



LNGS SEMINARS

Volodymyr Tretyak

Institute for Nuclear Research, Kiev, Ukraine

Final results of the Aurora experiment to study double beta decay of ^{116}Cd with enriched $^{116}\text{CdWO}_4$ crystal scintillators

Abstract

The double beta decay of ^{116}Cd has been investigated with the help of radiopure enriched $^{116}\text{CdWO}_4$ crystal scintillators (1.162 kg) at the Gran Sasso underground laboratory. The half-life of ^{116}Cd relative to the two neutrino double beta decay to the ground state of ^{116}Sn was measured with the highest up-to-date accuracy as $T_{1/2}=(2.63\pm 0.11)\times 10^{19}$ yr. A new improved limit on the neutrinoless double beta decay of ^{116}Cd to the ground state of ^{116}Sn was set as $T_{1/2} > 2.2\times 10^{23}$ yr at 90% C.L., which is the most stringent known restriction for this isotope (corresponds to the effective Majorana neutrino mass limit in the range of 1.0 – 1.7 eV, depending on the nuclear matrix elements used in the estimations). New improved half-life limits for double beta decay with majoron(s) emission, Lorentz-violating decay, and transitions to excited states of ^{116}Sn were set at the level of $> 10^{20} - 10^{22}$ yr. New limits for the hypothetical lepton-number violating parameters (right-handed current admixtures in weak interaction, the effective majoron-neutrino coupling constants, R-parity violating parameter, Lorentz-violating parameter, heavy neutrino mass) were set.

July 4, 2019 - h 2:30 pm

LNGS - "B. Pontecorvo" room

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