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Noise analysis of CMOS readout circuits

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Equivalent noise charge (ENC) is useful method for indicating total noise of detection system [1]. Here, the quantity of ENC depends on aspect ratio of a transistor which places on the input of the preamplifier. Analyzed ENC is use to minimize system noise in designing CMOS readout circuits in the gamma-ray detection system. The analysis in [1] is quietly effective to design CMOS readout circuits, however, the overdrive voltage and the bias current of the input transistor of preamplifier is missed. Theses parameters are important to satisfy saturation condition of the readout circuits and also important to achieve a linearity of readout circuit. As discussing these parameters and analyzing the influence of them, we propose the more effective method of designing readout circuits. In addition, we suggest the need of suppressing flicker noise by showing the difference of noise analysis between 0.35 μm and 0.18 μm CMOS technology.

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References

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