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New electronics of the spectrometric channel for the SND detector electromagnetic calorimeter

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The Spherical Neutral Detector (SND)[1] is intended for the study electron-positron annihilation processes operating at VEPP-2000[2] $e+e-$ collider, which is located at Novosibirsk, Russia. The main part of the SND detector is a three-layer electromagnetic calorimeter (EMC). The EMC consists of 1640 counters. Each counter includes NaI(Tl) crystal, vacuum phototriode[3], and charge-sensitive preamplifier.

Now the SND team has an aim to study $e+e-$ into neutron-antineutron reaction near threshold. One of the necessary condition for this task is to provide the time resolution of about 1 ns or better[4] (now 5 ns) and save current amplitude resolution. To achieve that, new modules for shaping and digitizing signal were designed, manufactured and tested.

New shaping module F12M provides optimal signal shape for best time and amplitude resolution.

New FADC module will provide recording and processing of the signal oscillogram for the time-of-flight and amplitude calculation. Special algorithm of the signal processing was developed and tested.

Achieved time resolution is about 1 ns, the amplitude resolution is 250 keV.

References

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- [4] A.A.Botov et al. Nucl. Phys. B, Proc. Suppl.162, 41 (2006)

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