

Wu Yi (1 year Master student started in July 2021) + 10% F. Carlier Post-doc

### ❑ **Theory study**

Study of relevant literature on theoretical development of spin dynamics. To understand the mechanisms of polarization and depolarisation through various resonances.

### ❑ **Learning Bmad**

Learning to use Bmad. Full BMAD tutorial, basic calculations for the FCC-ee (i.e. extracting optics functions, setting radiation damping, basic manipulation of the FCC-ee lattice etc.)

### ❑ **Initial steps in spin simulations with BMAD**

The following has been performed as first exploration of spin simulations:

- Convergence studies per magnet type in FCC-ee for different spin tracking methods to determine correct number of slices required for simulations.
- First energy scans in Tao (bmad program) without radiation and without perturbations to setup workflow and tools
- First simulations with vertical quadrupolar error uncovered a bug. Has been addressed by David and being tested at the moment by Yi.
- We are in contact with Tessa Charles to include magnetic error models for the FCC-ee

### ❑ **Next steps**

- Perform energy scans of polarization including simple errors to develop understanding of spin vs. depolarization resonances of different orders.
- Include realistic (corrected) error sets to slowly increase complexity of FCC-ee model
- Setup tools to perform long term tracking simulations for polarization measurements and depolarization studies.

Working on a LEP case for benchmark: found lattice from LEP2, tested optics functions with new MADX. Possible use in BMAD. tbc

Preparing for 1 PHD and 1 Post-doc student to join the team most probably next year