NEW YORK CITY COLLEGE OF TECHNOLOGY
Physics Department
Center for Theoretical Physics

Status of Muon Anomalous Magnetic Moment

Presented by:

Simon Eidelman

Budker Institute of Nuclear Physics
Novosibirsk State University, Russia

Thursday, November 3 at noon
Namm, Room 823

Abstract

The muon anomalous magnetic moment (MAMM) is one of the physical quantities that have been measured with high accuracy. In the most recent experiment at Brookhaven National Laboratory, this accuracy reached the level of 0.5 x 10^{-6}, allowing important tests of the Standard Model (SM) to be performed. Since the QED and electroweak terms in the SM prediction are known to very high accuracy, such tests require a calculation of the hadronic term, which is dominated by the contribution of e^+e^- annihilation into two pions. Recently two very accurate measurements of the cross section of this process were performed with the BaBar and KLOE detectors. Using these results as well as previous measurements of this and other cross sections, three new estimates of the MAMM prediction appeared. All three confirm a large discrepancy between the experimental value and the SM prediction, which is between 3.3 and 3.6. We discuss various calculations of MAMM, the differences in the approaches as well as corresponding data. Also discussed is the problem of comparison between the estimates using purely e^+e^- data and those involving data on tau-lepton decays, an elegant solution to which has been recently suggested.