

R&D for Future Circular Collider Applications

with Stored Polarized Electron Beams at ELSA (University of Bonn)

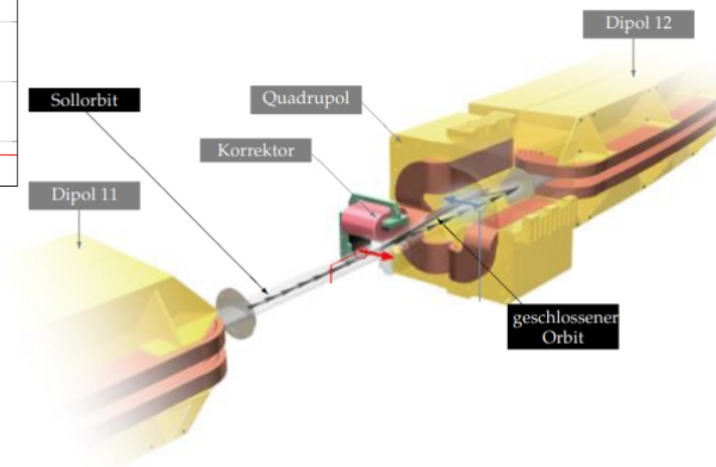
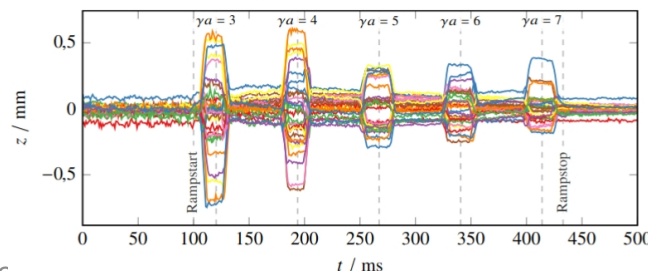
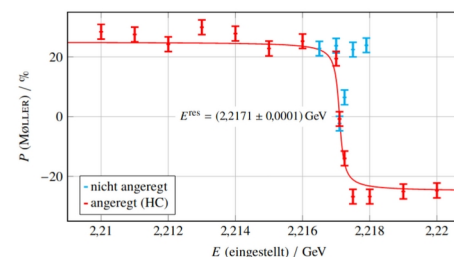
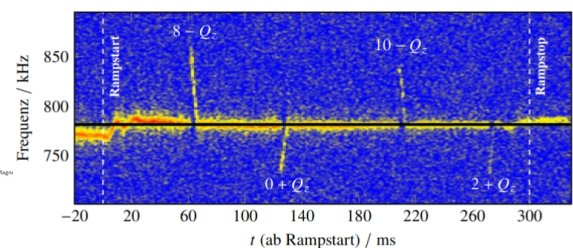
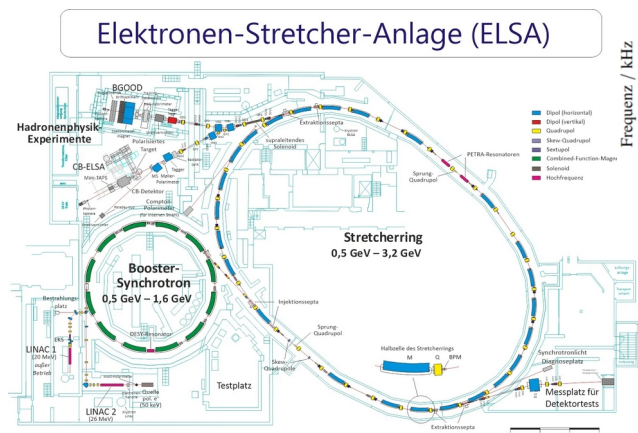
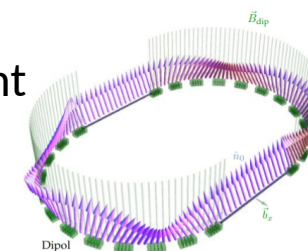
ELSA @ Uni Bonn: Fast ramping 3.2 GeV synchrotron

- Operational **source** of polarized electrons
- Polarimetry** available for full energy range (0.5 – 3.2 GeV)
- Ideal **testbed** for spin dynamics studies:
 - resonance crossings (9 significant)
 - harmonic orbit correction / tune jumps
 - polarization preservation & monitoring
- University environment promoting **young talents**



Scientific contribution

- Experimental development and enhancement of spin preservation techniques
- Modelling and verification of beam & spin dynamics simulation codes (e.g. “X Suite”, CERN)
- Precise beam energy calibration schemes
e.g. RDP and NRPM → fast polarimetry



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Laser Compton Backscattering Polarimeter

- Polarization measurement of stored beam (full energy range)
- 2 % measurement accuracy within 5 minutes (1.4 % within 15 min.)

Upgrade / Invest

- Detector upgrade (Si strip → Timepix3 based pixel detector)
- Implement optical cavity to reduce measurement time
(increase 20 W input power towards kilowatts + efficient detector)
→ Resolution down to sub-seconds for NRPM observation
- Demonstration of precise beam energy calibration beyond RDP

→ Relevance for FCC-ee

