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P1.053 Gaseous ^{83m}Kr generator based on ^{83}Rb deposited in zeolite

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The gaseous ^{83m}Kr electron source is currently used in neutrino mass experiments KATRIN and Project 8, dark matter experiments XENON, LUX and DarkSide, and ALICE (CERN) experiment.

The main attractive features of this radioactive noble gas are its monoenergetic conversion electrons with well known energies and a half-life of 1.8 h, which is short enough to avoid any long-lasting contamination of the system while the long half-life of the mother ^{83}Rb isotope ($T_{1/2} = 86$ d) enables more time demanding measurement. Particularly, in the neutrino mass experiments with gaseous tritium in which the ^{83m}Kr is applied in the same manner as the tritium, the K-32 conversion electrons with energy conveniently close to the beta spectrum endpoint represent an important test and calibration tool.

We present the design and characteristics of the gaseous ^{83m}Kr generator for KATRIN (KArlsruhe TRitium Neutrino) experiment. Specifically ^{83m}Kr as well as possible ^{83}Rb emanation behaviour at the generator output will be shown. Also, the ^{83m}Kr emanation for various environments of the zeolite beads will be addressed.