Contribution ID : **4** Type : **Oral talk**

Search for processes beyond the Standard Model in the GERDA experiment

Friday, 25 October 2024 16:30 (15)

The main goal of the GERDA experiment was to search for the neutrinoless double-beta decay of ^{76}Ge. Beside this, many other GERDA results of searching for various processes beyond the Standard Model were obtained. Among them, a possible manifestation of the inclusive, mode independent decays of a single neutron and proton and some specific modes of tri-nucleon decays in ^{76}Ge were investigated, as well as a possible decay of an electron via channel $e^- \rightarrow \nu_e \gamma$. A search for full energy depositions from bosonic keV-scale dark matter candidates has been performed too. After 127.2 kg yr of total exposure, a limit on the half-life of neutrinoless double-beta decay in ^{76}Ge is set at $T_{1/2} > 1.8 \times 10^{26}$ yr , which corresponds to an upper limit on the effective Majorana neutrino mass m < 79–180 meV. No signal candidates were found for either single or tri-nucleon decays of ^{76}Ge. This leads to lifetime limits for the inclusive decay of a single nucleon: for neutrons $\tau_n > 1.5 \times 10^{24}$ yr and for protons $\tau_p > 1.3 \times 10^{24}$ yr at 90% C.I. This is the first limit obtained for ^{76}Ge. The obtained limit on the sum of the decay widths of the four inclusive tri-nucleon decays corresponds to a lower lifetime limit of 1.2×10^{26} yr. This result improves previous limits for tri-nucleon decays by one to three orders of magnitude. For the electron decay $e^- \rightarrow \nu_e \gamma$ a lower limit of $\tau_e > 5.4 \times 10^{25}$ yr has been determined. The limits for the search of bosonic dark matter candidates pose the most stringent direct experimental results between 140 and 1021 keV. The brief description of the other results for several non-standard mechanisms of double-beta decay is also included.

Primary author(s) : SMOLNIKOV, Anatoly (JINR)

Co-author(s) : GERDA COLLABORATION

Presenter(s) : SMOLNIKOV, Anatoly (JINR)

Session Classification : Neutrino

Track Classification : Neutrino physics