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## Self-Triggering Readout System for the Neutron Lifetime Experiment PENeLOPE

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The aim of PENeLOPE is a high-precision measurement of the neutron lifetime and thereby an increase of the parameter's precision by one order of magnitude. In order to achieve an increasingly higher accuracy, modern experiments naturally require state-of-the-art readout electronics, as well as high-performance data acquisition systems. This talk will therefore present the readout system for the neutron lifetime experiment PENeLOPE, which is currently being designed at the department of physics at Technische Universität München.

The system's readout chain involves preamplifier, shaper, sampling ADC, and a data processing stage implemented on field programmable gate arrays (FPGAs). Due to the incorporated signal detection, the system is able to process data from 1,000 self-triggering channels, each of which is hit by 10 particles/sec. The corresponding data rate of 1.5 MB/sec is transferred to the outside of the experiment by a high-speed optical interface, which has been developed to meet the special experimental requirements of PENeLOPE. The main focus of the talk will be set on the performance and tests of the trigger algorithm as well as on characteristics and properties of the optical interface. The project is supported by the Maier-Leibnitz-Laboratorium (Garching), the Deutsche Forschungsgemeinschaft and the Excellence Cluster "Origin and Structure of the Universe".

### Collaboration

PENeLOPE-Collaboration

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