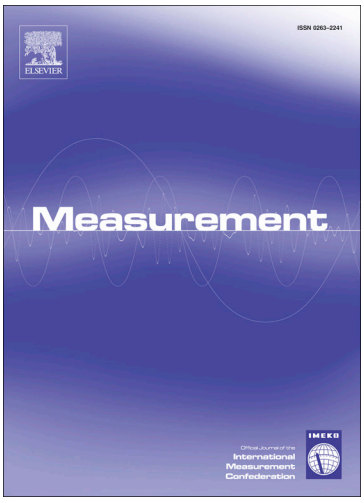

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Abstract

Trusted measurement systems are critical for the verification of future arms-control treaties that involve confirming the authenticity of nuclear warheads on the basis of their radiation signatures. Several research efforts have produced prototype systems, but their designs are typically not published in detail, making it difficult to enable trust in these devices. The Information Barrier Experimental (IBX) is a new prototype built around the Red Pitaya computing platform using passive gamma spectroscopy. It is the first such platform designed to help a broad research community study vulnerabilities and define the required specifications for a common, trusted inspection system. It is low-cost, simple to assemble, and enables comprehensive hardware and software authentication studies. The device follows a digital data acquisition approach, which significantly reduces the number of components between scintillator and spectrum output. Measurements demonstrate that this approach is technically feasible and produces excellent measurement results.

Keywords: Gamma Spectroscopy; Information Barrier; Digital Pulse