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Report on GERDA project

The GERDA experiment is looking for neutrinoless double beta decay ($\beta\beta(0\nu)$) of ^{76}Ge using Germanium semi-conductor diodes enriched in ^{76}Ge installed directly in liquid argon to cool down the detectors. The search of ($\beta\beta(0\nu)$) decay is essential to determine the nature (Dirac or Majorana particle) of the neutrino and it is the most sensitive process. Several projects using different techniques and measuring different double beta decay isotopes are on going. These projects are complementary in the sense that the theory is not able to predict the most favourable nucleus and the backgrounds are different depending on the techniques and the transition energy of the studied nucleus.

GERDA experiment is one of the most sensitive and promising experiment in this field.
The liquid argon is also used as an active veto to reject a part of the background. The collaboration has demonstrated with the GERDA I and GERDA II phases the feasibility of such experiment and also its capability to reach the required background.GERDA II has established the best limit for the $\beta\beta(0\nu)$ process of ^{76}Ge with $T_{1/2} > 5.8\ 10^{25}$ years and a background level in the Region of Interest of 10^{-3} count keV^{-1} $kg^{-1}yr^{-1}$.

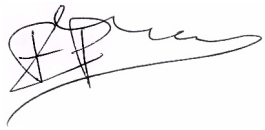
Additional detectors will be added inside the cryostat and an improvement of teh liquid argon veto will allow to improve the sensitivity until 2019. The objective is to reach a sensitivity on the half-life $T_{1/2} > 10^{26}$ years and to prepare an exposure of 100 kg.yr.

A new generation of detectors is also in progress for the LEGEND project which is the following of GERDA experiment. It requires the procurement of enriched ^{76}Ge and the construction of new detector as well as an R&D to develop low background materials and to improve the readout electronics. The first phase of LEGEND is expected for 2020-2021.

The JINR Dubna has essential contribution in GERDA experiment on the Ge detectors, te procurement of enriched germanium, the muon veto system, the liquid argon and analysis. It has also the technical coordination of the experiment. There is a substantial involvement of physicists with at least 6 FTE.

There is no doubt that GERDA experiment and LEGEND project will produce in the futur important results in the field on neutrinoless double beta decay. The JINR Dubna team has very strong and visible contributions in this successful international project.

In conclusion, I strongly recommend support the GERDA project.



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