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Author(s):	Kris Kwiatkowski, Paul Nedrow, Chris L. Morris, Fesseha Mariam, Frank Merrill, Andy Saunders, Cynthia Schwartz and Gary Hogan
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Performance of Fast Si/CMOS Hybrid Imager in Multi-Frame Flash Radiography

Kris Kwiatkowski, Paul Nedrow, Chris L. Morris, Fesseha Mariam, Frank Merrill, Andy Saunders, Cynthia Schwartz and Gary Hogan
Physics Division, Los Alamos National Laboratory, NM 87545

A 3-Mframe/s burst-mode, with 3-frame in-pixel storage, imager was fabricated in collaboration with Rockwell Scientific. The imager has been in operation for several years, in a variety of static and dynamic experiments at the 800MeV proton radiography (pRAD) facility at LANSCE. The cameras operate with a preset inter-frame time of 250ns to 2s. In majority of experiments the exposure/integration-time is set to 200ns. The imager can also be operated in a slower "video mode." It is then externally synchronized to 0.1-to-5Hz, 50-ns wide proton beam pulses, and records radiographic movies 10-to-30 minute duration. The effectiveness and dependence of the global electronic shutter on the pixilated Si-sensor bias voltage will be discussed. We will also sketch features of a new generation higher-resolution imager, which is now in a CMOS IC design stage.

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