

Designing 3-channel Solid-State Particles Detector for Multiple Radiation Sources

Novel applications of fundamental particle detectors often require that the final device has a compact and lightweight design that offers more than one sensing mechanism covering a wide energy range. Radiation emitted from different radioactive sources often consists of various types of radiation (alpha, beta, gamma).

This article describes the design of an amplification and biasing circuit for a 3-channel solid-state particle detector for multiple radiation sources. The TINA-TI V9 [1] and LTSpice [2] simulation tools were used in this study to verify and fine-tune the parameters of the selected components. In particular, the size of the feedback capacitor CF and resistor RF significantly influences the bandwidth of the charge-sensitive preamplifier.

Workshop topics

Front-end electronics and readout

Author: KARJALAINEN, Ahti Elias (Lappeenranta-Lahti University of Technology (LUT), School of Engineering Science, Physics)

Co-authors: VAANANEN, Mika Petteri (Helsinki Institute of Physics (FI)); Dr KARADZHINOVA-FERRER, Aneliya (Lappeenranta-Lahti University of Technology (FI)); BEZAK, Mihaela (LUT University, Finland); Prof. LUUKKA, Panja (Lappeenranta-Lahti University of Technology (FI))

Presenter: KARJALAINEN, Ahti Elias (Lappeenranta-Lahti University of Technology (LUT), School of Engineering Science, Physics)