Referee's comment on the project GEMMA-III
(Investigation of neutrino properties
with the low-background germanium spectrometer GEMMA-III, 2019-2021)

goal of the GEMMA-III project is to study the fundamental parameters of neutrino. initial formulation of the Standard Model neutrinos are massless particles. However, v it is known that the Standard Model should be extended to some more general theory ır because of neutrinos which are the only particles exhibiting experimentally well- properties beyond the Standard Model. In many extensions of the Standard Model which neutrino masses and mixings neutrinos acquire nontrivial electromagnetic properties llow the direct electromagnetic interactions of neutrinos with electromagnetic fields and rticles or with particles which have magnetic moments. Unfortunately, in the easiest f the Standard Model a tiny value for the neutrino magnetic moment is predicted at the han ~ 10^{-19} Bohr magneton. In addition, in spite of reasonable efforts in studies of ectromagnetic properties, up to now there is no experimental confirmation, neither from aboratory studies nor from astrophysical observations in favor of non vanishing neutrino netic characteristics. However many experimenters and theoreticians really believe that have much greater magnetic moment values and are eagerly searching for it. Therefore, agnetic moments, once being experimentally confirmed, will open a window to new ond the easiest extension of the Standard Model.

e primary result of the GEMMA-I phase of the project the best world terrestrial upper limit on the neutrino effective magnetic moment has been obtained as 2.9×10^{-11} eton. The discussed next phase of the GEMMA project (GEMMA-III) is aimed for the ease of sensitivity to the neutrino magnetic moment and will reach the level of about ~ Bohr magneton. This seems quite a reasonable and attainable goal for the GEMMA n. The claimed limit on the neutrino magnetic moment will be reached because of mprovements in characteristics of the GEMMA-II experimental setup in respect to MMA-I. The most important, in particular, are the following:

creasing by factor 2 in the total neutrino flux at the detector because of much closer tion of the detector to the reactor core;

creasing by factor 3.7 in the total mass of the detector;

ecreasing of the energy threshold from 2.8 keV to 200 eV.

ermore, the experimental setup will be located in the new position (room) with much n order of magnitude) γ-background conditions and will be installed on a moveable he later gives an opportunity to vary on-line the neutrino flux and thus suppress rrors.

o new low-threshold germanium detectors it will become possible to study the another effect – coherent elastic neutrino-nucleus scattering (CENNS). This process is predicted Model and recently was observed in accelerator by COHERENT collaboration. It was ved for the reactor neutrinos, so it would be interesting to compare the obtained results. ry high resolution of new detectors (production of CANBERRA) it will be possible to energy threshold till 200 eV which makes such detection possible. It is expected to have vents per day from CENNS, so GEMMA-III project can investigate this process with a ion and put a limit on non-standard neutrino interactions. Some other interesting ns including sterile neutrino search or reactor monitoring are possible within this

NR team of the GEMMA-II project has an ample experience in carrying out the first- nents in physics of low-energy weak interactions and there is no doubt that the proposed be successfully implemented and thus deserves all possible support.

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