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Development of the Single Chip Shift Register (SCSR) for Neutron Coincidence and Multiplicity Analysis

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The Single Chip Shift Register (SCSR) is designed to be a very simple, low cost, and very robust data acquisition circuit board that can be used with any neutron coincidence or multiplicity counter. Safeguards systems used in neutron detection presently require a detector/amplifier combination along with a data acquisition system that converts pulse streams into histograms of correlated pulses, commonly referred to as a shift register. The current state of digital electronics now makes it possible to incorporate the shift register into the detector/amplifier system and allow direct USB or Ethernet connection to the detector from a laptop. Inclusion of the shift register into the detector head will eliminate the need for the agency to purchase expensive and often not readily available shift register systems, i.e. AMSRs and JSR15s. The setup and operation of attended instrumentation will be simpler and more reliable. External HV or signal cabling will be unnecessary. The SCSR is a modification of the existing derandomizer circuit board which is normally located in the detector head. The modification includes the addition of the shift register circuitry, HV supply, USB port and Ethernet port.

Country or International Organization

United States of America

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