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Using fast FPGA-based technologies in the slow control system at KATRIN experiment

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KATRIN (KArlsruhe TRItium Neutrino) experiment is one of the most remarkable and at the same time complex experiments to determine with high sensitivity a neutrino mass. This is achieved by measuring the b-electron energy spectrum near the endpoint of tritium b-decay. The KATRIN slow control has a very strict requirements to safety, reliability and precise respond time. It is measuring a wide spectrum of different parameters on numerous subsystems running along more than 70-meter-long apparatus. The harsh conditions and presence of tritium in the rear section set very high demands on inter-locks forcing us to use the FPGA-based technologies as a hardware solution, free from software crashes. Thus, we chose a compact RIO hardware from National Instruments as a core component of slow control system in KATRIN. Detailed description of few subsystems will describe the features and advantages of using FPGA-based cRIO hardware.

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Summary

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