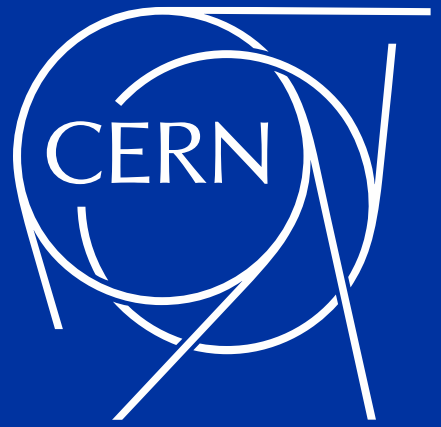


Beam losses

Comparison with FLUKA

Fabian Metzger (BE-EA-LE)

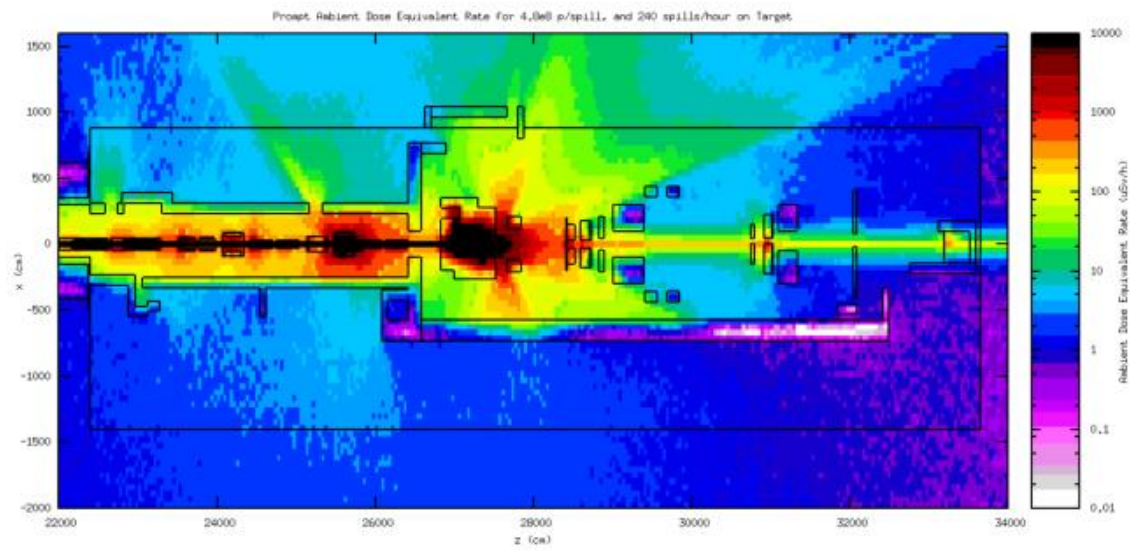
24.01.2022

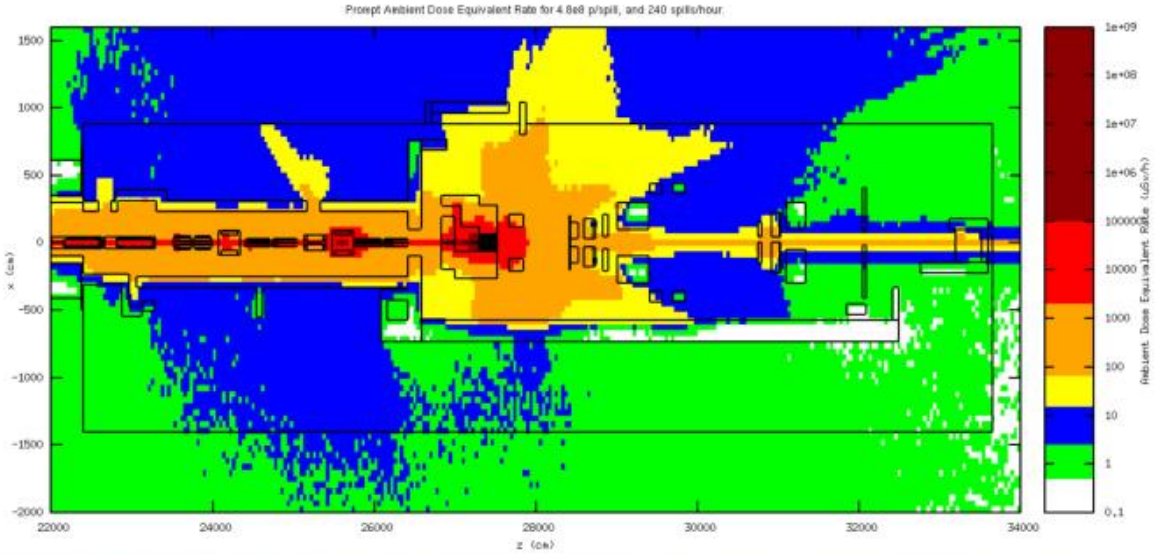
Slide courtesy A. Devienne

Preliminary results

	Area	Annual dose limit (year)	Ambient dose equivalent rate: permanent occupancy	Ambient dose equivalent rate: low occupancy	Sign
	Non-designated	1 mSv	0.5 µSv/h	2.5 µSv/h	
Radiation Area	Supervised	6 mSv	3 µSv/h	15 µSv/h	
Radiation Area	Simple Controlled	20 mSv	10 µSv/h	50 µSv/h	
Radiation Area	Limited Stay	20 mSv	-	2 mSv/h	
Radiation Area	High Radiation	20 mSv	-	100 mSv/h	
Radiation Area	Prohibited	20 mSv	-	> 100 mSv/h	
Controlled Area					

- Prompt radiation at **beam level** Y[-30;30] – V56
  - Source: source.for (190 GeV/c π^- beam from [1])
  - Magnetic field: magfld.for (magnets maps from [1] & modified last MBP x1.5)
  - Intensity: $4.8 * 10^8$ π^-/spill and 240 spills/h on Target
  - Currently 18% losses from COLL5 source to target (10% up to CEDARs and 8% up to target)
  - Plots are scaled with **intensity on Target** (factor 1.2 on V56)

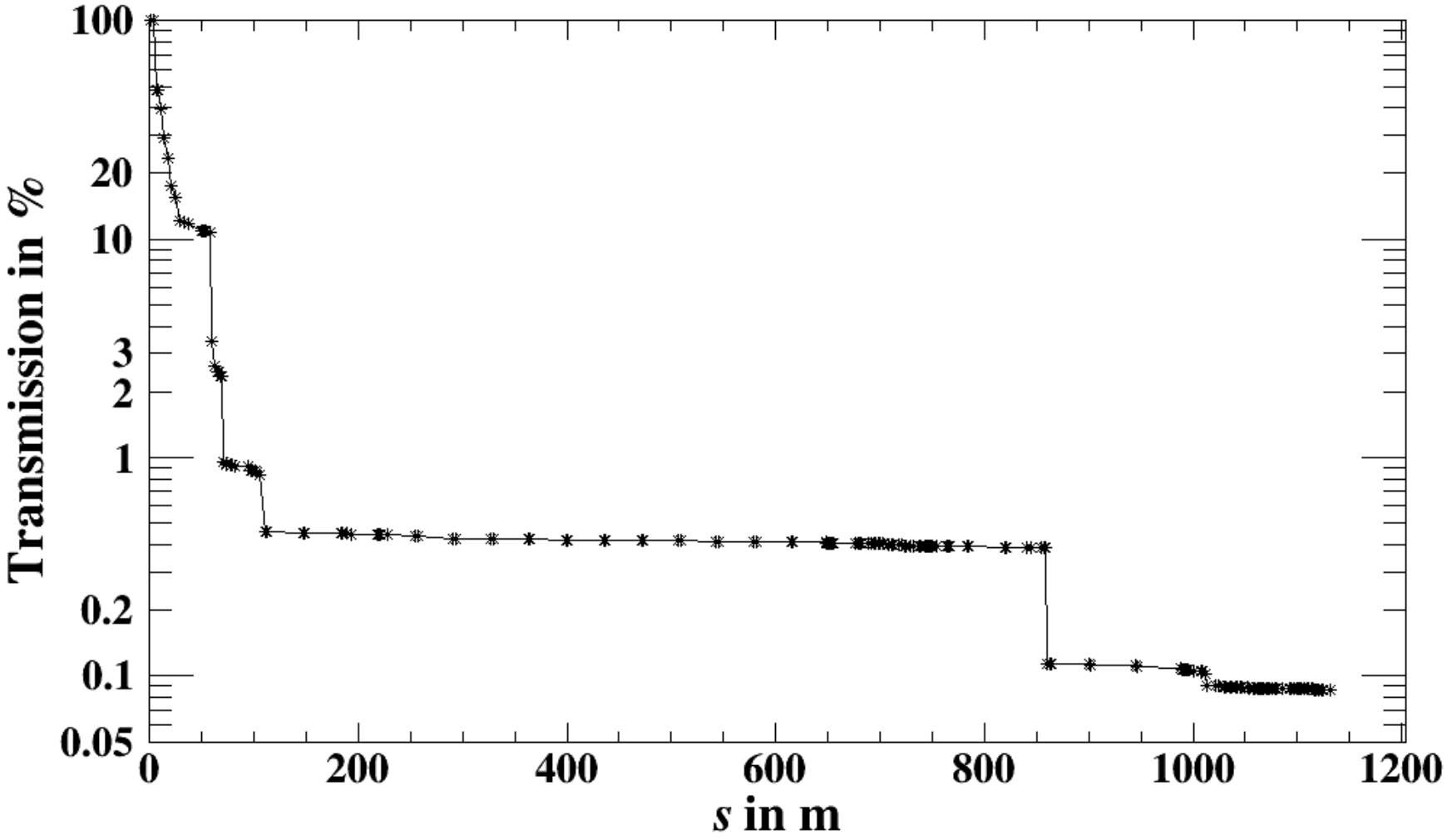




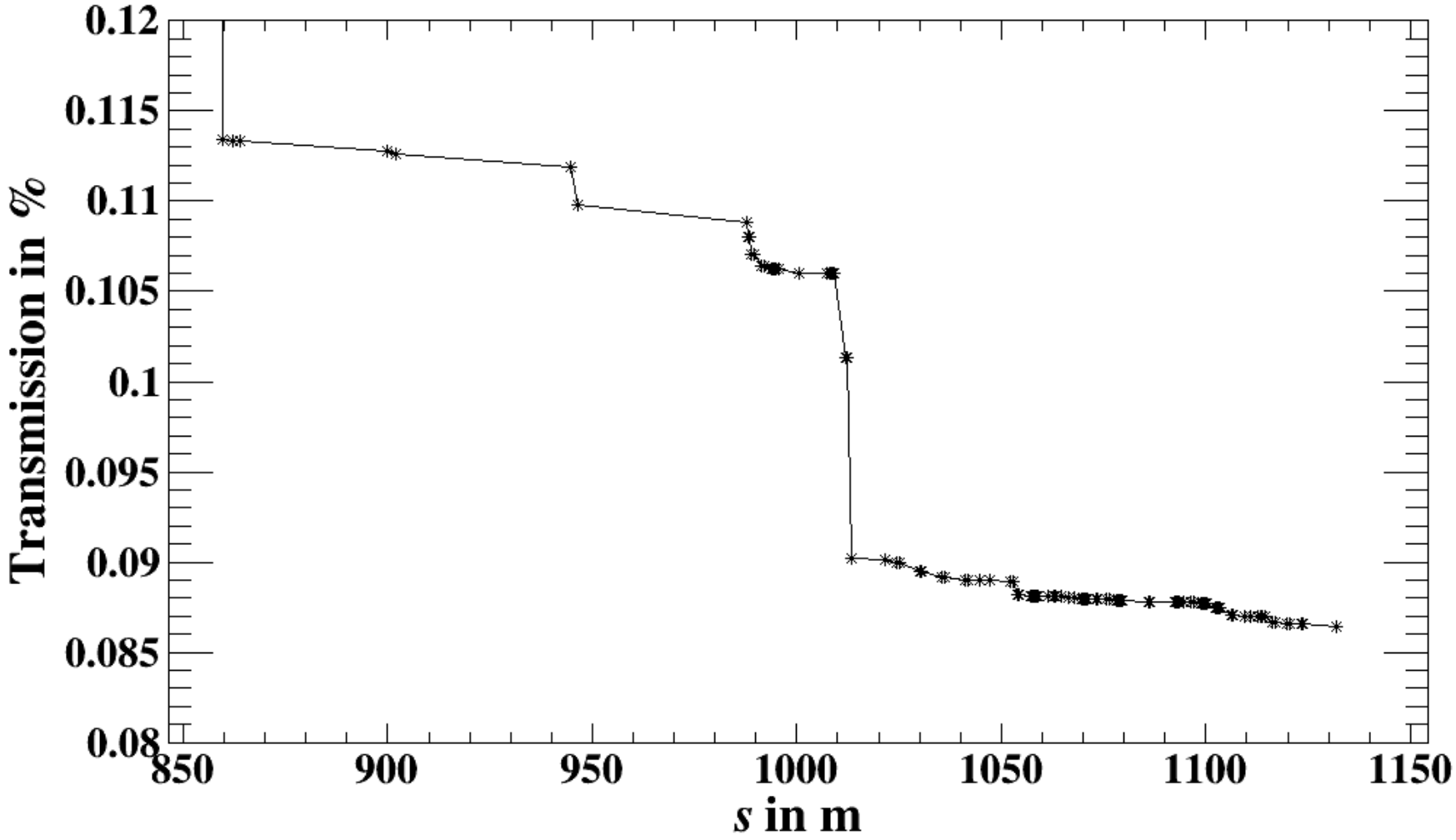
Beam loss simulation

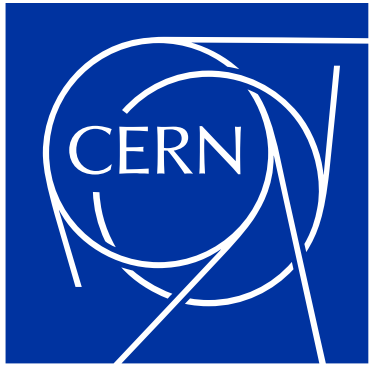
- **10% losses from COLL5 to CEDARs and additional 8% to the target**
- **Pencil beam distribution in FLUKA simulation**
- **We have a BDSIM-model of M2**
  - Thanks to Dipanwita, now with realistic magnet geometries
  - Simulate full beam transport from T6 to AMBER-target
    - Secondary π^--beam with large divergence and momentum distribution → We let BDSIM doing all the acceptance cutting; shown transmission is relative to number of particles the simulation started with
    - Now, of course no pencil beam in COLL5, but realistic distribution

Transmission along M2



Transmission from COLL5 to AMBER





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