Contribution ID: **193** Type: **Mini Oral and Poster**

Development of FPGA-Based Nuclear Electronics using NI MyRIO Hardware for Small-Scale Radiation Detector Systems

Tuesday 23 April 2024 12:35 (20 minutes)

Coincidence electronics and pulse height analyzers stand as pivotal techniques in radiation detection systems. The development of FPGA-based nuclear electronics has garnered attention due to their programmability, simplicity, testability, compact size, and low power consumption. This technology is increasingly favored worldwide for nuclear electronic systems over traditional analog counterparts. This study presents advancements in coincidence electronics and a Pulse Height Analyzer (PHA) utilizing commercial FPGA-based (Field-Programmable Gate Array) hardware for radiation scintillation detectors. The hardware, based on a cost-effective NI myRIO device, integrates a Field-Programmable Gate Array (FPGA), ARM Cortex-A9 processor, analog input (AI), digital input and output (DIO), and USB/wireless connectivity with a host computer. LabVIEW codes, developed on the LabVIEWTM platform, are implemented in NI myRIO hardware for seamless integration and computer interface. The FPGA-based coincidence electronics performance is assessed through an experimental setup for the gamma-gamma angular distribution of a Na-22 radioisotope source. Similarly, the FPGA-based PHA undergoes testing with a NaI(Tl) detector, with a subsequent comparison of energy resolution against a commercial EASY-MCA 2K from AMETEK Inc.

Minioral

Yes

IEEE Member

Yes

Are you a student?

No

Author: Dr HONG HAI, Vo (University of Science, Vietnam National University-Ho Chi Minh City)

Presenters: NGUYEN QUOC, Hoang (University of Science - Vietnam National University-Hochiminh City); PHAM VIET, Hoang (University of Science - Vietnam National University-Hochiminh City); TRI TOAN PHUC, Nguyen (University of Science - Vietnam National University-Hochiminh City); LÊ HOÀNG SANG, Phan; NGUYEN TAN, Phong (University of Science - Vietnam National University-Hochiminh City); HOANG, Trang (University of Science, Ho Chi Minh City, Vietnam); THỊ HỒNG LOAN, Trương (University of Science, VNUHCM, Ho Chi Minh City, Vietnam); NGUYEN HOANG, Tu (University of Science - Vietnam National University-Hochiminh City); Dr HONG HAI, Vo (University of Science, Vietnam National University-Ho Chi Minh City)

Session Classification: Poster A