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## Higher-order QED contributions to the lepton anomalous magnetic moments

*Thursday 14 March 2019 12:00 (30 minutes)*

The anomalous magnetic moment of the electron  $a_e$  and that of the muon  $a_\mu$  occupy the special positions for precision tests of the Standard Model of elementary particles. Both have been precisely measured, 0.24 ppb for  $a_e$  and 0.5 ppm for  $a_\mu$ , and new experiments of both  $a_e$  and  $a_\mu$  are on-going aiming to reduce the uncertainties. Theoretical calculations of  $a_e$  and  $a_\mu$  starting from the Lagrangian of the Standard model can also be achieved to the same precision of the future measurements. However, to do so, we need to carry out the five-loop QED calculation without any approximation. I will overview the computation method invented by T. Kinoshita in 1960's that enables us to numerically calculate the entire five-loop QED contribution to the lepton anomalous magnetic moment. I also discuss the current status of the precision tests of the lepton anomalies and the fine-structure constant  $\alpha$ .

**Presenter:** NIO, Makiko (Mishina Center, Riken)**Session Classification:** Plenary**Track Classification:** Track 3: Computations in Theoretical Physics: Techniques and Methods