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(G*) (POS-43) Searches for double beta decay of Xe-134 with EXO-200

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The EXO-200 experiment uses a liquid xenon (LXe) time projection chamber to search for neutrinoless double beta decay ($0\nu\beta\beta$). The already observed two neutrino double beta decay ($2\nu\beta\beta$) mode, a second-order weak transition in which two neutrons simultaneously decay into two protons emitting two electrons and two antineutrinos, is a well-known process predicted by the Standard Model whereas the hypothetical neutrinoless double beta decay mode ($0\nu\beta\beta$), a spontaneous transition that emits only two electrons, has not been observed yet. The observation of $0\nu\beta\beta$ would help constrain the absolute mass scale of neutrinos and verify that they are their own anti-particle. Although focused on the study of ^{136}Xe, EXO-200's LXe enrichment of 80.7% in the isotope ^{136}Xe and 19.1% in the isotope ^{134}Xe allows to study the decay of both isotopes. The EXO-200 experiment collected data from 2011 to 2014 (Phase I) and from 2016 to 2018 (Phase II) at the Waste Isolation Pilot Plant in Carlsbad, New Mexico, USA. Using data from Phase I, EXO-200 obtained the most stringent lower limit for the half life of the two modes of double beta decay of ^{134}Xe, which is expected to be further improved using the complete data set. This poster presents the current efforts and results obtained by EXO-200 focusing on the analysis of the ^{134}Xe double-β decay modes.

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