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the Scenes of Handheld Hybrid Neutron-Gamma Imaging System: A Bespoke Readout Circuit.

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This paper showcases the work done on the designing and the making of a bespoke readout circuit that reads and produces the measurements of a unique imaging system used to assay nuclear materials and hidden neutron and gamma emitting radionuclides. The system in itself uses neutron and Compton scattering simultaneously within three layers of detectors all baked with an 8x8 silicon photomultiplier (SiPM) array. Each pixel in the SiPM is read individually which gives a total number of 192 channels that requires a dedicated circuit to read and produce a meaningful signal. The work on the readout circuit has successfully produced an imaging system that offers a fast scan time of 60 seconds and a data processing time of less than 60 seconds. The device has been tested with 300 kBq Cs-137 gamma sources and a 1 MBq Cf-252 neutron sources in close proximity. Experiments conducted in the Faculty of Science and Technology at Lancaster University (UK) indicated that the system can detect and localize both gamma rays and neutron sources with intrinsic efficiencies in the order of 10E−4. Further upgrading of the readout circuit is carried out as a joint research with the Physics Department at Sultan Qaboos University.

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Promotional text

My name is Hajir Al Hamrashdi. I work in the field of nuclear physics and nuclear engineering. My research interests are mainly in the field of imaging system, nuclear instrumentation and nuclear electronics.

Oral preference format

in-person

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