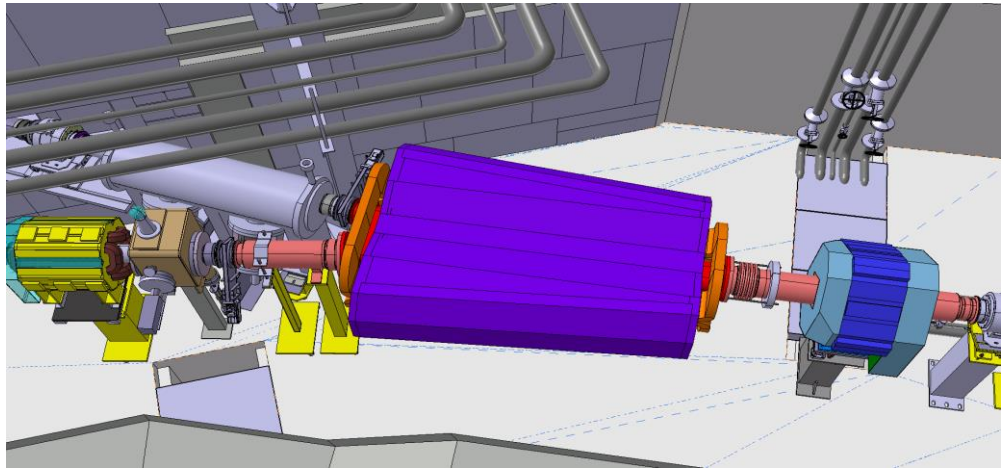
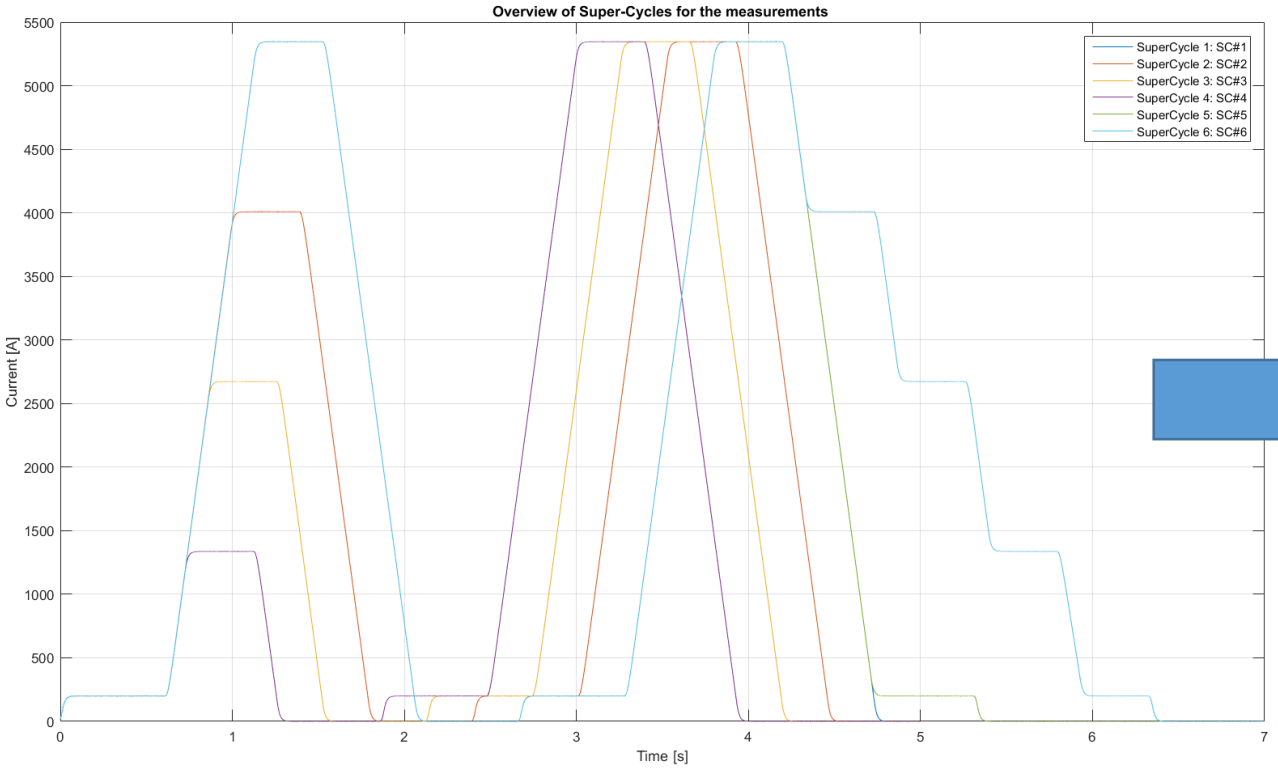
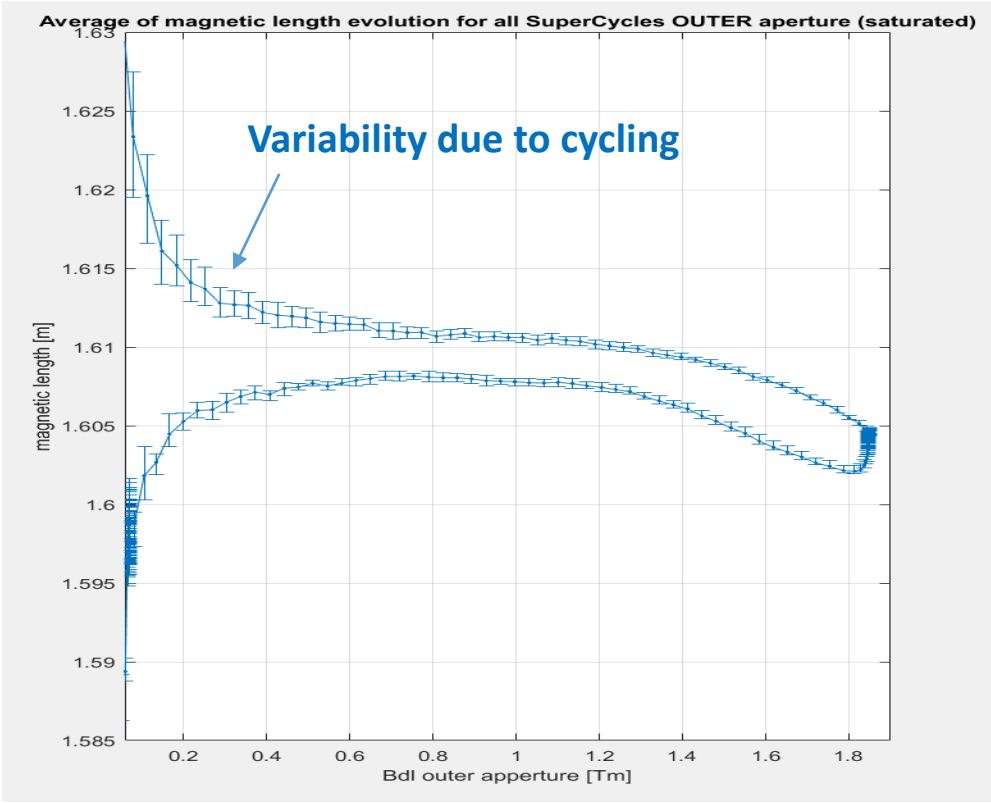
Field Control of TL Switching Dipole

Expected issues:
- history-dependence (~10^{-3} at low field)
- Compounded by asymmetric field profile → complex hysteresis and eddy currents patterns
- More difficult to measure and simulate





Main dipole unit test supercycle (different combinations of energy levels in succession)



Possible control strategies

Feed-forward current control: test on the bench, then apply a ΔI taken in real-time from a table:

1) $\Delta I = f\,(E_{\text{current cycle}}, E_{\text{last cycle}})$ *(4 combinations)*
2) $\Delta I = f\,(E_{\text{current cycle}}, E_{\text{last cycle}}, E_{\text{second-to.last cycle}})$ *(16 combinations)*

Possible problems: complex, new energy levels require re-measurement

Field feedback control

1) Hall probe → FGC3 controller *(as in HIE ISOLDE bendings):* at best few 10^{-4}, must be tested
2) NMR teslameter → Java application *(as in ISOLDE HRS):* too slow
3) NMR teslameter → FGC3 controller: planned, but does not exist yet
4) Full fledged B-train → FGC3 controller: safest solution, subset of the ring system, requires new PCB coils + one field marker