# Introduction - Recap R & B

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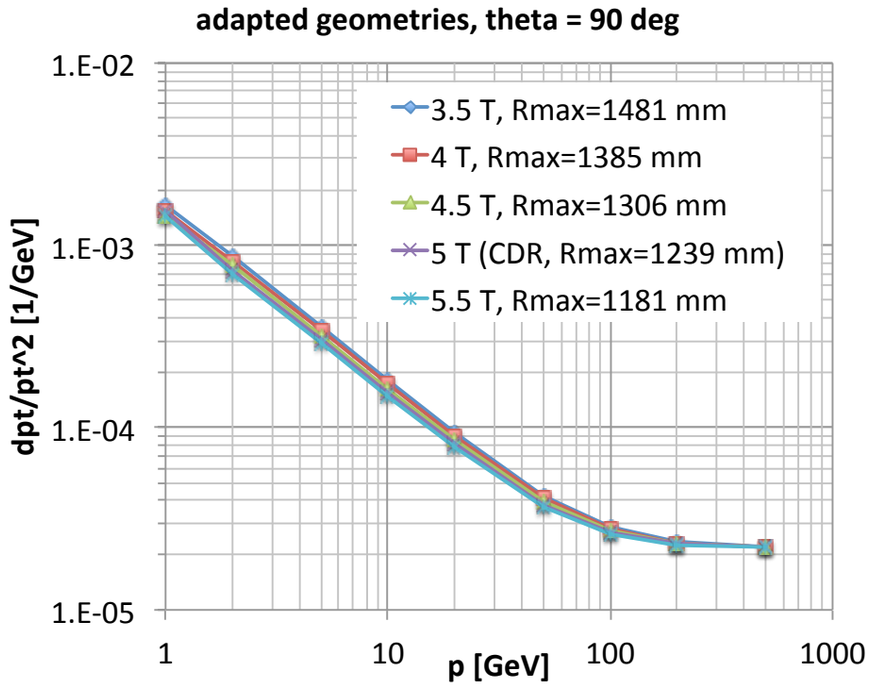
# Recap: Effects of B and R on Tracking and PFA

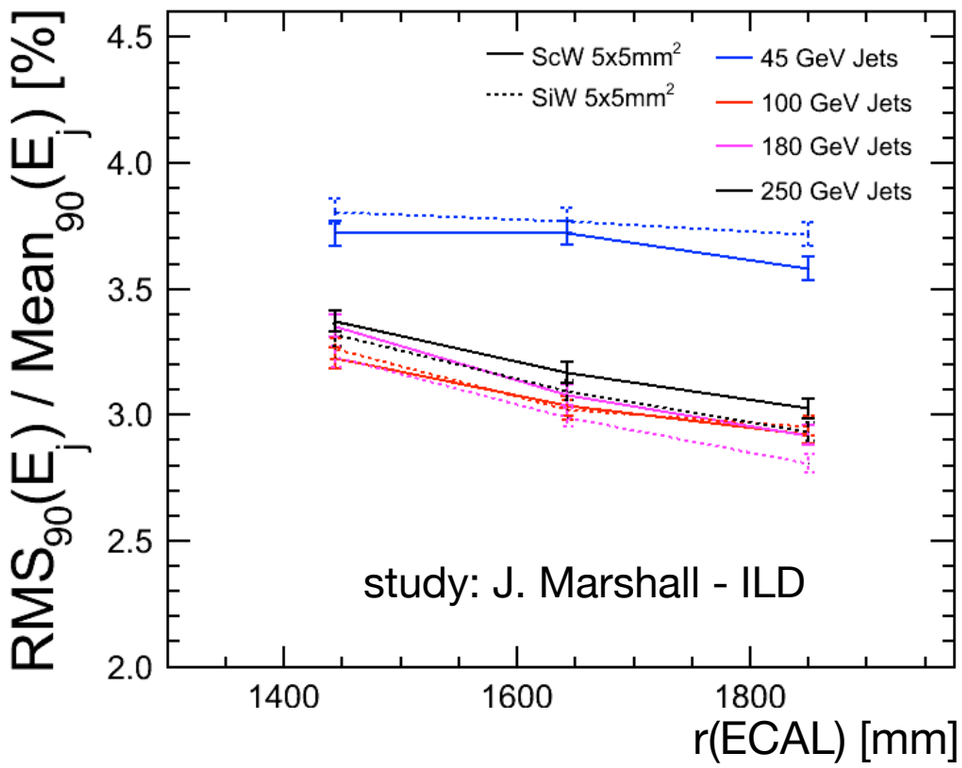
- Has impact on tracking resolution at highest momentum

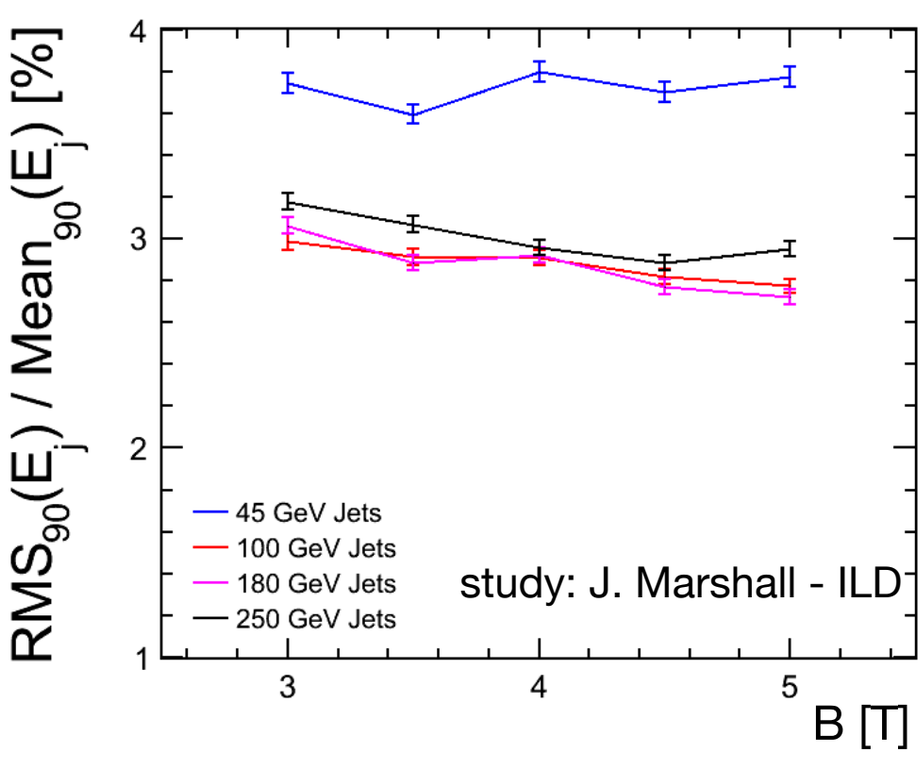
  Dominated by multiple scattering up to highest momenta in present design

  NB: Full simulation resolution better than LICToy - better single point resolution




- Affects PFA Performance




slight improvement with r for higher energies

slight improvement with B for higher energies



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# Selecting a new “Working Hypothesis” - B & R

- Practical limits: (Very) large radius and (very) large B-field technologically and financially challenging
- Large radius (and correspondingly large lever arms for support) challenging for tracker design
- Higher B-fields beneficial for background reduction in inner detector - not fully explored yet, as is precise benefit for flavor tagging

▸ Want to be larger than SiD (1.3 m), while going to ILD radius (1.8 m) seems too much

▸ SiD - like magnetic field technologically feasible but sufficiently challenging - needs to be designed for more than typical operating point

⇨ A first “working hypothesis” to provide input for further studies (performance, physics, engineering):

Inner ECAL radius: **1.5 m** , Magnetic field: **4.5 T**

▸ Free bore of solenoid ~ 3 m

# Selecting a new “Working Hypothesis” - L

- A long main tracker is crucial for the forward tracking performance:
  momentum resolution depends even stronger on the lever arm at lower angles
  $1/L^2$ for $p_T$ (particles not reaching full radius in barrel) and 1/L for the polar angle)
- A long distance from the IP to the calorimeter endcaps provides the highest angular coverage of the (hadronic) calorimeters - inner radius currently limited by the support tube with a radius of 0.5 m

▸ Do not want a tracker shorter than the one of ILD (2.3 m)

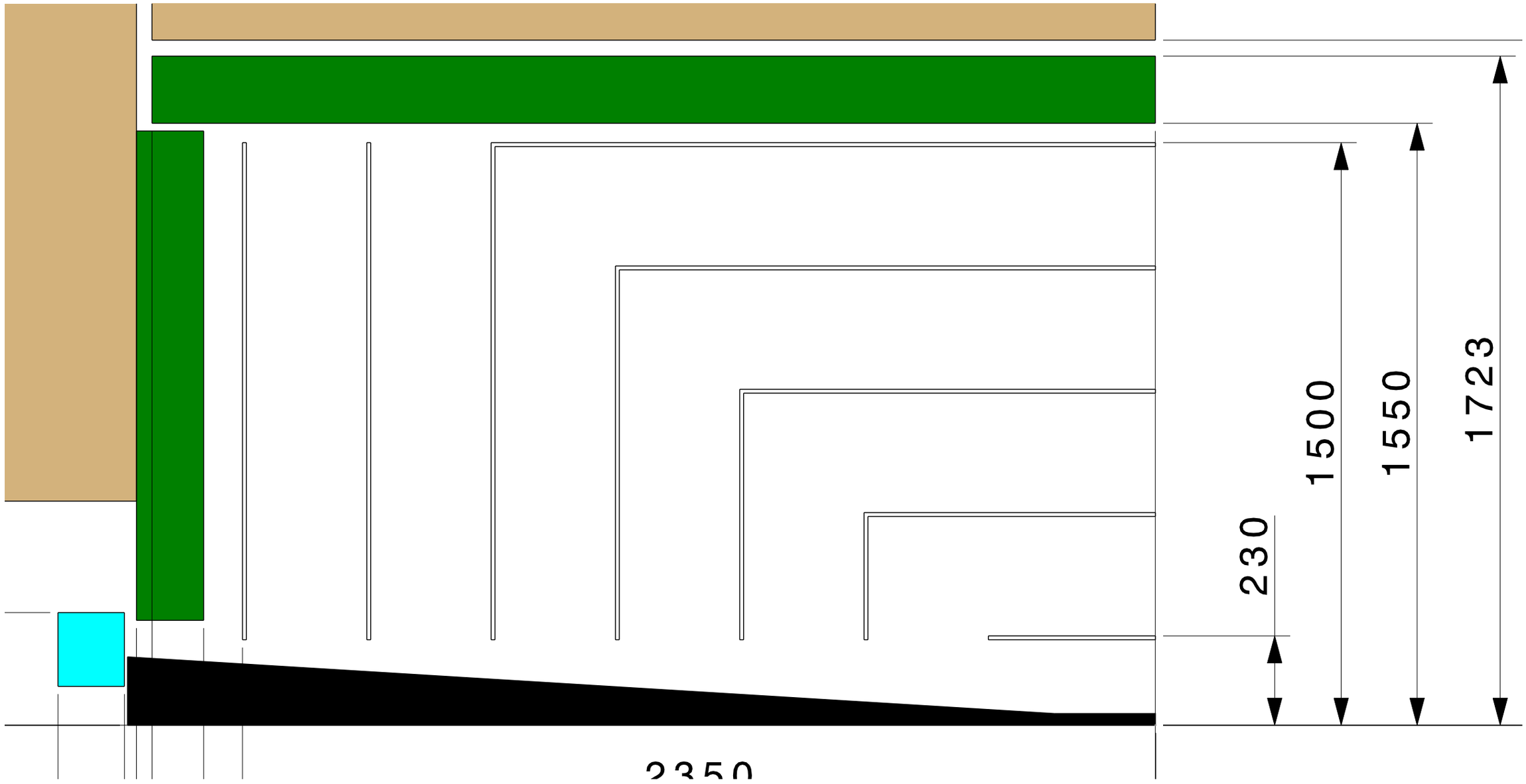
⇨ current choice: **2.3 m**

- Could potentially be increased if endcap yoke thickness can be reduced (end coils)

- Long tracker staves (up to ~ 5m) compromise the material budget due to increased support needs

▸ Investigate a shorter barrel tracker with additional end cap disks (as for CMS)

# Indicative Sketch of “New Main Tracker”




- Rough first sketch, no design yet - Probably beneficial to avoid pointing “edge” between tracker and disks

# Conclusions

- … too early - Work with the new geometry is just starting