Compton and Bremsstrahlung spectra (photon beam)

- Energy spread of the primary electron beam in the VEPP–4M is $\sigma/E = 3 \times 10^{-4}$.
- The energy scale and resolution of the NaI and BGO calorimeters were calibrated using the edges of the Compton (by laser) and Bremsstrahlung (by residual gas) spectra.
- The edge (maximum energy) of the Compton spectra is defined as:

$$E_{\text{edge}} = E_{0} \left(1 + \frac{\sigma}{E_{0}}\right)^{-1}$$

List of possible calibration points at VEPP–4M collider

- VEP/4M: $1000 \text{ MeV}$
- Bremsstrahlung energy: $100 \text{ MeV}$
- Compton edge: $50 \text{ MeV}$

Examples of fit of Compton spectrum near edge (left) and of Bremsstrahlung spectrum near edge (right).

Summary

- The test electron beam facility is fully operational since 2011.
- The parameters of the test electron beam:
  - energy range: 10 – 1000 MeV
  - energy spread: 7.8% (100 MeV) – 2.6% (3000 MeV)
  - intensity: 50 kHz
- A series of experiments with FARICH prototype detectors, MCP-based devices and GEM detectors were successfully performed on the electron beam.
- The tagged photon beam was used in 1998 last time for testing BELLE Calorimeter prototype. So, it takes some time (about 2.3 months) for its come back.