Abstract Submitted
for the TSS16 Meeting of
The American Physical Society

Wire bond protection of periodic Lorentz forces and humidity induced corrosion through thin polyurethane coatings MATTHEW KURTH, JOSEPH M. IZEN, University of Texas at Dallas, RUSTY BOYD, University of Oklahoma — Aluminum wedge wire bonds are common in pixel and strip detectors for particle detectors. Unlike commercial applications, bulk encapsulation of wire bonds has not been used in the high radiation, extended temperature range environment of solid-state tracking detectors. Bare aluminum wire bonds are vulnerable to condensation-induced corrosion and oscillations from periodic Lorentz forces. Polyurethane-coated wire bonds are being investigated for use with the ATLAS ITk upgrade. Systematic radiation exposures with Sandia National Laboratory's Co 60 gamma source replicates the anticipated lifetime dose at several ITk locations. The damping of mechanical oscillations, corrosion resistance, and the effects of thermal cycling and irradiation of polyurethane-coated wire bonds is reported.

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Date submitted: 04 Mar 2016 Electronic form version 1.4