

Calculation of the QED contributions to the electron anomalous magnetic moment on graphics processors

Sunday, 29 July 2018 15:20 (30 minutes)

High-precision calculation of the electron anomalous magnetic moment requires evaluation of QED Feynman diagrams with 4 independent loops and even more. To make this calculation practically feasible it is necessary to remove all infrared and ultraviolet divergences before an integration. A procedure of removing both infrared and ultraviolet divergences in each individual Feynman diagram will be presented. This procedure leads immediately to finite Feynman-parametric integrals. A method of Monte Carlo integration of these Feynman-parametric integrands will be presented. The method is based on importance sampling. The probability density function is constructed for each Feynman diagram individually by using the information about ultraviolet degrees of divergence in this diagram. The results of the computations on NVidia GPU rent from Google Cloud Platform will be presented:

- 1) contributions of all QED Feynman diagrams without lepton cycles up to 4 loops;
- 2) contributions of some individual Feynman diagrams up to 6 loops.

Primary author: Mr VOLKOV, Sergey (SINP MSU; DLNP JINR)

Presenter: Mr VOLKOV, Sergey (SINP MSU; DLNP JINR)

Session Classification: CALC2018 Workshop