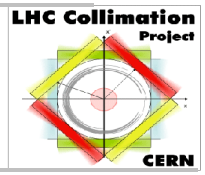
Status of energy deposition studies at IR7

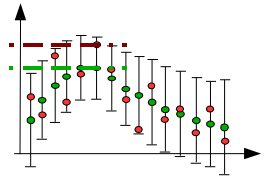
Collimation Meeting
25-04-2005

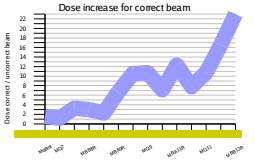


A. Ferrari, M. Magistris, M. Santana, V. Vlachoudis

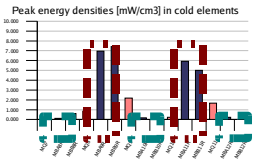
Summary.

1) Statistical fluctuation corrections.
2) Correction of beam direction.
3) Tungsten jaws.
4) Dose in cold elements.
5) To do & conclusions.



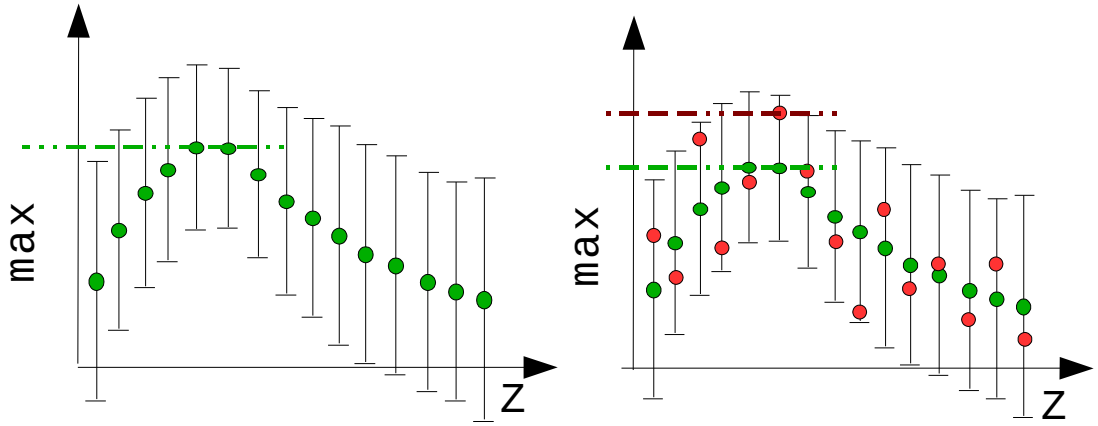


Element	Cu JAWS		W Jaws		Cu/W	
MQ6 peak [mW/cm3]	0.77	11%	0.1970	35%	3.9	37%
MQ6 coil [W]	0.56	7%	0.1500	10%	3.73	12%
MQ6 [W]	1.95	5%	0.5000	8%	3.9	8%
MQ7 [W]	0.388	18%	0.172	26%	2.26	32%

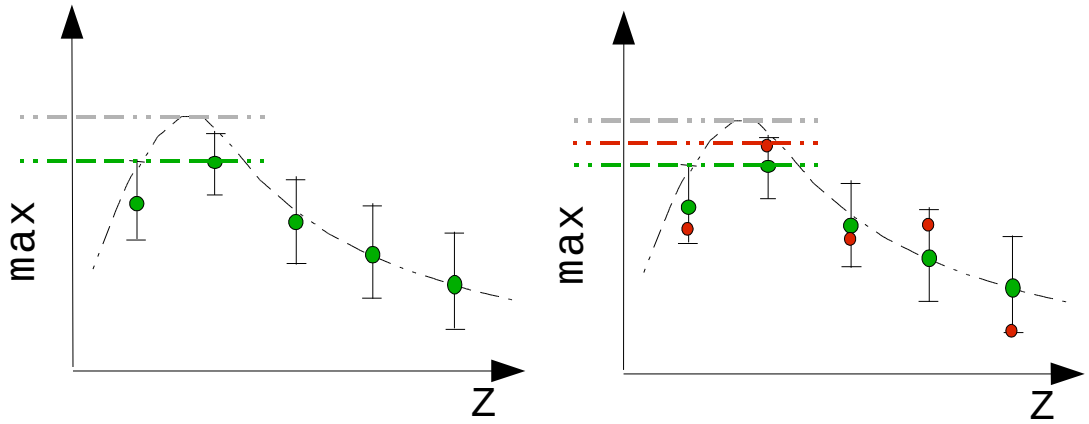


1. Statistical fluctuation corrections.

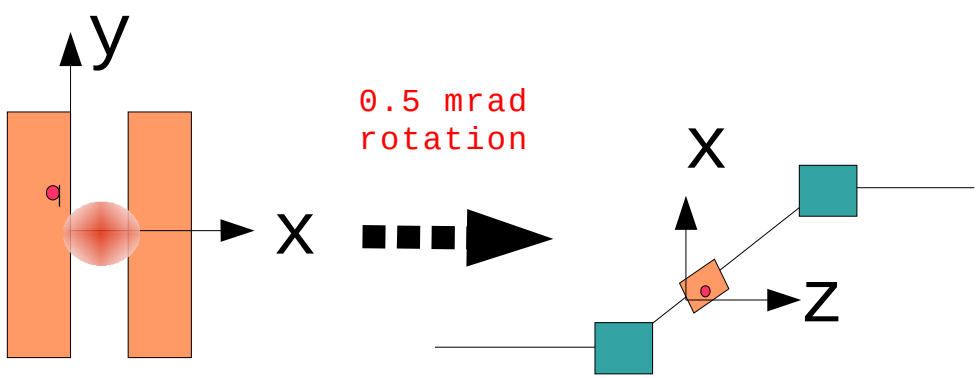
Scoring volumes very small
- accurate maximum but...
- ... slow convergence
- ... thus poor precision
- overestimation of the overall maximum dose.



Scoring volumes very big
- real peaks are lowered but...
- ... high precision.
- calculated dose closer to real value, but could be underestimated.



2. Correction of beam direction.

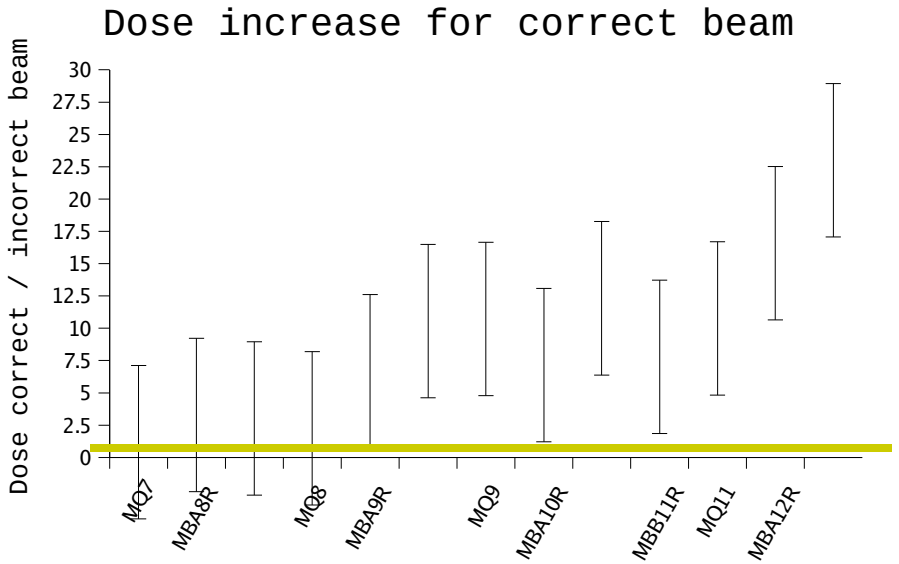


Only interactions in the primary collimators are affected.

85% inelastic scattering
(minor consequences).
15% diffractive scattering
(deviated and partially lost).

40% more dose in MQTLH,
but still below limit.

Higher dose
in the curved section,
but still well below the limit.



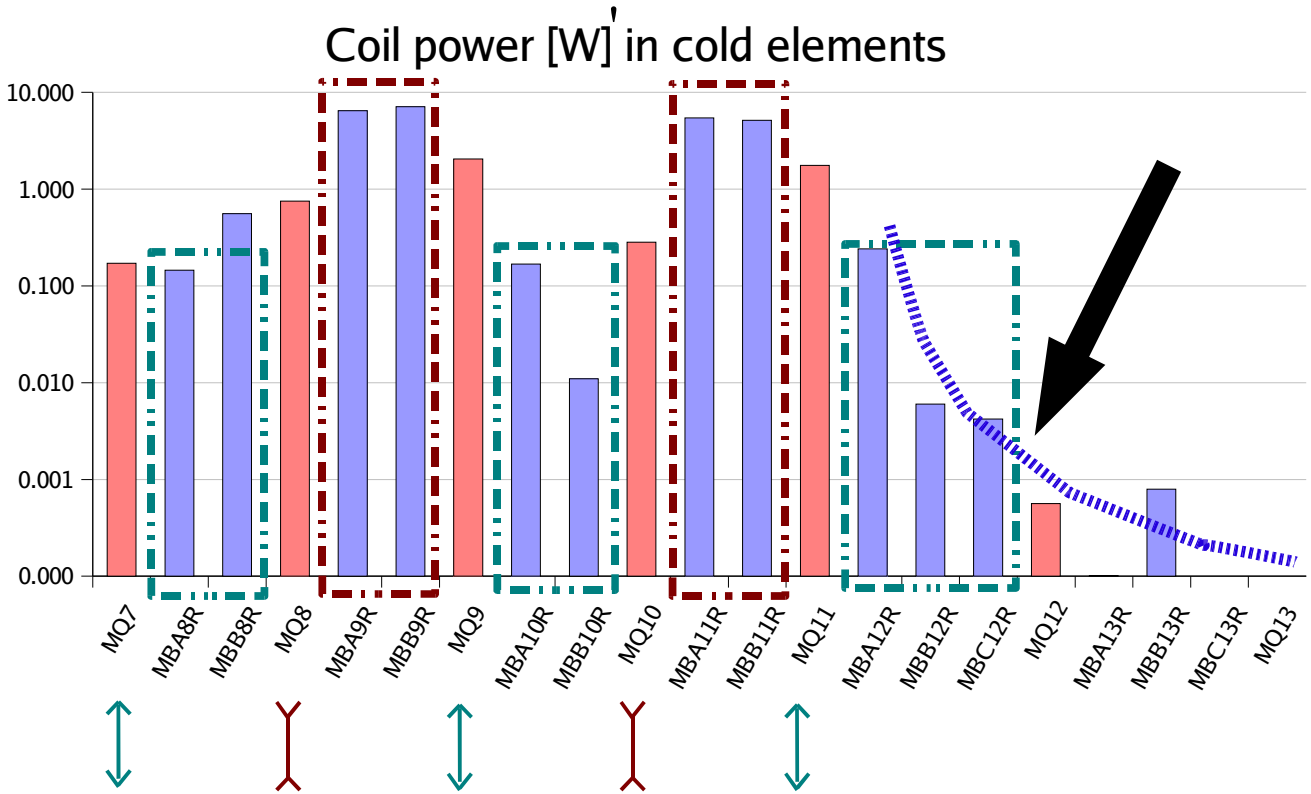
3. Tungsten jaws.

Element	Cu JAWS		W Jaws		Cu/W	
MQ6 peak [mW/cm3]	0.77	11%	0.1970	35%	**3.9**	**37%**
MQ6 coil [W]	0.56	7%	0.1500	10%	**3.73**	**12%**
MQ6 [W]	1.95	5%	0.5000	6%	**3.9**	**8%**
MQ7 [W]	0.388	19%	0.172	26%	**2.26**	**32%**

W jaws are very effective (~400%) in shielding the MQTLH and the next cold quadrupole (MQ7).

The difference between copper and W jaws in the curved section is minor.

4. Dose in cold elements.



5. Conclusions & To do.

-The magnetic field in the MB is now more accurate.
-An inaccuracy in the beam definition is now corrected.
-The W jaws prove to be more efficient in shielding MQ6 and MQ7.
-For the moment no significant difference between A7 and B7 was found.
-The tertiary halo still needs investigation (this may have consequences on the choice between A7 and B7).