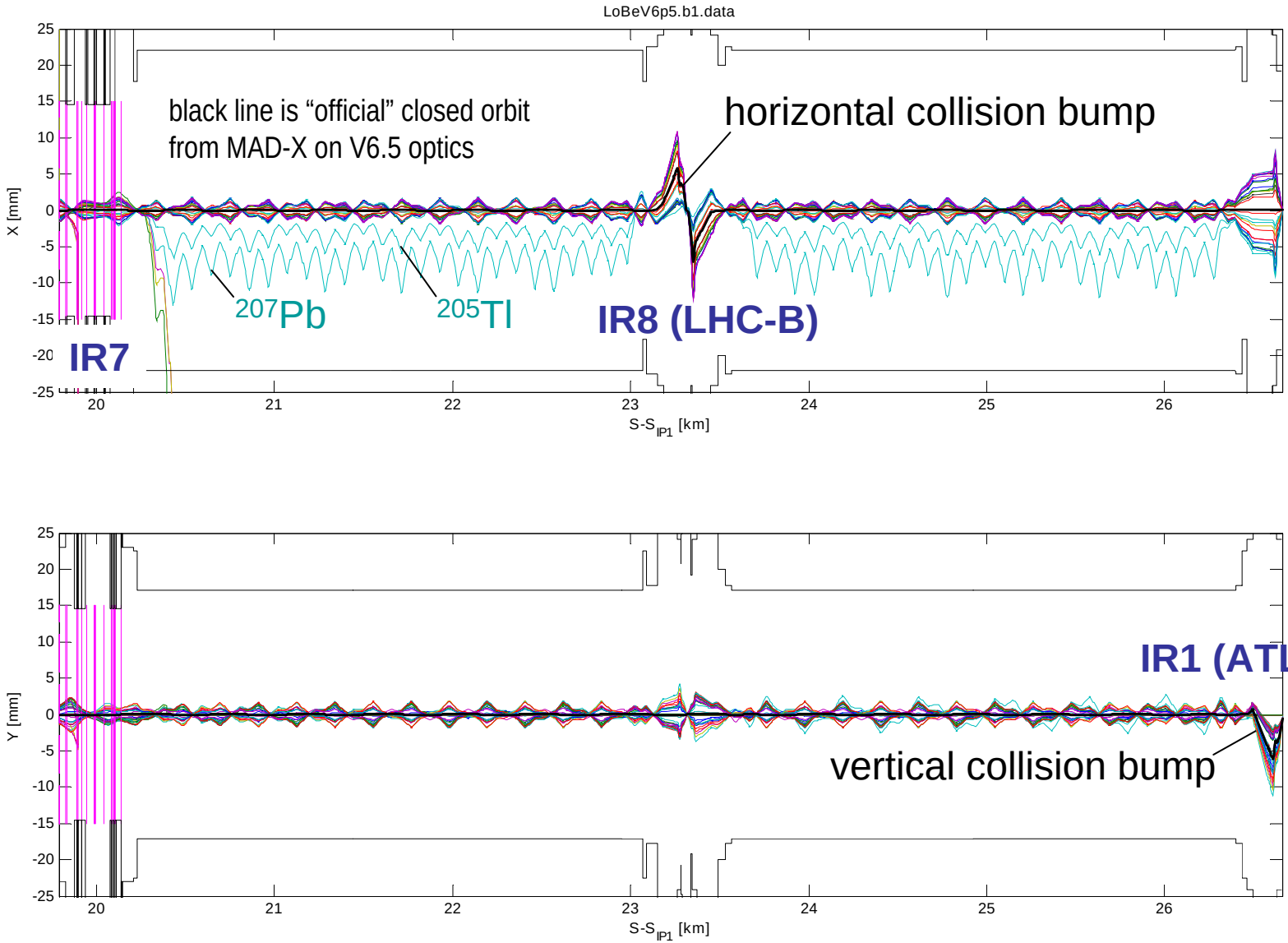
Implementation of collision bumps in ICOSIM

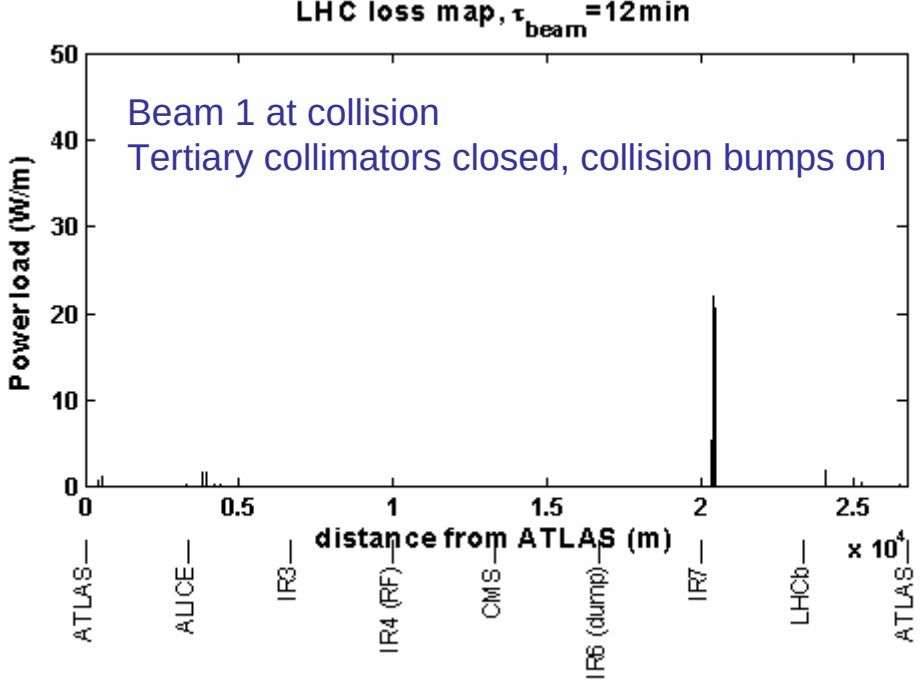
- Read corrector positions from MAD-X TWISS table
  (HKICKER, VKICKER, KICKER type elements)

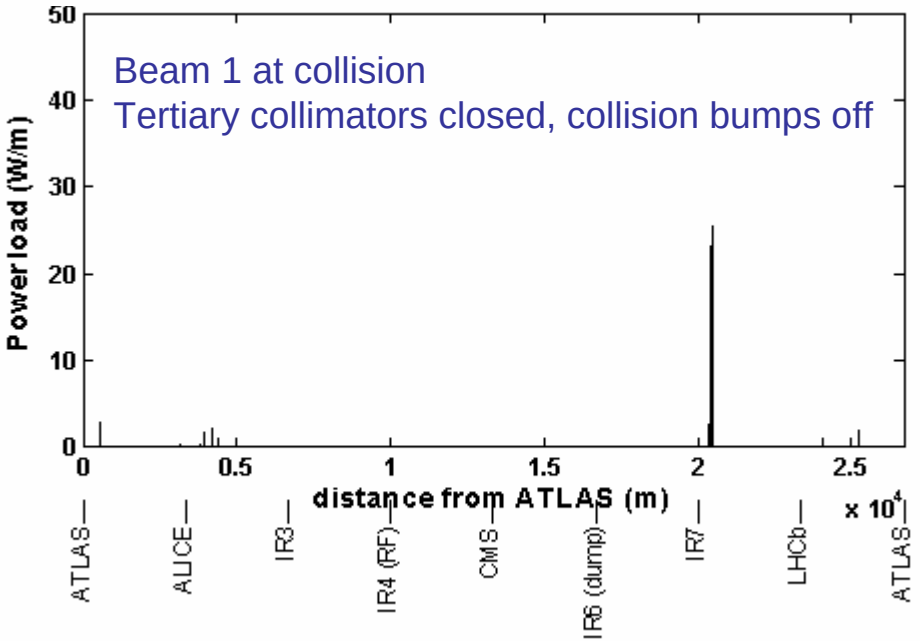
- Compute corrector strength from central orbit x' and y' (from TWISS table)

- Center collimators on x and y orbit (from TWISS table)

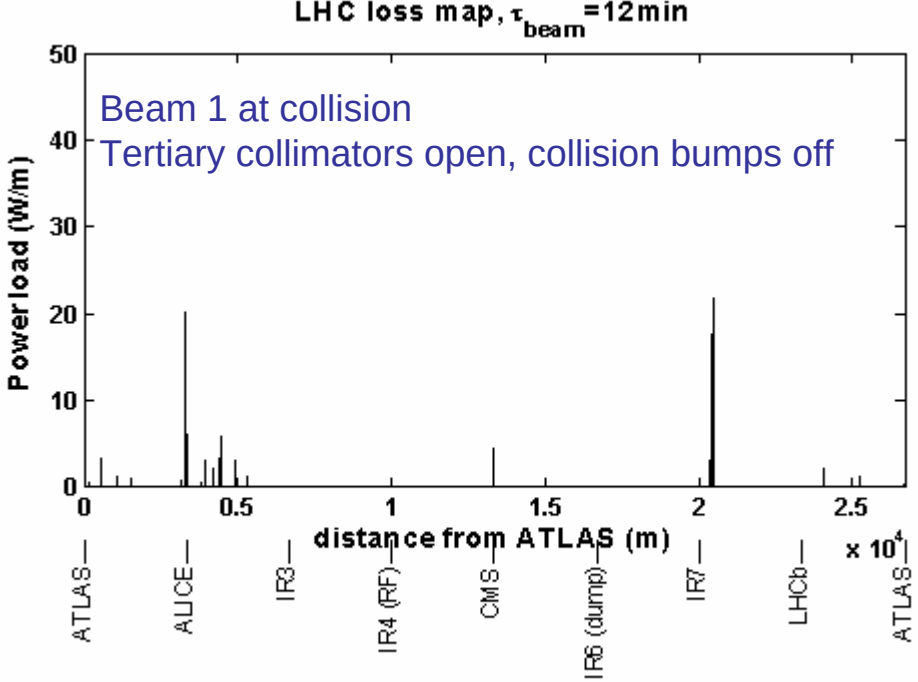
- Apply corrector kick on each particle individually
  in proportion with $\Delta P/P$ incl. Z/A differences

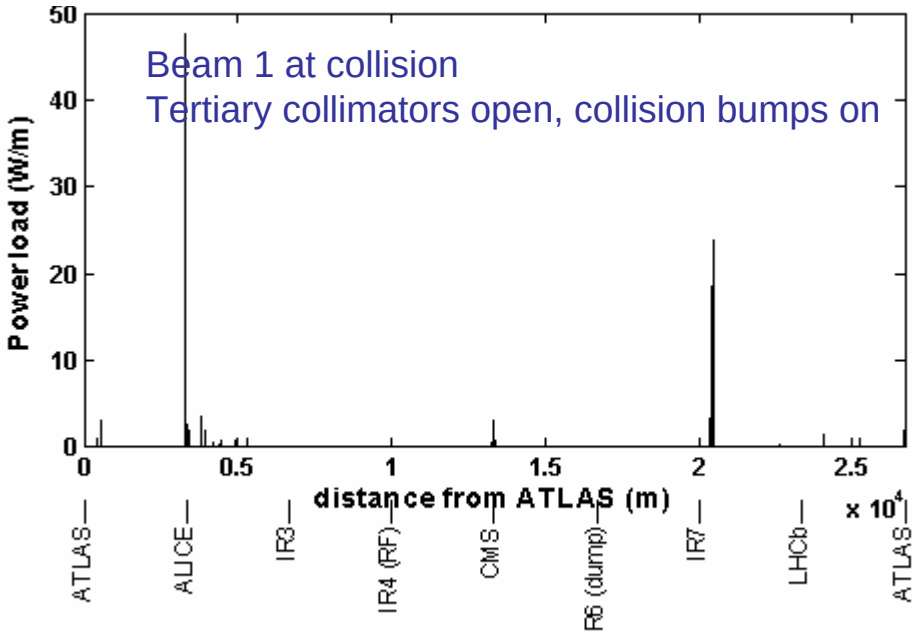

LoBeV6p5.b1.data
black line is “official” closed orbit
from MAD-X on V6.5 optics
horizontal collision bump
207Pb
205Tl
IR8 (LHC-B)
IR7
X [mm]
S-S_IP1 [km]
IR1 (ATLAS)
vertical collision bump
Y [mm]
S-S_IP1 [km]





With tertiary collimators upstream of IR triplets little consequences from collision bumps !





With tertiary collimators upstream of IR triplets taken out strong losses in IR2, further enhanced by orbit bumps !

Conclusions and outlook

- **Effect of corrector magnets has been added to ICOSIM**
- **Initial study for beam 1 shows that the tertiary collimators stop particles effectively with and without collision bumps**
- **Giulia will perform more detailed studies to check with up-to-date optics (i.e. without orbit bump for LHC B) and for beam 2**
- **To study effect of r.m.s. orbit we suggest to induce a orbit oscillation with variable betatron phase downstream of cleaning insertion and take the oscillation out before re-entering cleaning insertion**
- **Work for an improved method for ICOSIM to detect particle losses in quadrupoles is in progress but not yet completed**