Comparison of debris simulations between SixTrack and FLUKA

*A. Marsili, R. Bruce, F. Cerutti, L. S. Esposito, S. Redaelli*

Introduction

- FLUKA simulations of IP debris by L. Esposito

- SixTrack simulations of debris tracking by myself from FLUKA distribution of debris

- Same optics (7TeV nominal)
    - β*=55cm, Xing = 142.5 µrad

- First results quite different:

    - Collimator alignment error in FLUKA

    - Small difference in aperture

        - Beam screen "aperture" / "nominal dimension"

    - Energy cuts too tight in SixTrack initial distribution

- Will be part of an IPAC article

protons lost in case of no TCLs
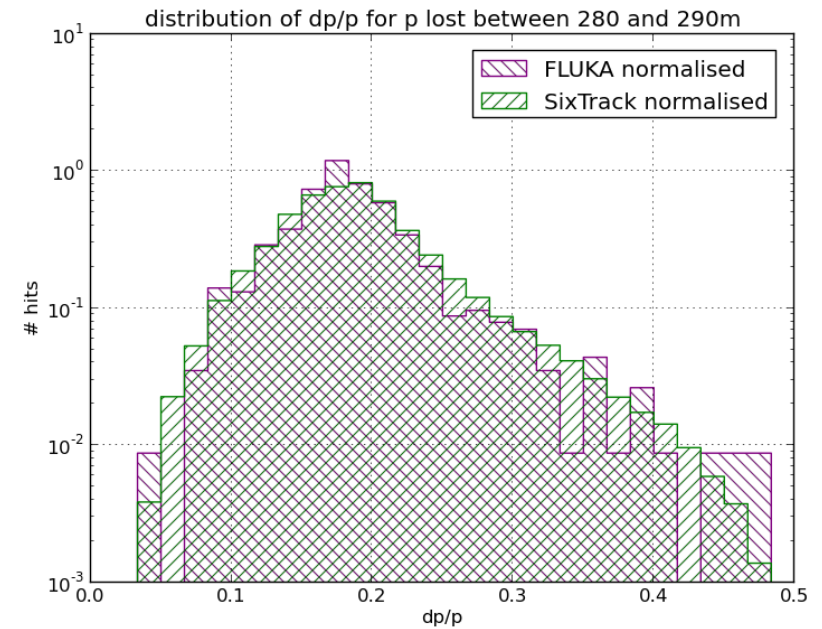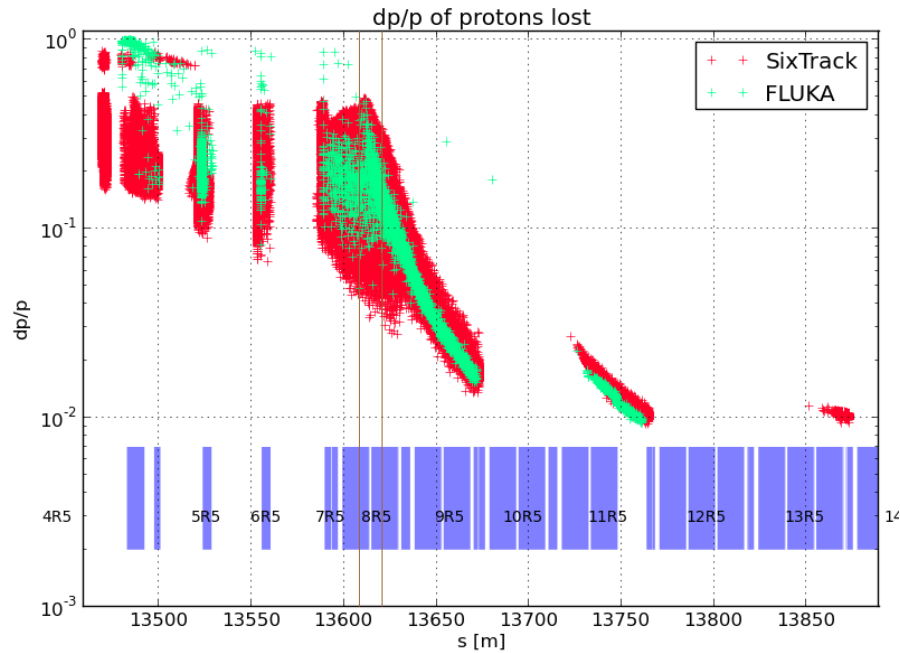
FLUKA
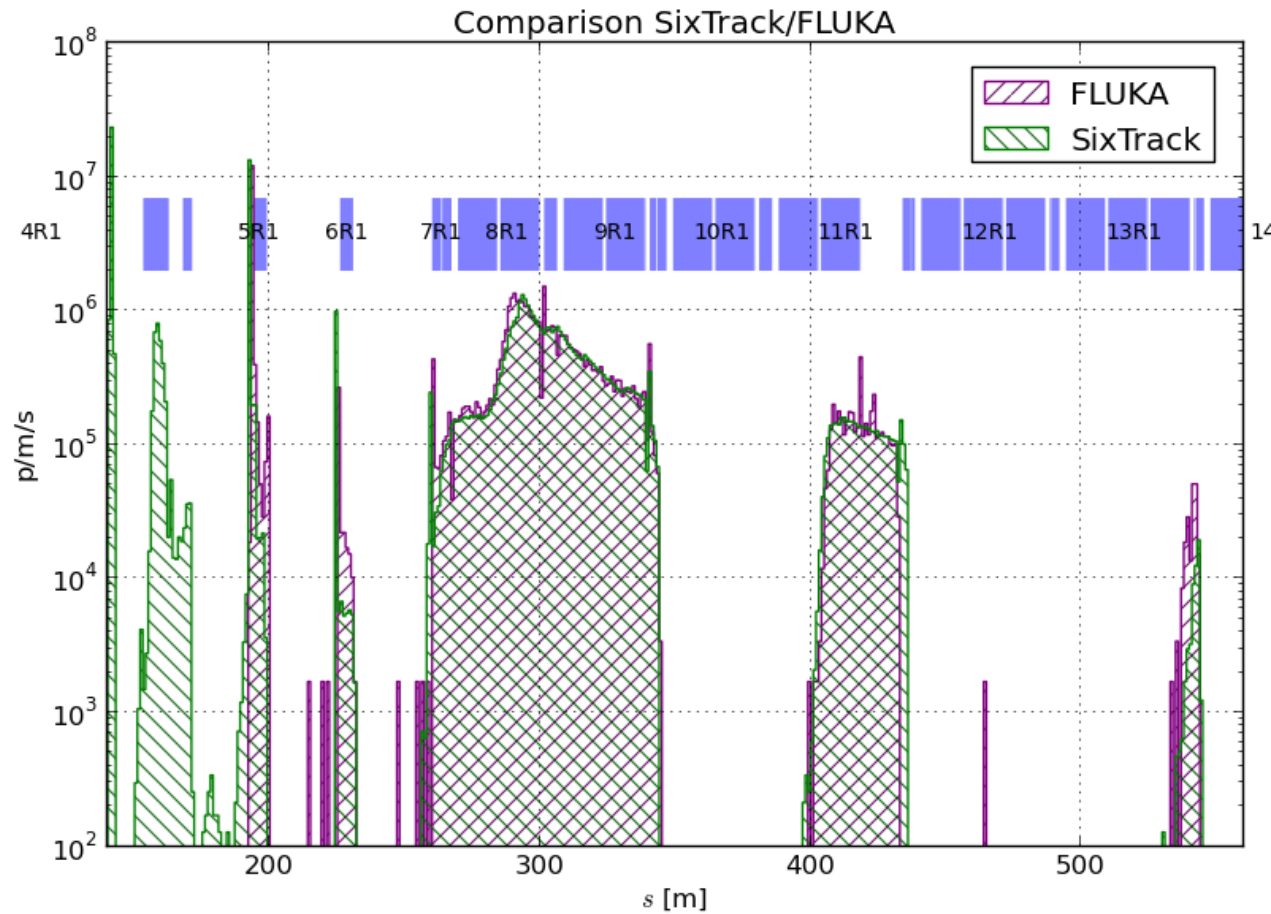

dp/p vs longitudinal position of impact
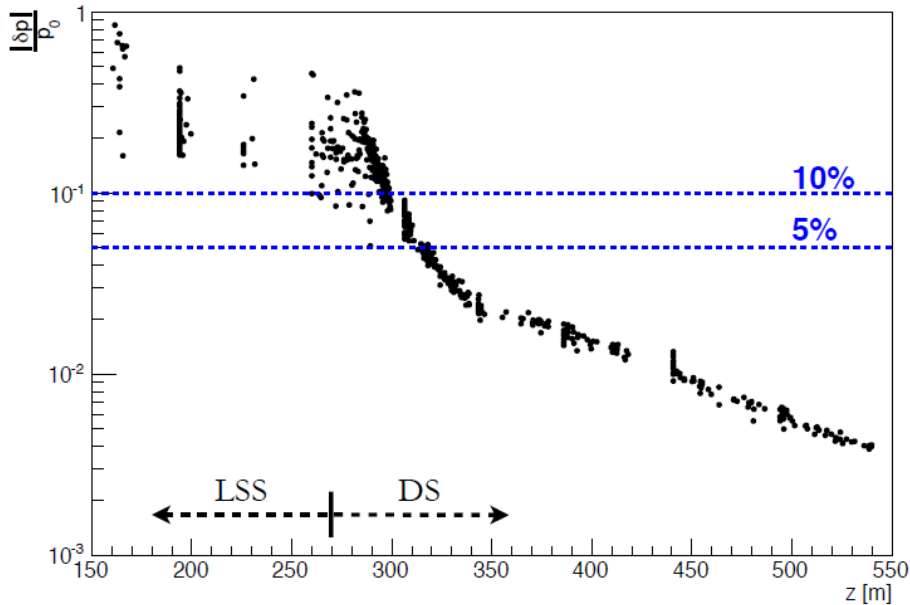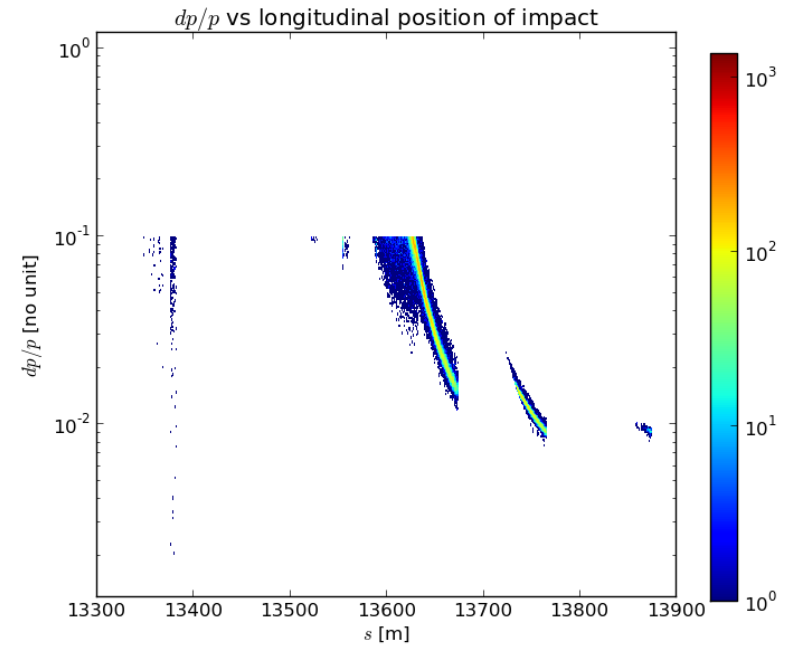
SixTrack

- *dp/p* cut of collision debris in SixTrack (10 %) was too tight: losses were "missing" from the DS and before

- Initial distributions were generated again

dp/p of particle lost vs. longitudinal position: new results

dp/p of protons lost

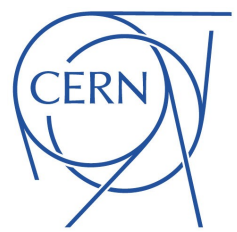distribution of dp/p for p lost between 280 and 290m

- Distributions are now matching

- The SixTrack one is wider: more statistics

- 1D distributions of dp/p between 280m and 290m

- Distributions normalised to $\Sigma=1$

Comparison SixTrack / FLUKA: no TCL

Comparison SixTrack/FLUKA

- Now excellent agreement!

- Longitudinal positions of peaks within one bin (1m)
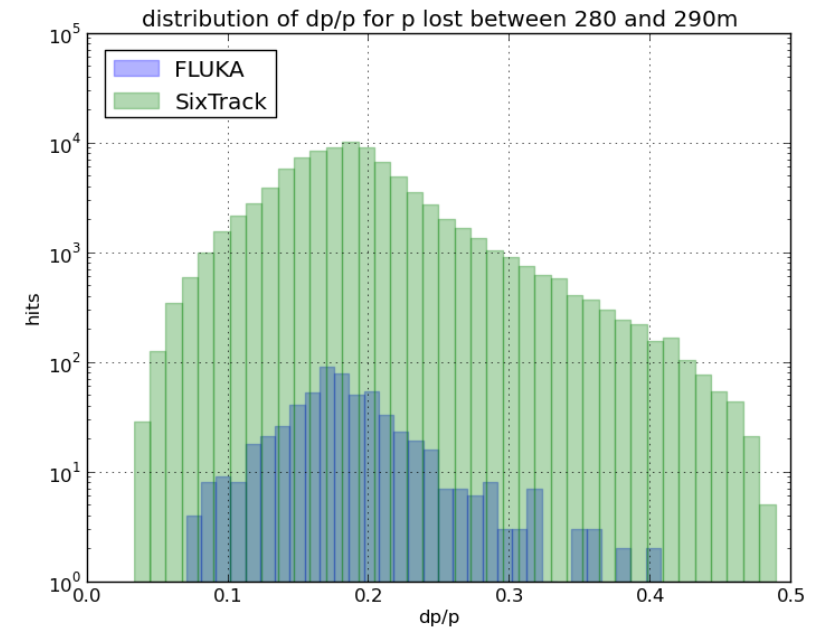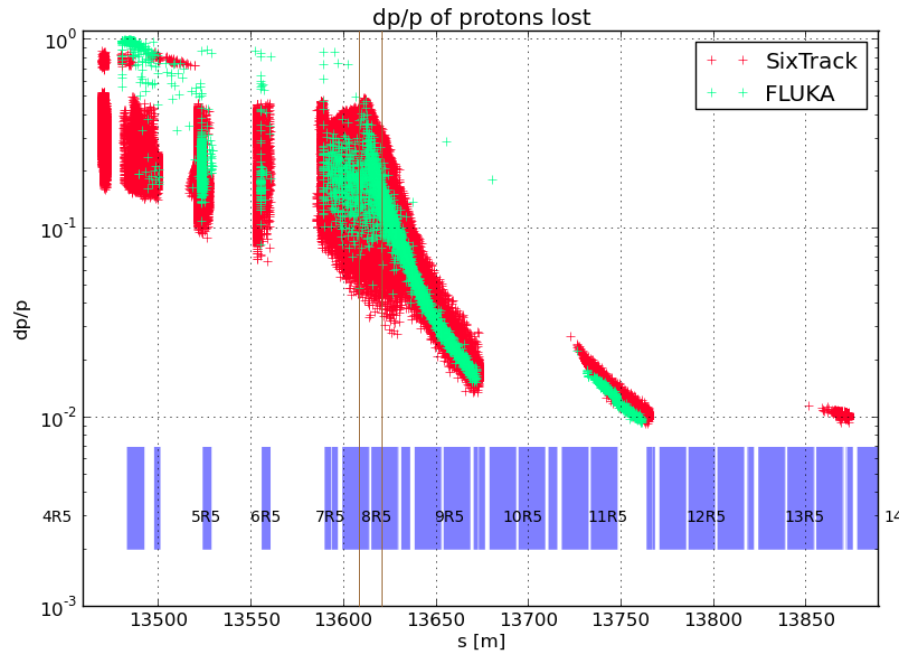
Conclusion on comparison with FLUKA

- Excellent agreement between SixTrack and FLUKA in DS (p/m/s)

- Gives us confidence that tools are in agreement for estimated far losses

- Next steps:
  - Multi-turn tracking
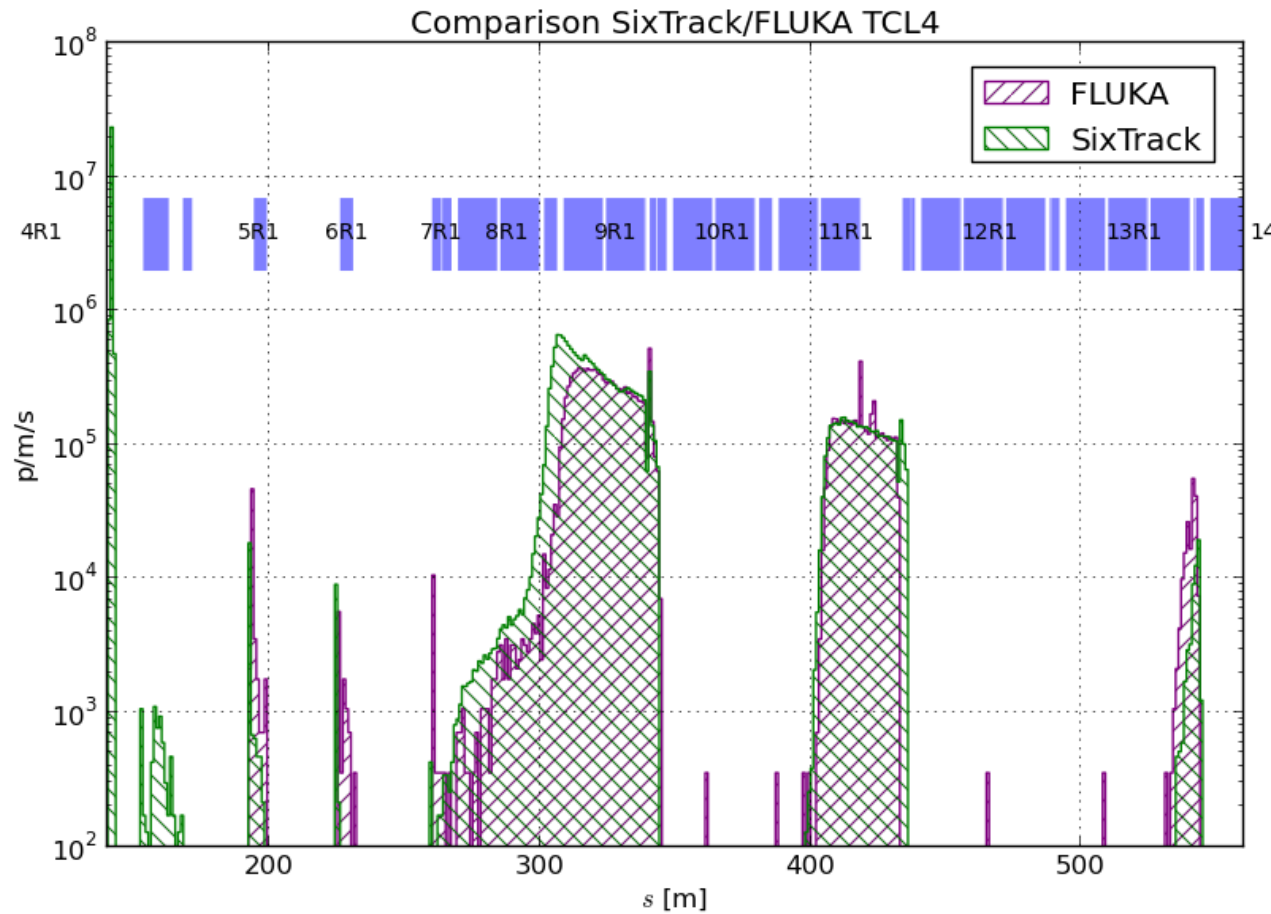 - Scans of crossing angle

Spare slides

dp/p of particle lost vs. longitudinal position: new results

- Distributions are now matching

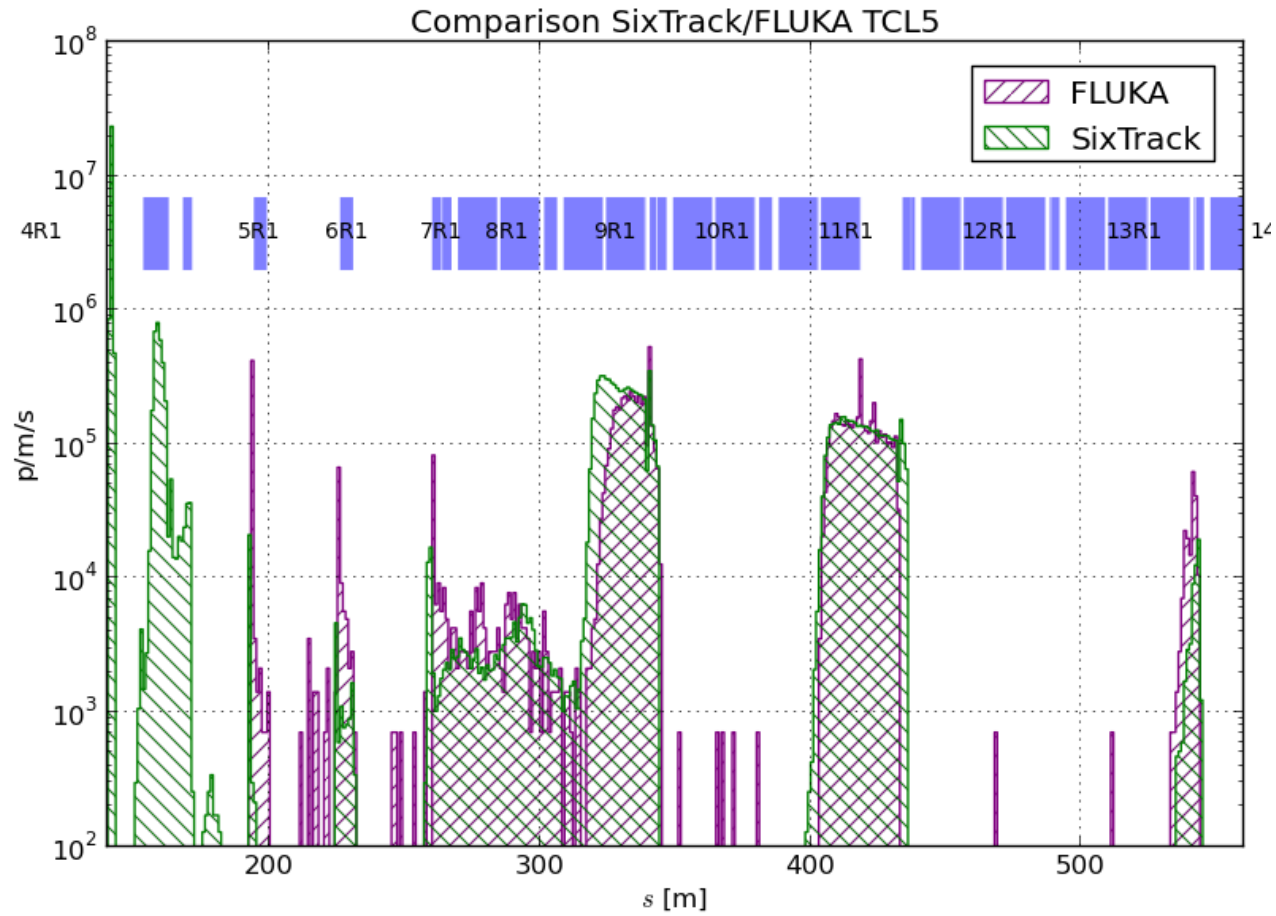- The SixTrack one is wider: more statistics

- 1D distributions of dp/p between 280m and 290m

- Distributions not normalised

- Difference in longit. position can be due to misalignment: left jaw too far away in FLUKA simulation

Comparison SixTrack / FLUKA: TCL5

Comparison SixTrack/FLUKA TCL5

- Also an alignment issue in FLUKA