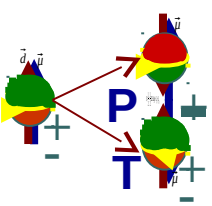


Spin Tracking for Precision Measurements

<https://indico.cern.ch/event/368912/overview>

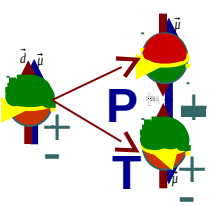
Spin Tracking Code Evaluation Session Summary

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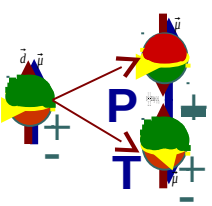
Motivation/Goal of the workshop

- **To fulfill the requirements of the storage ring based EDM search, the following capabilities are essential:**
 - Accurate description of all ring elements including electric field, fringe fields (spin behavior), magnetic focusing in cavity; electric dipole moment part of BMT-equation
 - Allowing various error inputs for systematics investigation.
 - Accurate implementation of RF spin manipulation elements.
 - Calculation of both orbital and spin motion with a high accuracy for over 10^9 orbital revolutions.
 - Allowing multiple particle tracking for exploring IBS, cooling, as well as beam-beam effects.
 - User friendly graphic interfaces for extracting physical information such as orbit, betatron tune, and spin tune from tracking data.
 - Benchmarking



Other effects

- RF cavity off-axis B field on EDM systematics
- Collective effects
 - IBS
 - spin decoherence due to emittance growth?
 - direct effects on EDM systematics?
 - For pEDM, Beam-beam effect on orbit and spin
- Fringe field effects on detailed spin motion
 - Or is spin coherence time enough?
- Is it desire to have cooling?
 - If yes, then which one, e-cooling or SC, and their effects on spin motion



Benchmarking

- First principle prediction
 - Check against theoretical expectations
- Against other codes
 - With the same setup
- Benchmarking against experimental results
 - COSY data: spin coherence time, stable spin direction measurement