



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

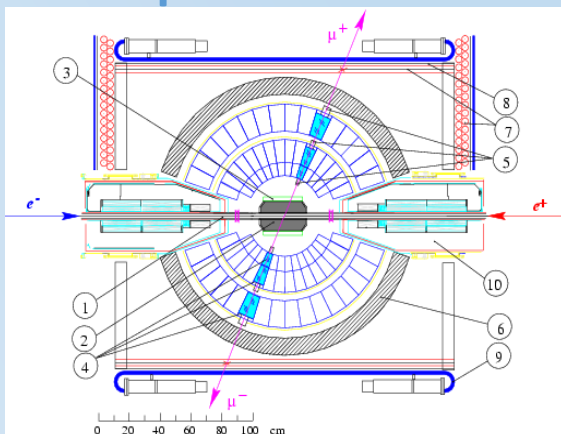


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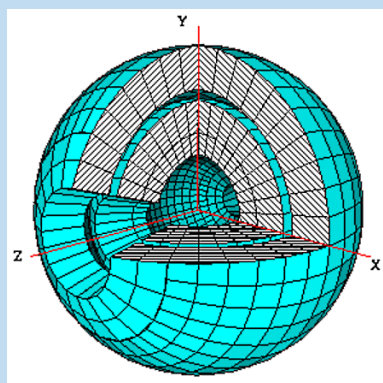
**Abstract:** The Spherical Neutral Detector (SND) is intended for study of electron-positron annihilation at VEPP-2000  $e^+e^-$  collider, which is located at BINP (Novosibirsk, Russia). The main part of the SND detector is a three-layer electromagnetic calorimeter (EMC). The SND team plans to perform a precision study of the reaction  $e^+e^-$  to neutron-antineutron near threshold. One of the necessary condition for this task is a time resolution in the calorimeter of about 1 ns or better. To achieve that, new modules for shaping and digitizing signal have been designed and tested. A time resolution of about 1 ns and an amplitude resolution of about 250 keV are reached.

## Spherical Neutral Detector



1 – VEPP-2000 beam pipe, 2 – tracking system, 3 – aerogel Cherenkov counter, 4 – NaI(Tl) counters, 5 – vacuum phototriodes, 6 – absorber, 7-9 – muon system, 10 – VEPP-2000 superconducting focusing solenoids

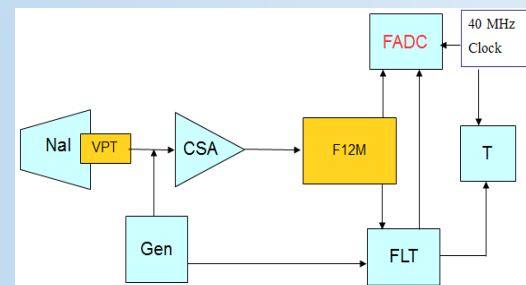
## EMC



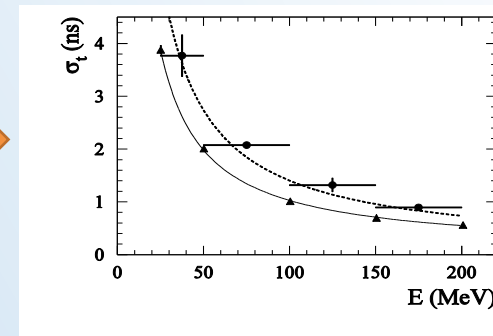
### SND calorimeter general parameters:

- NaI - 3.5 tons, 1632 crystals
- VPT readout
- $13.4X_0\text{NaI}=34.7$  cm
- $0.9 \cdot 4\pi$  solid angle,  $\Delta\varphi=\Delta\theta=9^\circ$
- Energy resolution  $4.2\%/4\sqrt{E(\text{GeV})}$
- Angular resolution  $0.82^\circ/\sqrt{E(\text{GeV})} \oplus 0.63^\circ$

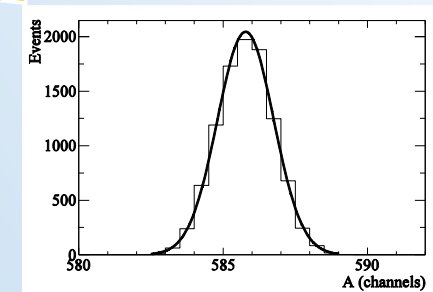
## New spectrometric channel



- NaI – SND calorimeter crystal
- VPT – vacuum phototriode
- CSA – charge-sensitive preamplifier
- F12M – shaper module
- FADC – flash ADC (24 channels, 12 bit, 40 MHz)
- T – time-to-digital converter
- FLT – first-level trigger system
- Gen – calibration generator



Time resolution ~ 1 ns



Amplitude resolution ~ 250 keV