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P4.062 Measurement of the double-beta decay half-life and search for the neutrinoless double-beta decay of Cd-116 with the NEMO-3 detector

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The NEMO-3 experiment measured the half-life of the $2\nu\beta\beta$ decay and searched for $0\nu\beta\beta$ decay of ^{116}Cd to the ground state of ^{116}Sn . The analysis is performed using 410 g of ^{116}Cd installed in the detector with an exposure of 5.26 years and a dedicated background model. The measured half-life of the $2\nu\beta\beta$ decay represents one of the best measurement available for this isotope. The search for $0\nu\beta\beta$ is performed using a multivariate approach to improve the discrimination among signal and background and increase the sensitivity. No events have been observed above the expected background searching for $0\nu\beta\beta$ decay. Lower limits are derived for several underlying mechanisms involving physics beyond the Standard Model. The NEMO-3 detector is able to identify different particles and reconstruct different topologies in the final states. This feature allows to perform a search for the not yet observed $\beta\beta$ decays of ^{116}Cd toward the excited states of ^{116}Sn , which is currently ongoing. The poster describes the results obtained on $\beta\beta$ decay of ^{116}Cd to the ground state of ^{116}Sn and the strategy adopted for the decay toward the excited states.