

Vujo Drndarević, M.Sc.
Boris Kidrič Institute of Nuclear Sciences, Vinča
Electronics Department

LOW-NOISE CHARGE SENSITIVE PREAMPLIFIERS FOR
SEMICONDUCTOR DETECTOR RADIATION SPECTROMETERS

SUMMARY

Attainment of the best possible energy resolution is one of the most important requests that is set before spectrometer systems. Energy resolution of the whole measuring system is mostly determined by the characteristics of the preamplifier that is used. Charge sensitive preamplifiers, as the most commonly in use, are treated in this study.

Considering that the element for discharge integrating capacitor is one of the main source of noise, the exceptional attention is given to this question. The kind of the feedback has determined the generalization of the charge sensitive preamplifiers. Also, the review of the characteristic solutions is given together with the range of application and the description of the best realised results.

According to this analysis the conclusion could be drawn that the application of the conventional preamplifiers with whom could be achieved the energetic resolution under 1 keV is appropriate in the high-energy particle spectrometers. In those cases electronic noise is usually negligible. Other analysed solutions are usually used in X and Y-ray spectrometers, in which cases is achieved the resolution under 100 eV, by the help of the drain feedback preamplifier.

Finally, the further development of preamplifiers was considered concerning their components which could make the preamplifiers much more accessible considering the price as well as the convenience of the use.