

Characterization of an FPGA-Based DAQ System in the KATRIN Experiment

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Abstract—This article will describe the procedures used to validate and characterize the combined hardware and software DAQ system of the KATRIN experiment. The Mk4 DAQ Electronics is the latest version in a series of field programmable gate array (FPGA)-based electronics developed at the Karlsruhe Institute of Technology's Institute of Data Processing and Electronics (IPE). This system will serve as the primary detector readout in the KATRIN experiment. The KATRIN data acquisition software is a MacOS X application called ORCA (Object-oriented Real-time Control and Acquisition), which includes a powerful scripting language called ORCAScript. This article will also describe how ORCAScript is used in the validation and characterization tests of the Mk4 DAQ electronics system.

Index Terms—Data acquisition, FPGA electronics, neutrinos, software, scripting.