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Performance Characteristics of A Low-Background Front-End Electronics Package for Germanium Spectrometers TODD HOSSBACH, CRAIG AALSETH, Pacific Northwest National Laboratory, MAJORANA COLLABORATION — The Majorana project is a next-generation ^{76}Ge neutrinoless double-beta decay search, using 57 isotopically-enriched segmented germanium crystals mounted in each of 8 modular cryostats. This configuration provides physical granularity which should reject most expected backgrounds. To achieve greater effective granularity, a method of radial pulse-shape analysis is planned. Maximum PSD efficacy is achieved with low-noise electronics and a minimal signal bandwidth of ~ 25 MHz. Pacific Northwest National Laboratory has developed a fourth generation Low-Background Front-End Electronics Package (LFEP-4) using carefully selected and screened low-background components. The performance characteristics of the LFEP-4, namely bandwidth, noise, and energy resolution, have been quantified and compared with conventional HPGE front-end electronics. To meet the requirements of the Majorana experiment, a fifth-generation LFEP has been designed with lower power dissipation and increased signal bandwidth, while maintaining a minimal footprint. Details of the LFEP-5 design and anticipated performance are presented.

Todd Hossbach
Pacific Northwest National Laboratory

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