Spin Tracking for Precision Measurements
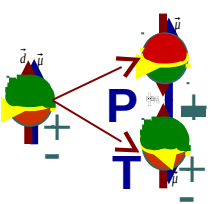
https://indico.cern.ch/event/368912/overview

Location: IPAC15 Satellite Meeting
Hosted by: IKP, Forschungszentrum, Juelich, Germany

Organizhttps://indico.cern.ch/event/368912/overviewer:Prof. Dr. Hans Stroeher, Prof. Dr. Andreas Lehrach,
Dr. Yannis Semertzidis, Dr. Edward Stephenson, Mei Bai

Motivation/Goal of the workshop

- **To achieve the unprecedented precision of the EDM measurement requires**
  - Robust and advanced numerical tracking codes for exploring various systematic effects.
  - Sophisticated lattice design tools for storage rings in the energy range of 0.7-1.5GeV/c with all electrostatic elements as well as combined magnetic and electric elements.

- **To fulfill the requirements of the storage ring based EDM search, the following capabilities are essential:**
  - Accurate description of all ring elements including fringe fields.
  - 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 109 orbital revolutions.
  - Allowing multipole particle tracking for exploring IBS 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.
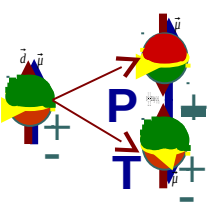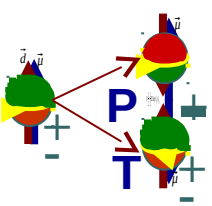
Agenda of the workshop

May 5: 1pm—6pm

- Presentations: 13:00—14:30

- Chair: Ed Stepenson

- 13:00-13:10 Mei (FZJ), Welcome and introduction

- 13:10-13:30 Greta(Ferrara), Overview of spin coherence time study results at COSY

- 13:30-13:50 Marcel(FZJ), Spin tracking with COSY-infinity and its benchmarking

- 13:50-14:10 Prof. Andrianov(St. Petersburg University), Spin tracking with MODE and its benchmarking

- 14:10-14:30 Selcuk Haciomeroglu(CAPP/IBS at KAIST), Tracking results of all-electric ring with Runge-Kutta integration
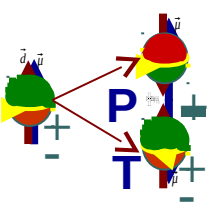
Coffee break

Agenda of the workshop

Panel discussion on codes for precision measurement of storage ring based EDM search

- 15:00 – 18:00 Chair: Vadim, Evaluation of various codes
- ~ 15mins presentations from COSY-infinity, E-Teapot, Tspink, PTC, zgoubi, BMAD, etc on its strength and limitations for EDM spin tracking
- Dr. Sagan: BMAD
- Prof. Talman: E-Teapot
- Dr. Abell: Tspink
- Dr. Meot: zgoubi
- Dr. Gaisser (CAPP/IBS at KAIST), Fast integration algorithm for spin tracking
- Prof. Berz: COSY-infinity
- Kyoko(MSU): Fringe field treatment in COSY-infinity

Agenda of the workshop

May 6: 1pm—3pm

- Panel discussion Chair: Georg
- Mei (FZJ): Summary panel discussion on codes for EDM spin tracking Panel discussion on benchmarking

Coffee break

- May 6: 3:30pm – 6pm
- Presentation Chair: Mei 15:30—16:00
- Valeri(FNAL), EDM lattice design challenges and requirements
-
- Panel discussion on lattice design tools, Chair: Valeri
- Comparison of available tools: MADX(CERN), Optim(FNAL) BMAD(Cornell)
-
- Session summary: write-up by organizers by the end of June