FIRST RESULTS OF THE EXPERIMENT TO SEARCH FOR 2β DECAY OF ^{106}Cd WITH THE HELP OF $^{106}CdWO_4$ CRYSTAL SCINTILLATORS

An experiment to search for 2β processes in ^{106}Cd with the help of $^{106}CdWO_4$ crystal scintillator (mass of 215 g), enriched in ^{106}Cd up to 66 %, is in progress at the Gran Sasso National Laboratories of the INFN (Italy). After 1320 h of data taking, limits on double beta processes in ^{106}Cd have been established on the level of $10^{19} – 10^{20}$ yr, in particular (all the results at 90 % C.L.): $T_{1/2}(0\nu2\varepsilon) > 3.6 \cdot 10^{20}$ yr, $T_{1/2}(2\nu\varepsilon\beta^+) > 7.2 \cdot 10^{19}$ yr, and $T_{1/2}(2\nu2\beta^+) > 2.5 \cdot 10^{20}$ yr. Resonant 0ν2ε processes have been restricted as $T_{1/2}(0\nu2K) > 1.4 \cdot 10^{20}$ yr and $T_{1/2}(0\nu LK) > 3.2 \cdot 10^{20}$ yr. A possible resonant enhancement of the 0ν2ε processes is estimated in the framework of the QRPA approach.

Keywords: double beta decay, ^{106}Cd, $CdWO_4$ crystal scintillator.