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NeuLAND MRPC prototypes tested at ELBE/Dresden

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Prototypes for the NeuLAND detector have been built at FZD and GSI and then studied using the 32MeV pulsed electron beam at the superconducting electron accelerator ELBE in Dresden, Germany. Owing to the new, single-electron per bunch mode of operation, a rapid validation of the design criteria (>=90% efficiency for minimum ionizing particles, s_t <= 100 ps time resolution) was possible.
Tested properties of the prototypes include glass thickness, spacing of the central anode, and a comparison of single-ended and differential readout. Tested frontend electronics schemes include FOPI (single-ended), PADI-based (both single-ended and differential mode tested), and ALICE (differential).
The NeuLAND detector at the R3B experiment at the future FAIR facility in Darmstadt aims to detect fast neutrons (0.2-1.0GeV) with high time and spatial resolutions s_t<100 ps, s_x,y,z<1 cm). The detector will consist of about 60 subsequent MRPC stacks containing a 4mm thick anode made of iron converter material, with an additional 4mm of converter material between two stacks. The secondary charged particles stemming from hadronic interactions of the high energetic neutrons in the converter will be detected in the MRPC's.

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