

Referee report to the joint NP+PP PAC at Dubna, 22. January 2019

Theme 1124 “Experiment Mu2e and g-2”

Search for new Physics in Experiments with High-Intensity Muons

The two experiments will both search for physics beyond the SM. In case of the already running “g-2 – test”, this is a continuation of the previous Brookhaven experiment which resulted in a $(255 \pm 80) \times 10^{-11}$ (3.2 sigma) deviation from theory. The new measurement will be 4 times more precise. The hope is to establish a difference >5 sigma (“discovery level”) with respect to the SM.

The Mu2e experiment is a search for the neutrino-less $\mu \rightarrow e$ conversion on a nucleus down to $B \sim 10^{-17}$, a sensitivity four orders of magnitude below the present upper limit.

Both experiments represent very important searches for new physics. The main goals and impacts of both experiments are well described.

The JINR contributions to Mu2e are the development, construction and tests of a Cosmic Ray Veto (CRV) system and of the Electromagnetic calorimeter (LYSO, CsI and eventually for second stage BaF2 crystals). For the (g-2) experiment the contribution is mainly work on the DAQ and graphics.

The future plans are continuation of these developments and possible participation in runs and data analysis. If the group wants to achieve high visibility, it will have to engage more rigorously with scientists in the future data taking and analysis of Mu2e. With 21 people (FTE ~ 14) among 242 collaborators in total this requires much skill to be visible.

The listed publications and thesis works are detailed and of technical nature. A fruitful activity is shown on International Conferences.

The financial contributions from Dubna for the detector components seem to be in balance. For participating on runs, probably more resources might be necessary.

One remark should be made conc. the international competition: There is worldwide a second $\mu \rightarrow e$ conversion experiment (COMET at J-PARC) underway which employs almost exactly the same setup and aims at the same scientific goal as Mu2e. A different Dubna group is supporting it in a similar way, see theme 1134, also discussed at this meeting. Since both efforts deserve support, it could be difficult to define priorities in case of short resources.

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