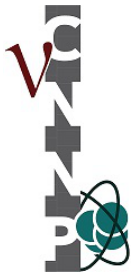

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New limits on double beta processes in ^{106}Cd

By comparing rates of neutrinoless double positron emission and electron capture with positron emission one could distinguish mechanism (due to light neutrino exchange or right-handed currents admixture in the weak interaction) of the neutrinoless double beta "minus" decay when observed. However, even the allowed two-neutrino mode of electron capture with positron emission is not observed yet. The nuclide ^{106}Cd is a promising candidate forthe experimental investigations of the double beta "plus"decays (double electron capture, electron capture with positron emission and double positron emission) due to its high energy release 2775.39(10) keV and relatively high isotopic abundance 1.245(22)%. An experiment to search for double beta processes in ^{106}Cd is in progress with the help of $^{106}CdWO_4$ crystal scintillator (enriched in ^{106}Cd to 66%) in coincidence with two large volume $CdWO_4$ scintillation detectors in close geometry at the Gran Sasso Underground Laboratory. The sensitivity of the experiment is approaching the theoretical predictions for the double beta processes in ^{106}Cd at a level of 10^{20}–10^{22} yr that corresponds to the most sensitive double beta-plus experiments. The new limits on different modes and channels of ^{106}Cd were set.

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