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P4.048 Sensitivity of ^{163}Ho experiments to a eV-scale sterile neutrino

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Anomalies in short baseline neutrino oscillations experiments point out towards the existence of additional particles which mix with neutrinos. A possible scenario able to reproduce the data is the so-called 3+1 model in which one sterile neutrino, with mass in the eV range, mixes with the three active neutrinos. The existence of such a sterile neutrino can be proved by identifying the effect of the corresponding heavy neutrino mass state in experiments designed for the determination of the effective (anti-)neutrino mass. We discuss the signature of an eV neutrino mass state with mixing parameter between about 10^{-2} and 10^{-1} , as foreseen by the 3+1 model, on the electron capture spectrum of ^{163}Ho . We present the sensitivity that can be reached in the different phases of the ECHO experiment. We found that in order to completely scrutinize the allowed parameter space for the eV-scale sterile neutrino, a total number $N_{\text{eV}} = 10^{18}$ of ^{163}Ho decays is necessary.