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Diamond Detectors for uses in a Proton Therapy Beam[1] HOLLY JOHNSON, ANNA ZANIEWSKI, RICARDO ALARCON, JASON HOLMES, Arizona State University, TREVOR VAN ENGELHOVEN, John Hopkins University, ROBERT NEMANICH, Arizona State University — Proton beam therapy is a form of cancer treatment that allows us to target and treat cancerous cells. High-energy protons deposit most of their energy immediately before they come to rest, forming a peak of energy deposition called a Bragg Peak. Thus, beams of protons can be tuned to pass through skin and healthy tissue to release their energy inside the tumor, leaving the healthier cells around it unaffected. However, precise knowledge of the beams position and energy is required for this targeting. Yet, current detectors, based on silicon, wear down and need to be replaced often, need frequent calibration and are susceptible to noise, having a band gap of 1.14 eV. A diamonds band gap of 5.45 eV means that it is not susceptible to thermal noise, and its structure is more robust to radiation damage than silicon. In this project we present a diamond-based proton detector. This detector is made with an optical-grade diamond sample cleaned thoroughly with Piranha (70

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