Master2 Internship proposal at CPT

Research team:

Particle Theory

Supervisor:

Aoife Bharucha

e-mail:

aoife.bharucha@cpt.univ-mrs.fr

Project title:

Electric dipole moment tests of CP violation in BSM models

Description:

Electron dipole moments are sensitive tests to look for CP violating couplings beyond the Standard Model (BSM). We plan to take an effective field theory (EFT) approach, matching BSM models at the weak scale to an EFT containing only SM fields, and perform a renormalization group running down to the low scale at which these EDMs should be calculated. The main part of this 4-month internship would be calculating the Wilson coefficients of the EFT from the full BSM model(s), e.g. the two-Higgs doublet model, and using existing codes (Flavio) to perform the running and the calculation of the EDMs. This would naturally lead to a PhD thesis.

References:

- Electric dipole moments of atoms, molecules, nuclei, and particles,'
  T. Chupp, P. Fierlinger, M. Ramsey-Musolf and J. Singh,
  Rev. Mod. Phys. **91** (2019) no.1, 015001 [arXiv:1710.02504 [physics.atom-ph]].
- flavio: a Python package for flavour and precision phenomenology in the Standard Model and beyond,'
  D. M. Straub,
  arXiv:1810.08132 [hep-ph].