Abstract Submitted
for the DNP07 Meeting of
The American Physical Society

Solid-State Photomultipliers Operated In Extreme Experimental Conditions. ERIK JOHNSON, Radiation Monitoring Devices, Inc., SKIP AUGUSTINE, Augustine Engineering, CHRISTOPHER STAPELS, RADIA SIA, JAMES CHRISTIAN, Radiation Monitoring Devices, Inc. — Nuclear and high-energy physics experiments that are conducted in harsh environments, such as in a liquid nitrogen bath, a high magnetic field of several Tesla, a small physical region of a few centimeters, a high intensity radiation field of hundreds of mrad/hour, require improved sensors that operate in these conditions. Advances in detector technology used in extreme environments can improve the data quality and allow new designs for experiments that operate under these conditions. Solid-State Photomultipliers (SSPM), a device built from an array of photodiodes, is a compact, high-gain photodetector with insensitivity to low temperatures, high radiation fields, and strong magnetic fields. Radiation Monitoring Devices has built SSPMs with CMOS processes, which allows for integrating signal processing and photon collection on one chip, allowing for a detector-on-a-chip design. SSPMs were exposed to 26 rads of dose from beams of 1 GeV/n silicon nuclei and 1 GeV protons, low temperature conditions from 77 K to 4 K, and high magnetic fields around 1 Tesla. The SSPMs were characterized under these extreme conditions.

Erik Johnson
Radiation Monitoring Devices, Inc.

Date submitted: 28 Jun 2007 Electronic form version 1.4