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Digital Electronics Equipment for the RIPEN Apparatus TOMMASO MARCHI, FABIANA GRAMEGNA, MARCO CINAUSERO, VLADIMIR KRAVCHUK, INFN - Legnaro, GIANMARIA COLLAZUOL, INFN Padova and Padova University, NUCL-EX COLLABORATION — The RIPEN apparatus is a neutron detector array composed of BC501 liquid scintillators specifically suited for neutron detection and time of flight measurement. It was installed at Legnaro National Laboratory in early '90s, while the last measurement campaign was performed in 2007. At present the apparatus is undergoing a process of complete substitution of readout/acquisition electronics. The capabilities of digital electronics have been tested using CAEN V1720 VME digitizers (12 bit, 250MS/s). Analogue RC/CR emulation filters have been developed to perform neutron/ γ discrimination: zero crossing technique as well as gate integrated method have been implemented. Signal interpolation routines allowed to obtain also ~ 1 ns timing performances. During June 2011 a subset of 8 detectors was successfully used to perform an in-beam experiment to measure neutron production cross sections. This required the use of 2 VME synchronized acquisition boards and the development of a specific on-line analysis software. We will present a short description of the RIPEN apparatus at LNL and the digital electronic setup. Specifically developed pulse shape algorithms will also be illustrated, as well as the results obtained in calibration and in-beam measurements.

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