Multi-element Germanium Detectors for Synchrotron Applications

Abdul K. Rumaiz\(^{(1)}\), Anthony J. Kuczewski\(^{(1)}\), Joseph Mead\(^{(1)}\), Emerson Vernon\(^{(1)}\)
Eric Dooryhee\(^{(1)}\), Sanjit Ghose\(^{(1)}\), D. Peter Siddons\(^{(1)}\)
Antonino Miceli\(^{(2)}\), Jonathan Baldwin\(^{(2)}\), Jonathan Almer\(^{(2)}\), John Okasinski\(^{(2)}\),
Orlando Quaranta\(^{(2)}\), Russell Woods\(^{(2)}\),
Thomas Krings\(^{(3)}\),
Stuart Stock\(^{(4)}\)

\(^{(1)}\) Brookhaven National Laboratory, Upton, New York 11973, USA.
\(^{(2)}\) Argonne National Laboratory, Argonne, Illinois 60439, USA.
\(^{(3)}\) Forschungzentrum Julich GmbH, 52425 Julich, Germany.
\(^{(4)}\) Northwestern University, Evanston IL 60208, USA.

siddons@bnl.gov (Presenting author in bold.)

We have developed a series of monolithic multi-element germanium detectors, based on sensor arrays produced by the Forschungzentrum Julich, and on Application-specific integrated circuits (ASICs) developed at Brookhaven. Devices have been made with element counts ranging from 64 to 384. These detectors are being used at NSLS-II and APS for a range of diffraction experiments, both monochromatic and energy-dispersive. Compact and powerful readouts systems have been developed, based on the new generation of FPGA system-on-chip devices, which provide closely coupled multi-core processors embedded in large gate arrays.

We will discuss the technical details of the systems, and present some of the results from them.