

FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

Garching Maier-Leibnitz-Kolloquium

Donnerstag, 28.10.2021, 16¹⁵ Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

Dr. Philipp Schmidt-Wellenburg

(Paul Scherrer Institute, Villigen, Switzerland)

Search for the muon EDM using the frozen-spin technique

The discovery of an electric dipole moment (EDM) of the muon would break time invariance and violate the combined symmetry of charge and parity (CP). In the light of the recently reported combined 4.2σ deviation from the SM in the anomalous magnetic dipole moment '(g-2)' of the muon by the Muon g-2 collaboration at Fermilab together with observed tensions in B decays at LHCb, the dedicated muon EDM experiment is very attractive not only to push EDM searches beyond the first generation of fundamental particles, but also to probe the role of the lepton flavour universality in nature.

At PSI we propose an experiment to search for the EDM of the muon based on the frozen-spin technique. We intend to exploit the high electric field, $E=1$ GV/m, experienced in the rest frame of the muon with a momentum of $p=125$ MeV/c when passing through a large magnetic field of $B=3$ T. Measured muon fluxes at the muE1 beamline of PSI permit an improved search with a sensitivity of $\sigma(d_\mu)\approx 6\cdot 10^{-23}$ ecm, about three orders of magnitude more sensitive than for the current upper limit of $|d_\mu| \leq 1.8 \cdot 10^{-19}$ ecm [1]. While a null result would set a significantly improved upper limit on an otherwise un-constrained Wilson coefficient, the discovery of a muon EDM would establish the existence of physics beyond the Standard Model.

[1] G.W. Bennett, B. Bousquet, H. N. Brown, et al., PRD 80, 052008 (2009)

For whom it is not possible to join in person (being the recommended participation mode), a remote access via ZOOM will be provided:

<https://lmu-munich.zoom.us/j/98457332925?pwd=TWc3V1JkSHpyOTBPaVlMelhuNnZ1dz09>

Meeting ID: 984 5733 2925

Passcode: 979953

gez. Peter Thierolf
Tel. 289-14064

gez. Norbert Kaiser
Tel. 289-12367