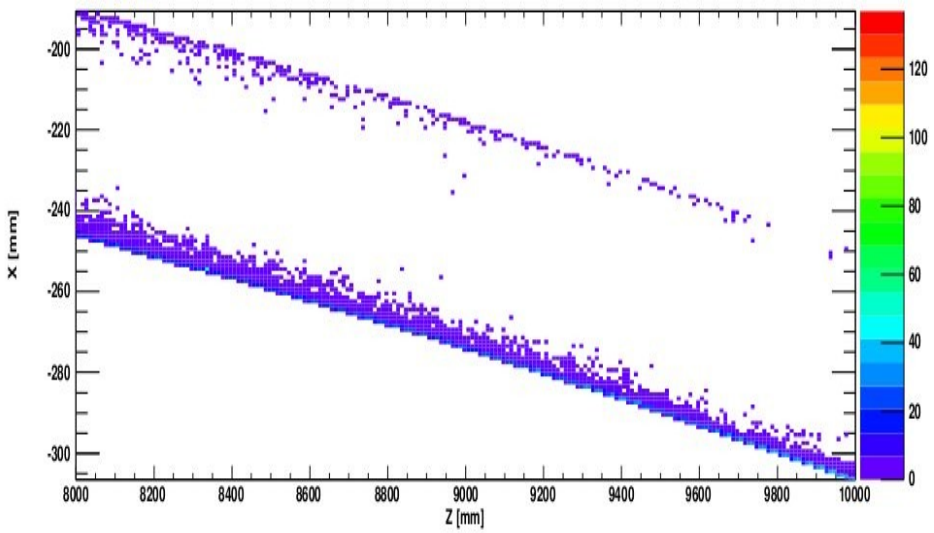


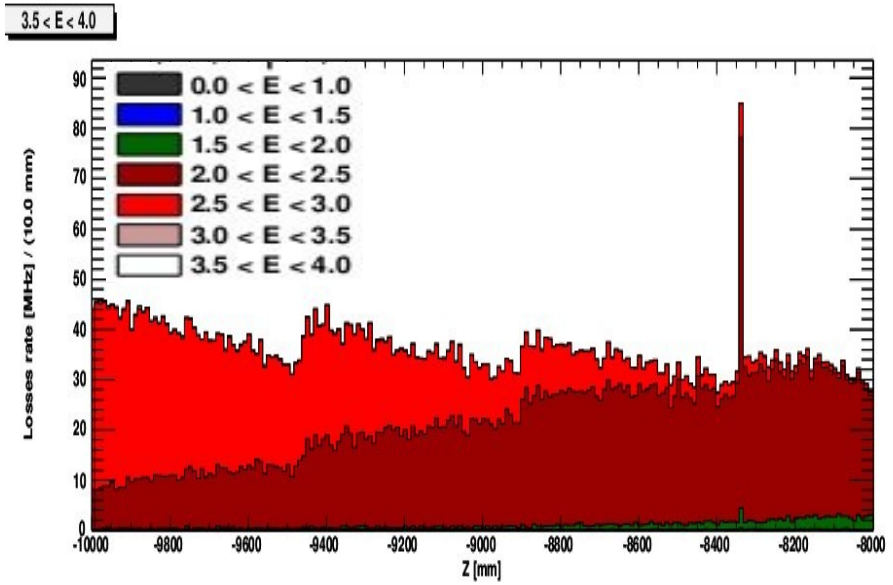


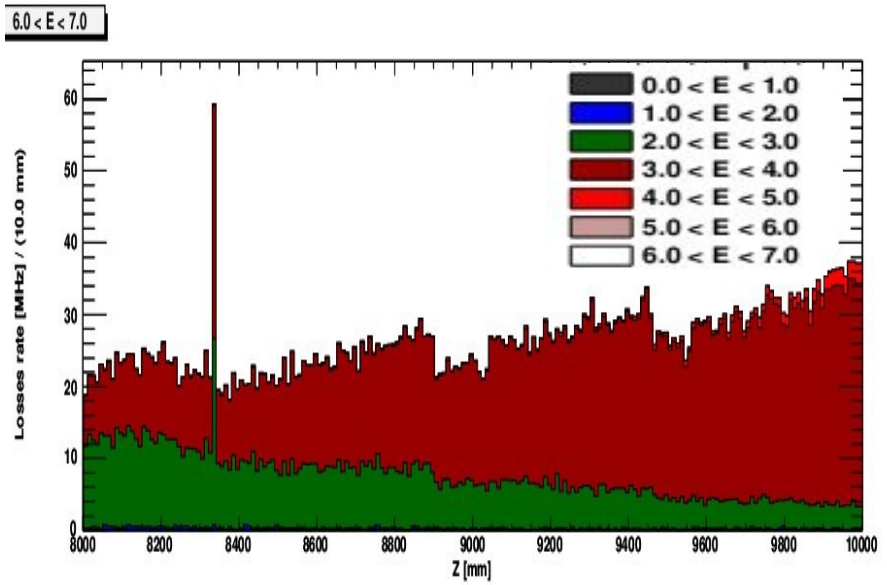
Losses results: v12-sf11 (leptons)

- V12-sf11 layout: HER = e^+ (6.69 GeV) and LER = e^- (4.18 GeV)



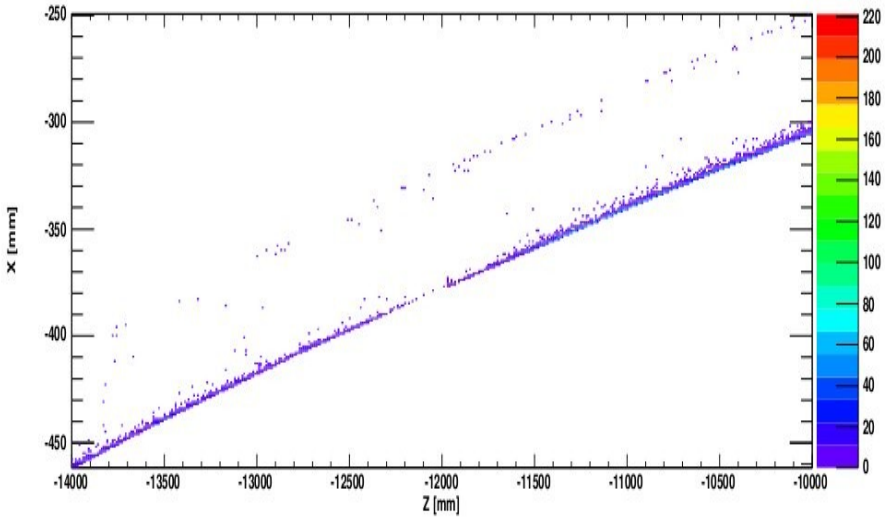


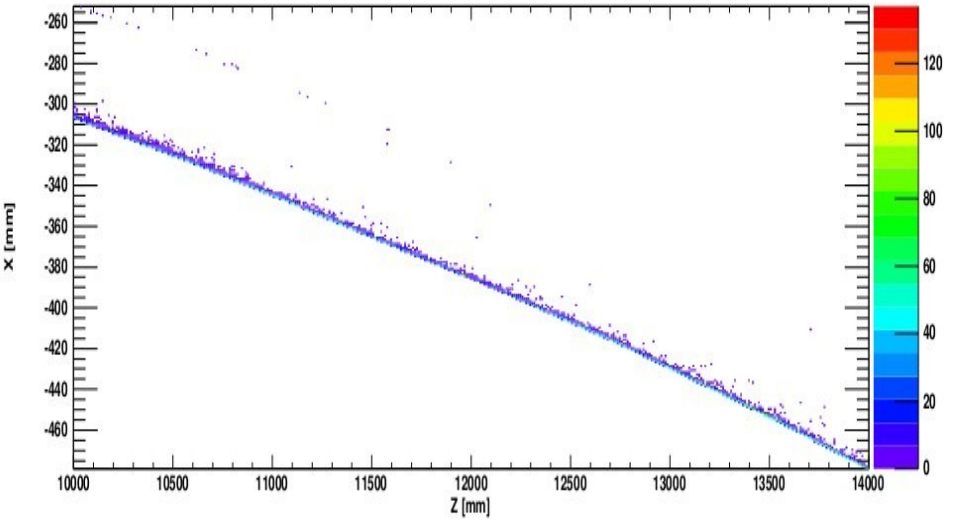


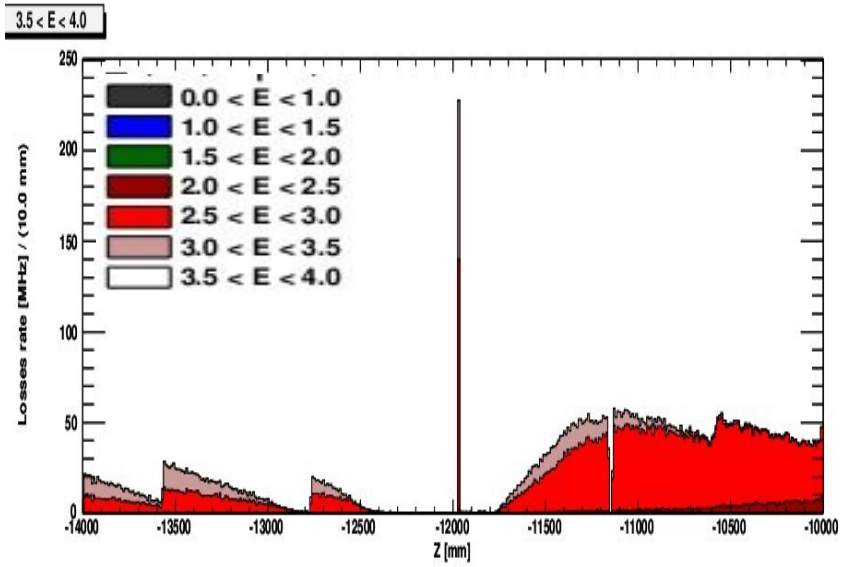


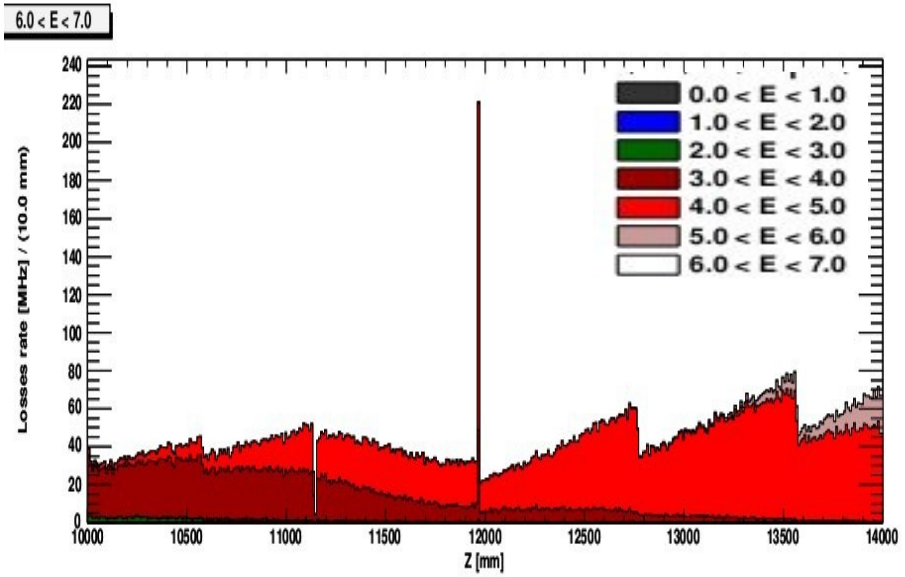
Losses results: v12-sf11 (leptons)

- **V12-sf11 layout: HER = e^+ (6.69 GeV) and LER = e^- (4.18 GeV)**



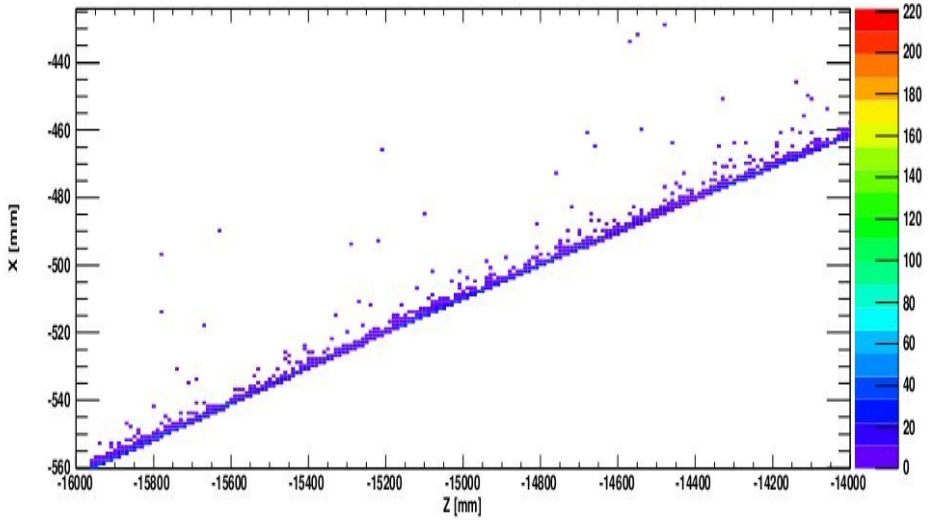


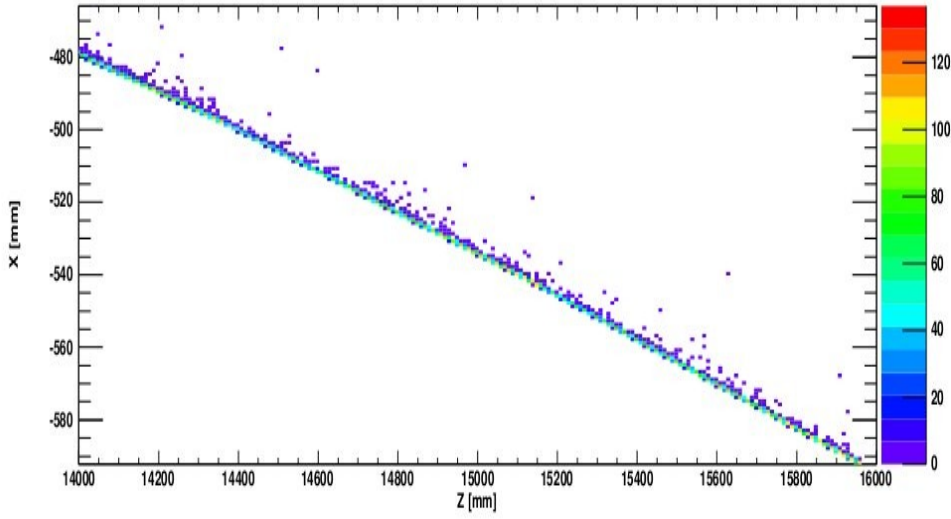


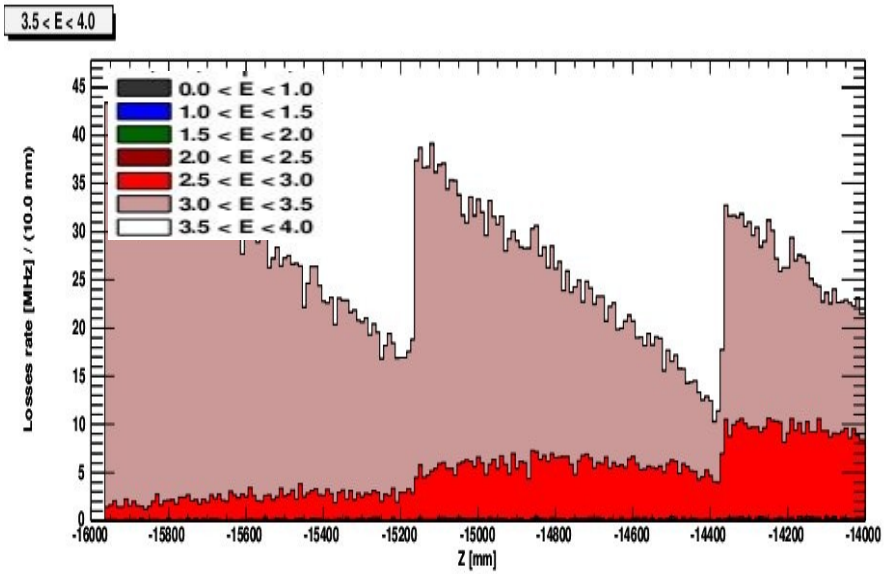


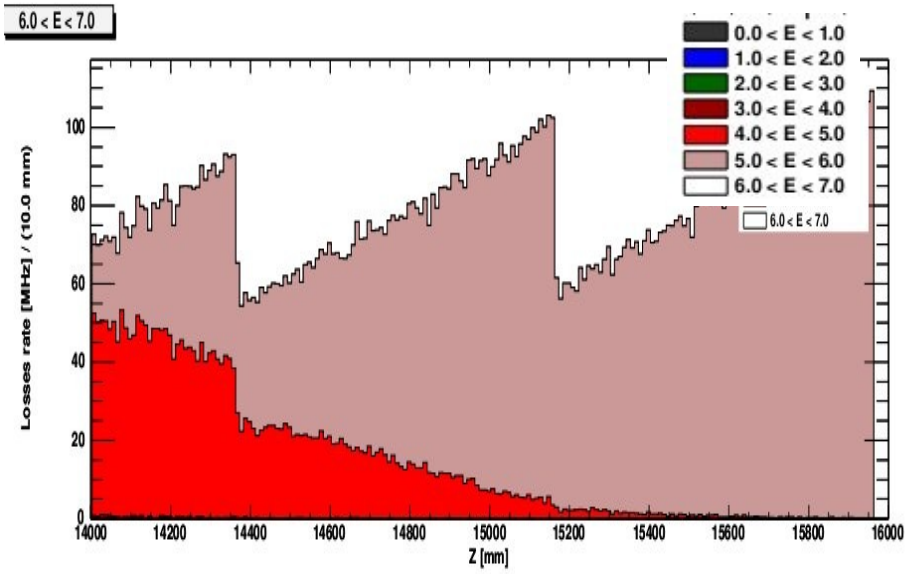
Losses results: v12-sf11 (leptons)

- V12-sf11 layout: HER = e^+ (6.69 GeV) and LER = e^- (4.18 GeV)









sf10 vs sf11 (II)