

Polarization & Spin tracking in plasma accelerators

a) Lepton polarisation in plasma accelerators

- Demonstrate generation of polarised electron beams from laser-driven plasma accelerators
 - Based on developed scheme <https://arxiv.org/abs/2304.02922>

b) Lepton spin tracking & management in plasma environments

- Theoretical and experimental studies of polarisation preservation in active plasma lenses and collider-relevant plasma columns
 - Experimental work using (e.g.) LPA-generated polarised electron beams or via Sokolov-Ternov or via polarized electron source through plasma lens/cell
- Feasibility study of using a polarised LPA as injector
 - Application: potential colliders, e.g. HALHF
- Polarization transfer under plasma acceleration
 - Application: potential colliders, e.g. HALHF

c) Simulation code development & optimization

- Spin-tracking in PIC codes and in light-weight particle tracking codes
- Multi-threading polarisation physics in GEANT4, COMSOL etc

Already in 'Verbund': Uni Hamburg, DESY

Under discussion: Uni Mainz, Uni Bonn.....?