

# **Hadronic contributions to the muon anomalous magnetic moment: strategies for improvements of the accuracy of the theoretical prediction**

**Tuesday 01 April 2014 - Saturday 05 April 2014**

**Waldthausen Castle near Mainz**

## **Scientific Programme**

**Topic:** Hadronic contributions to the muon anomalous magnetic moment: strategies for improvements of the accuracy of the theoretical prediction.

**Presently**, theoretical and experimental uncertainties are about the same, and a 3-4 sigma deviation has been persisting since the Brookhaven g-2 experiment published their results. Theory errors are dominated by the uncertainties in the hadronic contributions: the hadronic vacuum polarization (HVP) and the hadronic light-by-light scattering contribution (HLbL).

**In the future**, new experiments at Fermilab/J-PARC will improve the experimental accuracy by a factor 4.

The workshop brings together theorists and experimentalists to discuss possibilities to realize the improvements needed on the theory side. The main emphasis should be on discussions of possible new strategies.

#### **Topics to be covered by working groups:**

Perspectives for reducing the hadronic vacuum polarization (HVP) error by new cross-section measurements (Novosibirsk, Frascati, Beijing, Belle, BaBar). Theory issues here are the necessary radiative corrections calculations required for the extraction of the cross sections from the experimental data.

Exploiting low energy effective theories in conjunction with experimental data (including hadron production in gamma gamma physics) as required for the calculation of the HLbL contribution or for including tau-decay spectra and pi-pi scattering phase shifts to improve the HVP contribution. General theory tools, resonance Lagrangian approach, Schwinger-Dyson approach etc.

Perspectives for improvements in lattice QCD calculations of the HVP and HLbL contributions.

The topical workshop is supposed to focus 4 days on the working groups, followed on the 5th day by plenary presentations of reports for status and future progress. The plenary presentations are supposed to be a first part of the follow-up g-2 workshop of the Mainz Collaborative Research Center SFB-1044 "The Low-Energy Frontier of the Standard Model", April 7- 11, 2014.

Summary: Hadronic contributions to the muon anomalous magnetic moment: strategies for improvements of the accuracy of the theoretical prediction