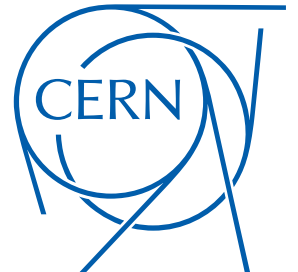


First Look at Tracker Geometry Optimization

CLIC Workshop
February 5th, 2014



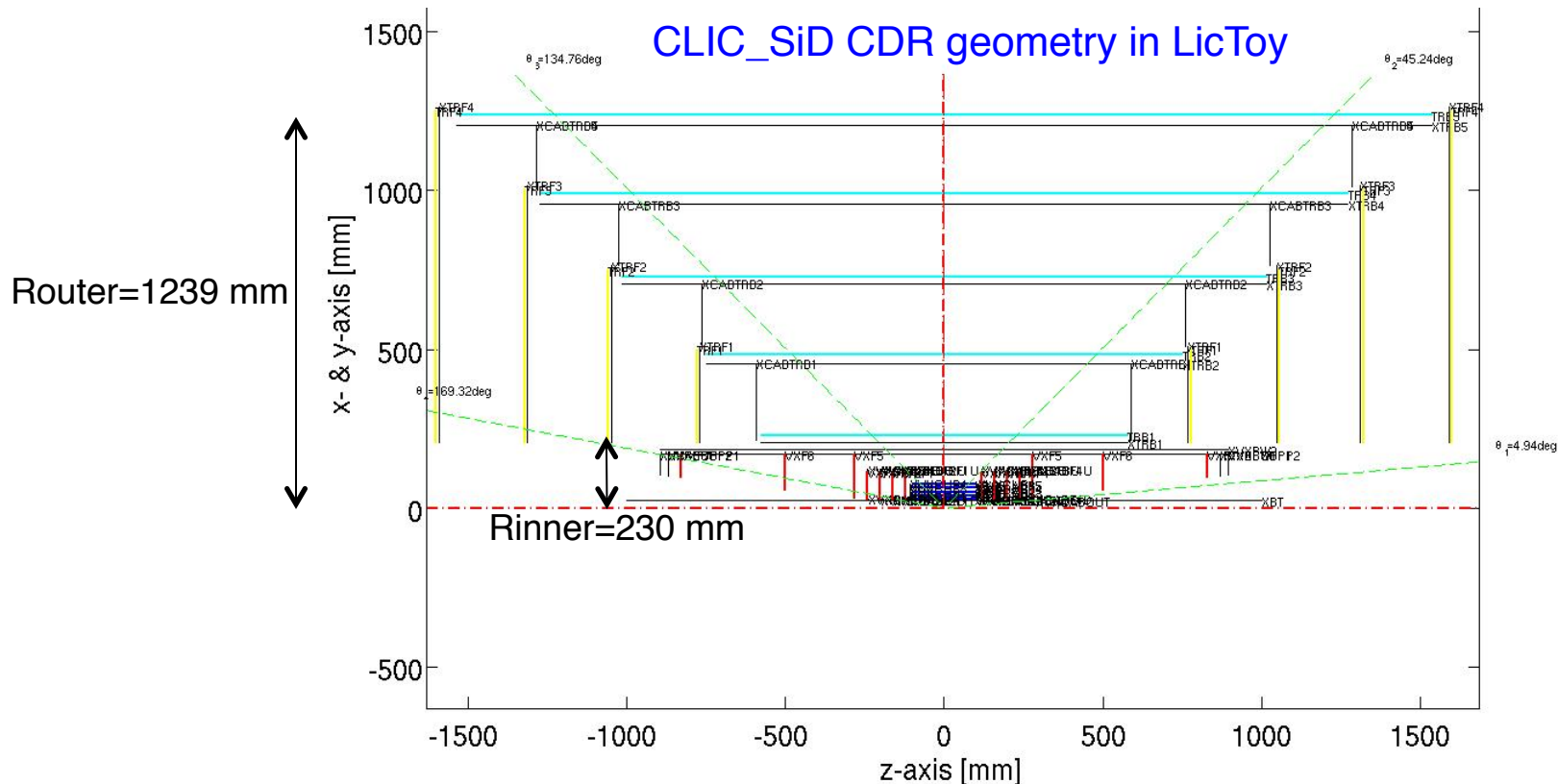
Dominik Dannheim, Wolfgang Klempt



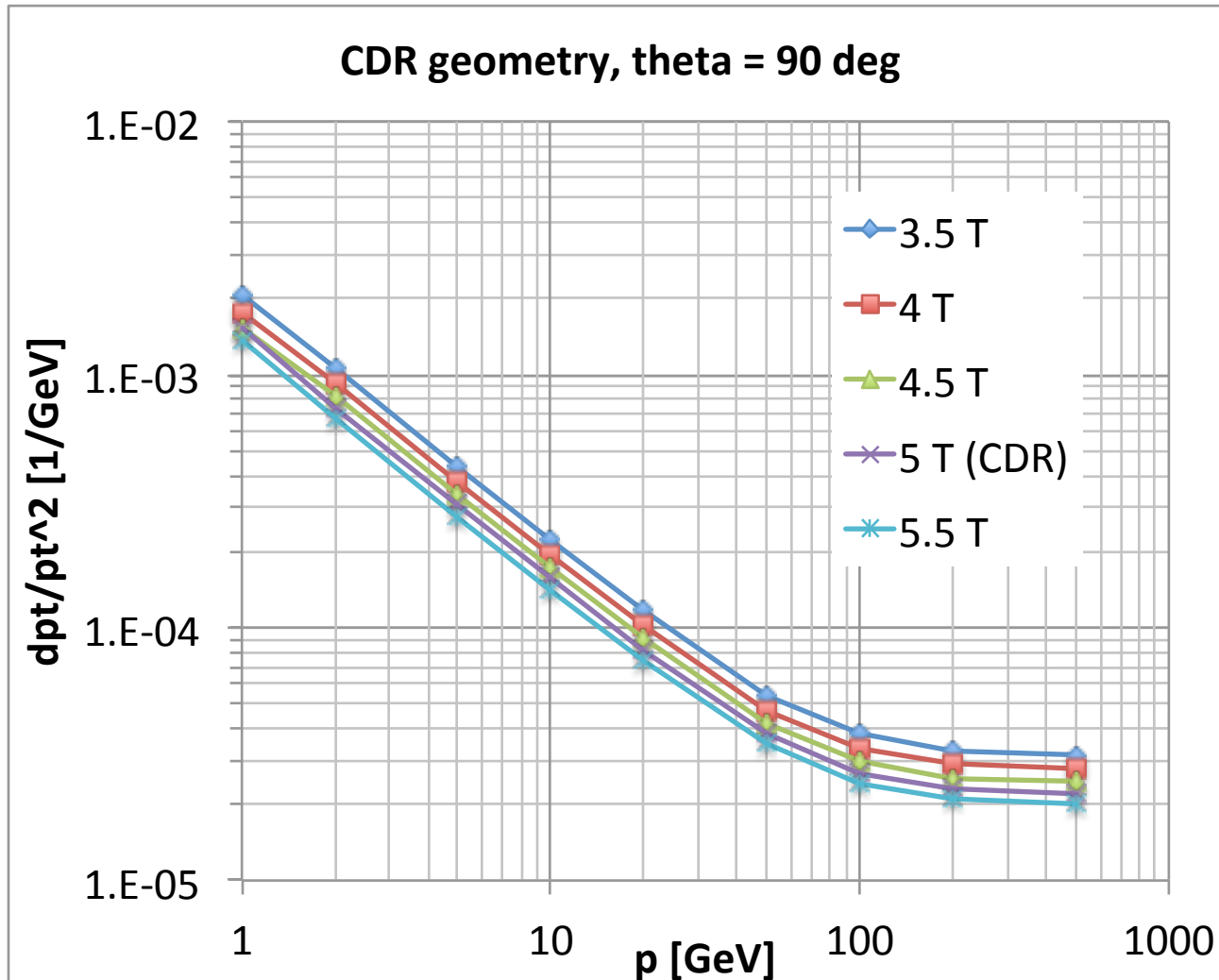
Tracking-performance simulation in LicToy



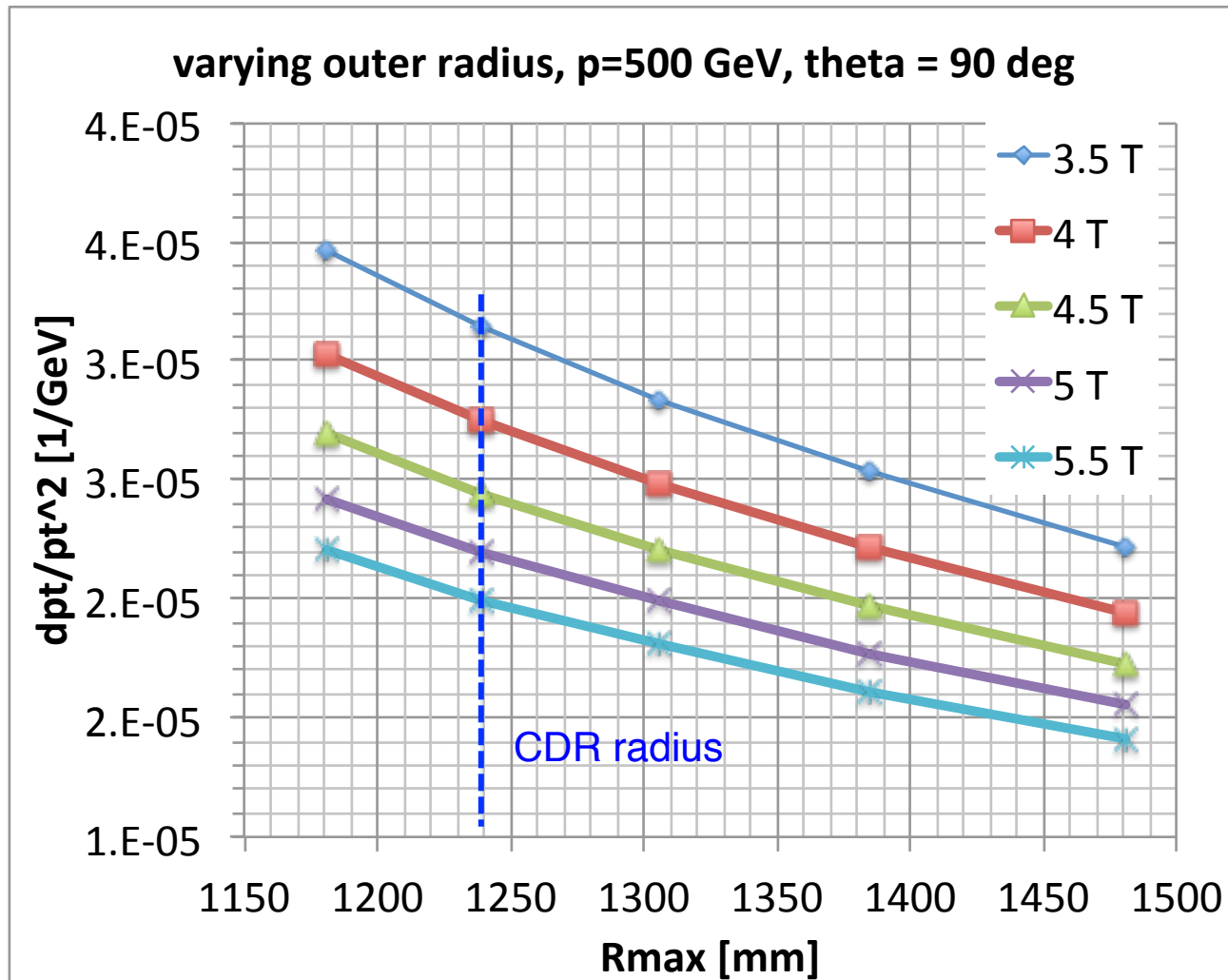
- Simulation based on CLIC_SiD CDR geometry:
 - $X \sim 1\%X_0$ / tracker layer + $1.4\%X_0$ for beam pipe and vertex detector
 - $\sigma_{\text{rphi}} = 7 \mu\text{m}$ for tracker layers (worse than in CDR full-simulation studies)
 - keep vertex-detector and innermost tracker layer fixed
 - equidistant spacing between the 5 tracker layers
- Vary magnetic field and outer tracker radius R_{max}
- Expect p-resolution scaling \sim according to Gluckstein formula (for large p):
 $d p_t / p_t^2 \sim \sigma_{\text{rphi}} / (B * R_{\text{max}}^2)$
 \rightarrow scale outer radius by $\sqrt{B_{\text{nominal}} / B}$ to achieve \sim nominal performance



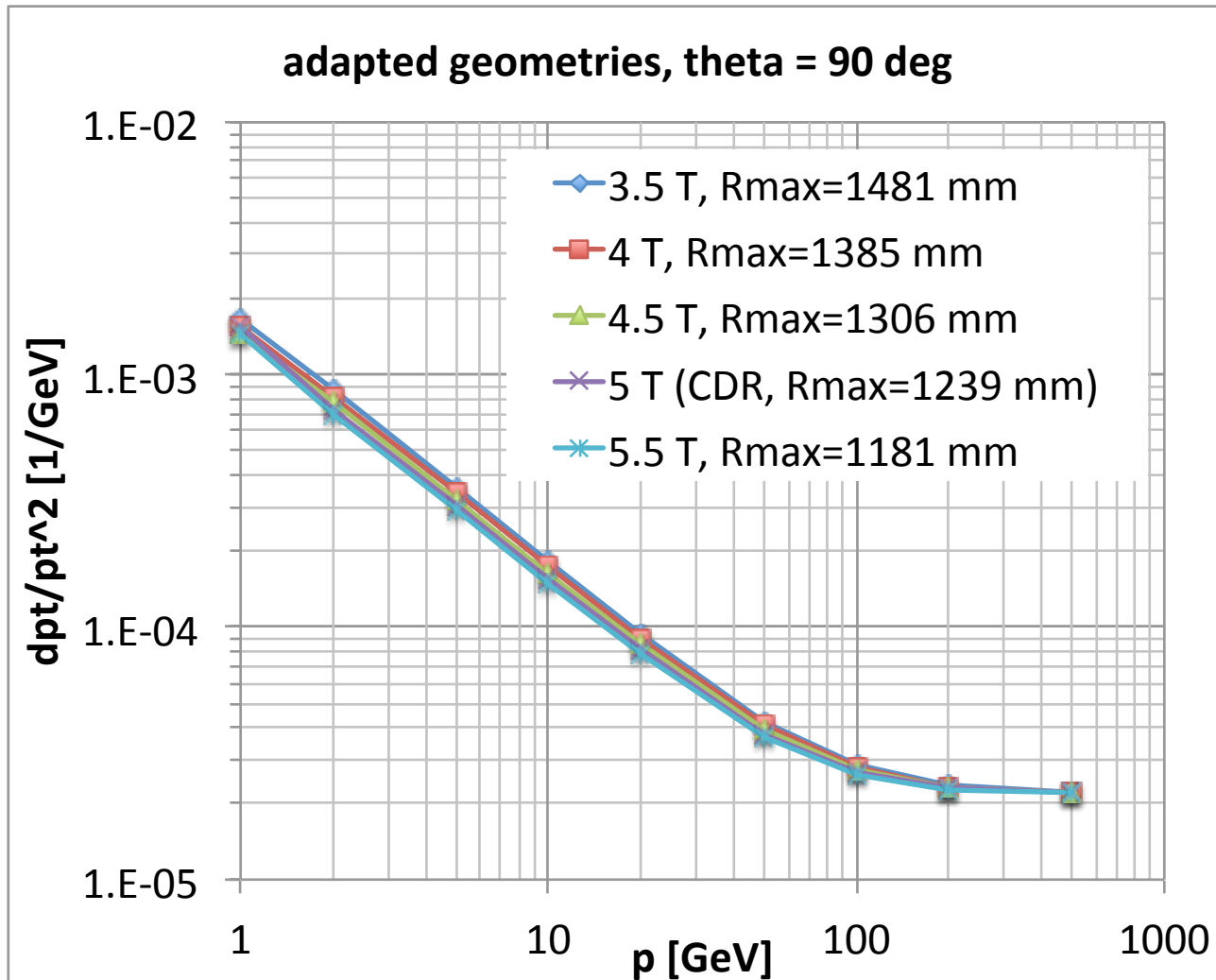
Tracking resolution for different B-fields



Tracking resolution for varying outer tracker radius



Tracking resolution with adapted geometries



- similar resolutions for various B fields, with adapted outer radius