

## Precise beam energy measurements at VEPP-4M collider

An accurate knowledge of the colliding beam energies is essential for the current experiments with the KEDR detector at the VEPP-4M collider. Now the experimental activity is focused on the measurements of  $\tau$ -lepton mass and parameters of narrow resonances of the  $\psi$ -family in the c.m.energy range of 3.0–4.0 GeV. Two complementary approaches are used for the beam energy measurements. The Resonant spin Depolarization technique (RD) provides an accuracy about 1–3 keV for the instantaneous beam energy value, but requires a special regime of the collider. Between calibrations the interpolation procedure is used providing the accuracy of 6–10 keV for the  $J/\psi$ ,  $\psi(2s)$  and 15–30 keV for the  $\tau$ -lepton mass determination experiments. Another approach allows to calculate beam energy via the maximum energy of backscattering laser photons. The Compton BackScattering (CBS) monitor allows continuous on-line monitoring of the beam energy with accuracy about 120 keV, which is critical during then  $\tau$ -lepton mass measurement. The statistical error for a one hour period is about 100 keV, the present systematic error is 50 keV.

**Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):**

[http://icfa-usa.jlab.org/archive/newsletter/icfa\\_bd\\_nl\\_48.pdf](http://icfa-usa.jlab.org/archive/newsletter/icfa_bd_nl_48.pdf)

**Primary author:** BLINOV, Vladimir (Budker Institute of Nuclear Physics)

**Presenter:** BLINOV, Vladimir (Budker Institute of Nuclear Physics)

**Track Classification:** High Energy Physics and Nuclear Physics