Fast ADT test: dependency of the simulated energy deposition on the loss distribution

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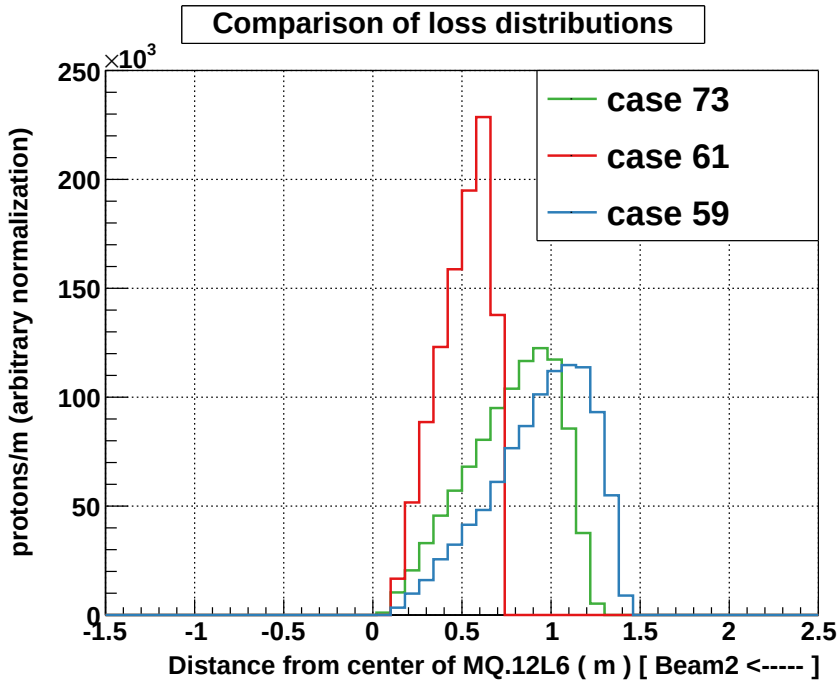
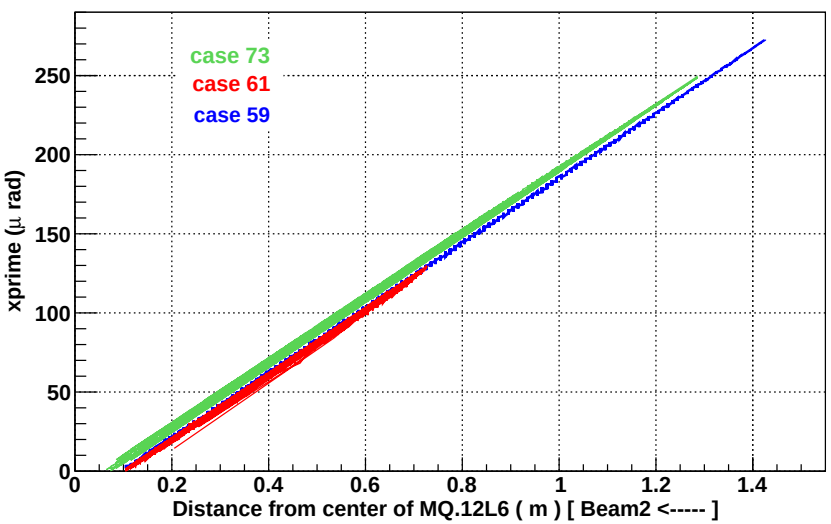
Part 1: Loss distributions from MADX

PART 1/2: Loss distributions from MADX





case 73 (**most realistic**):

- Tune was matched
- Bump was applied (the exact order as in experiment)
- MQ errors considered

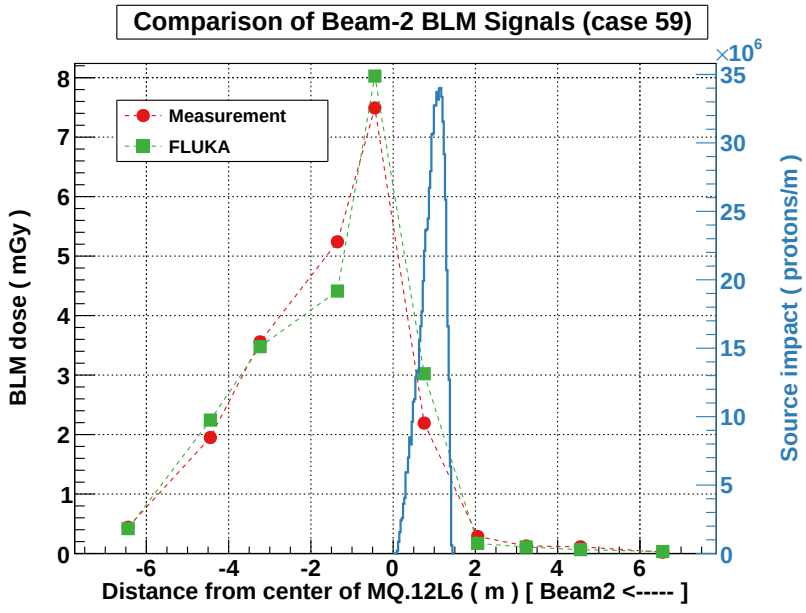
case 61:

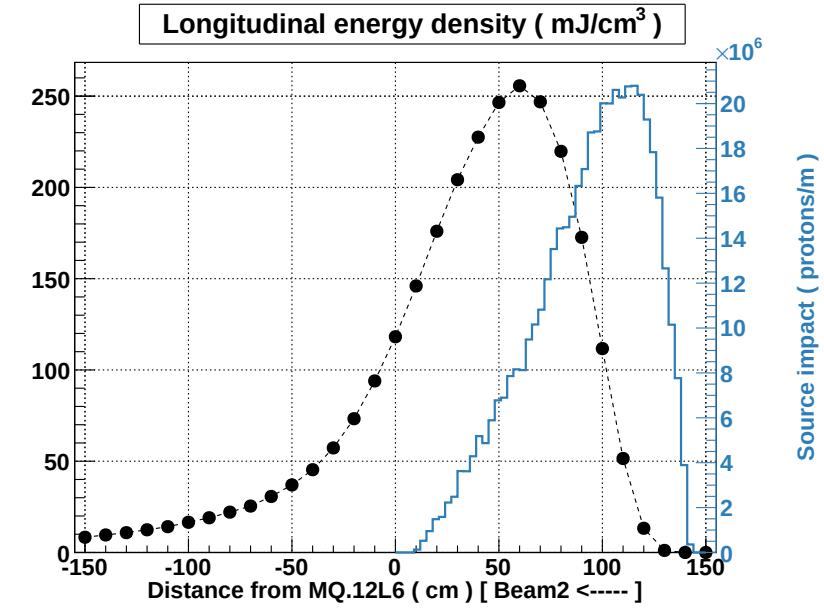
- Extreme impossible case of third integer tune
- Bump was applied

case 59 (**base**):

- Bump was applied
- Tune was matched afterwards, which was not done in the experiment.

Case 59 (also shown during previous presentation)



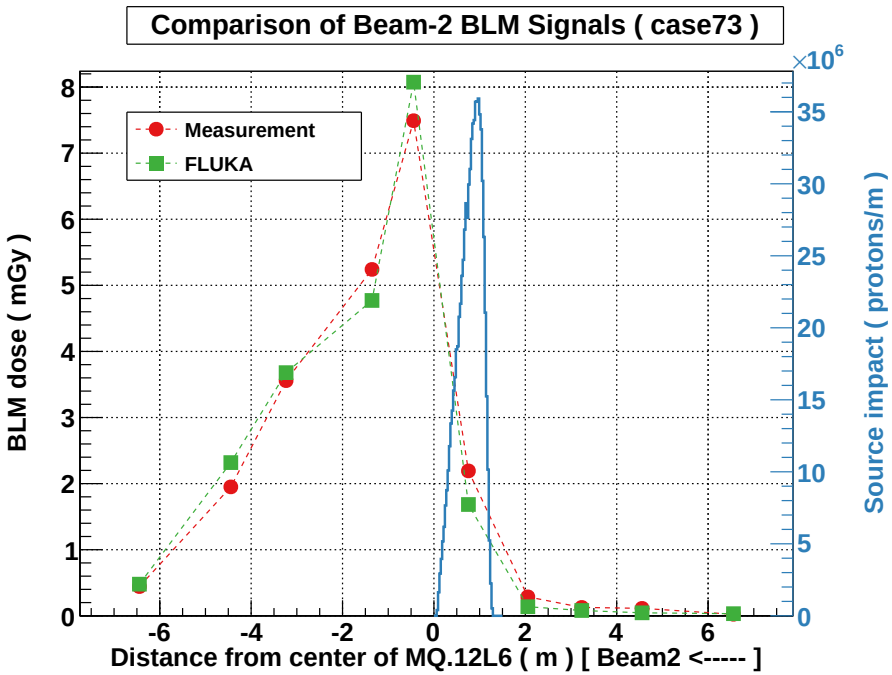


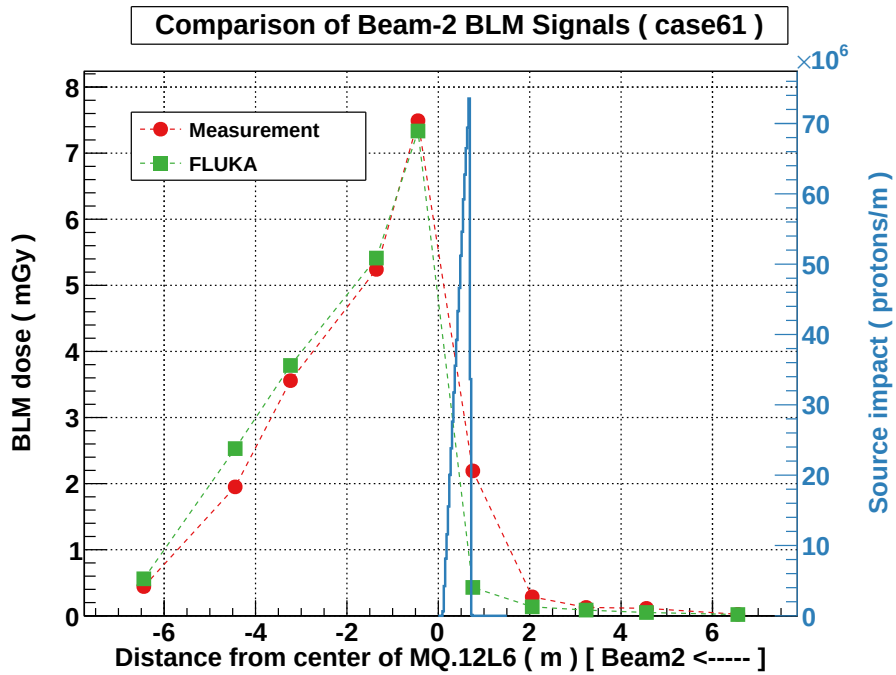
BLM dose simulation based on the original loss distribution (source) for 8.2×10^8 protons

BLM simulation and measurement agree very well

Max. energy density in MQ.12L6 (until quench) is ~ 250 mJ/cm^3 , for 5×10^8 protons

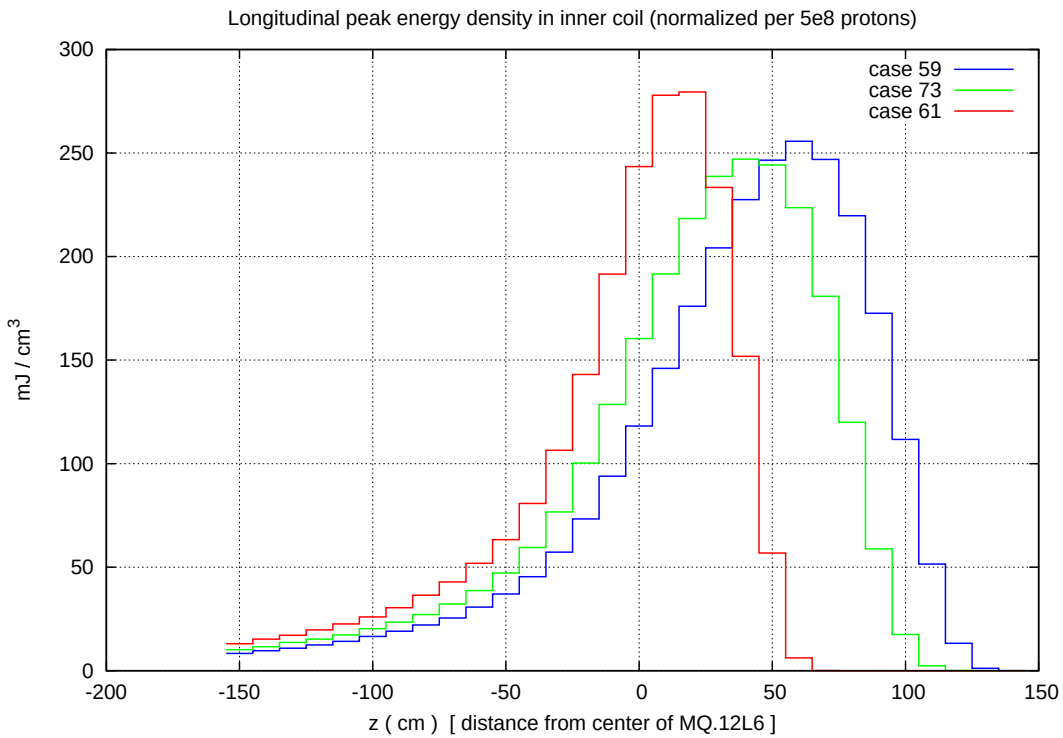
PART 1/2: BLM dose comparison





Simulation and measurement agree very well

PART 1/2: Longitudinal peak energy density

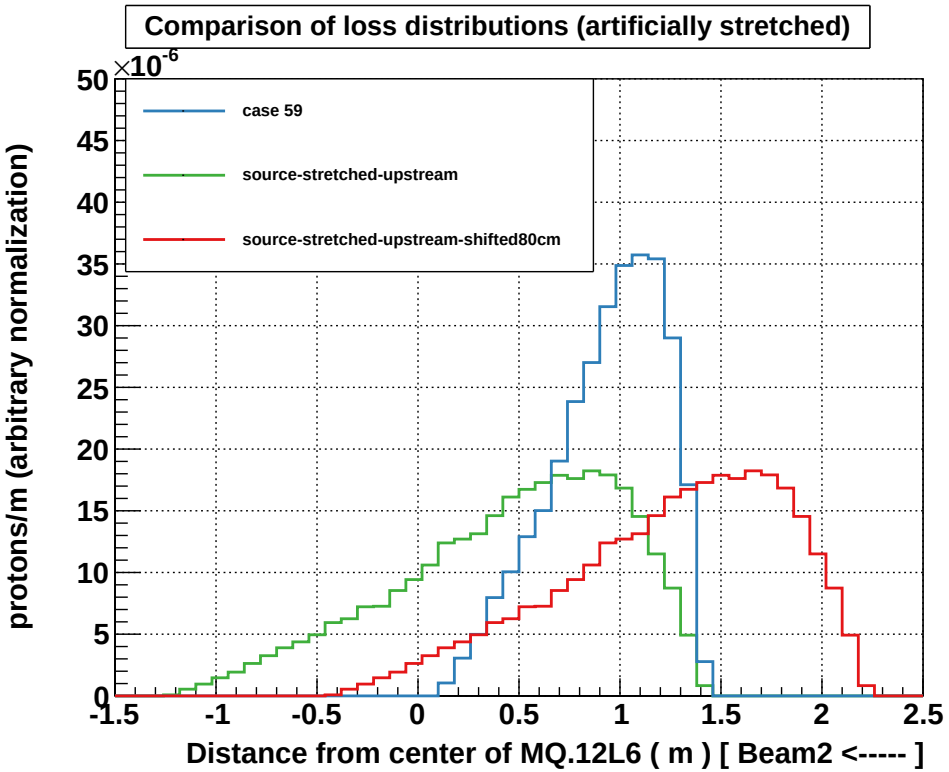


Max energy density in the range of $\sim$ 250 - 280 mJ/cm^3

For case 61, increase in energy density is not proportional to increase in local loss density as the horizontal impact angle is smaller

Part 2: Loss distributions (artificially stretched)

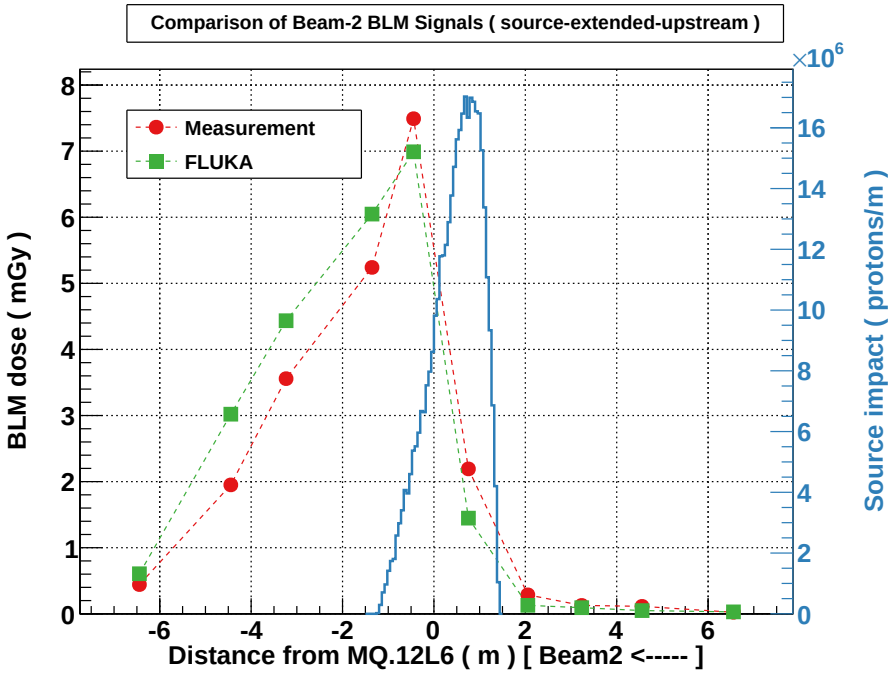
PART 2/2: Loss distributions (artificially stretched)

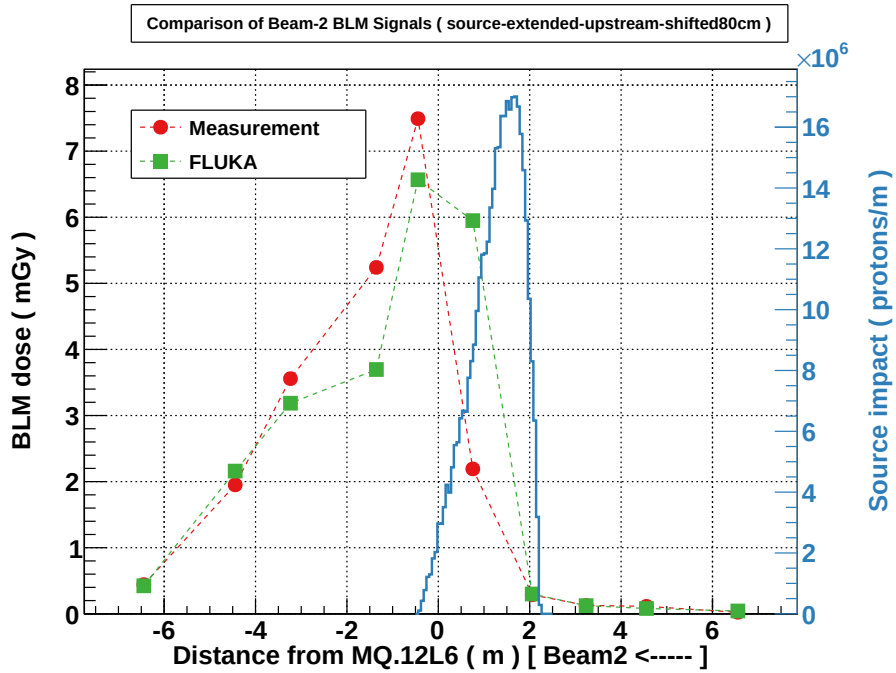


Source length doubled while maintaining the same total intensity

Artificial manipulation to study the effect of stretched source on BLM signal and energy density

PART 2/2: BLM dose comparison (artificially stretched)

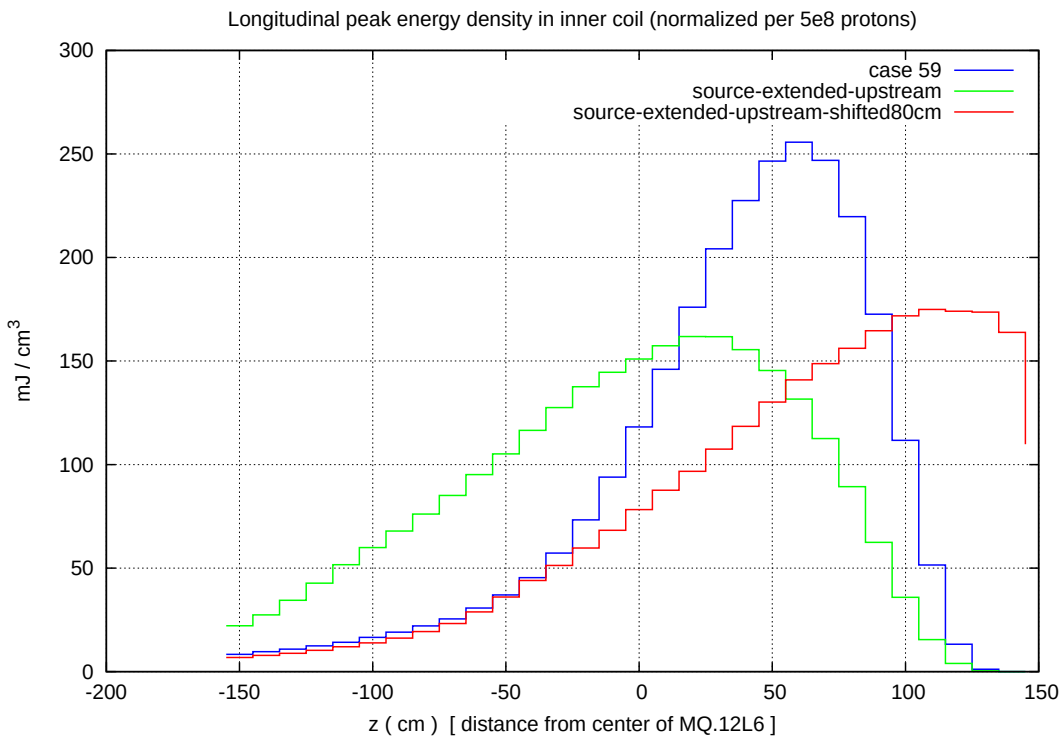




Still the simulation and measurement agree

PART 2/2: Longitudinal peak energy density

(artificially stretched)



Energy density decreases for stretched sources (while no proportional decrease in BLM dose)

Max energy density decreases from $\sim$ 250 mJ/cm^3 to $\sim$ 160 - 170 mJ/cm^3

Conclusions

BLM signal remains more or less the same for different loss distributions (the shower is smeared out at the BLMs because they are located farther laterally)

Energy density in the coil is sensitive to the local loss density and horizontal impact angle of the loss distributions (because of the proximity of the coil to the cascade development)