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An Alpha Schottky Junction Power Source MARC LITZ, JAMES CARROLL, STAN HENRIQUEZ, Army Research Laboratory — Isotope batteries present solutions for long-lived low power sources. Compact sensors, and electronic circuit boards can be powered for the lifetime of infrastructure. Alpha sources are practical for safety reasons because of the limited distance before energy absorption in materials, and the high energy ($\sim$5MeV) per particle. Damage to materials from the alphas limits the practical use. A Schottky diode geometry is created from an alpha foil on a diamond-like crystal. A power source is proposed that takes advantage of the radiation damage tolerance of diamond, combined with the short range of the alpha radiation. The internal field of the Schottky barrier creates a current through the diode from electron-hole pairs created by alpha bombardment in the gap. Calculations of the expected current, circuit model results, and design parameters for a device are described.

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