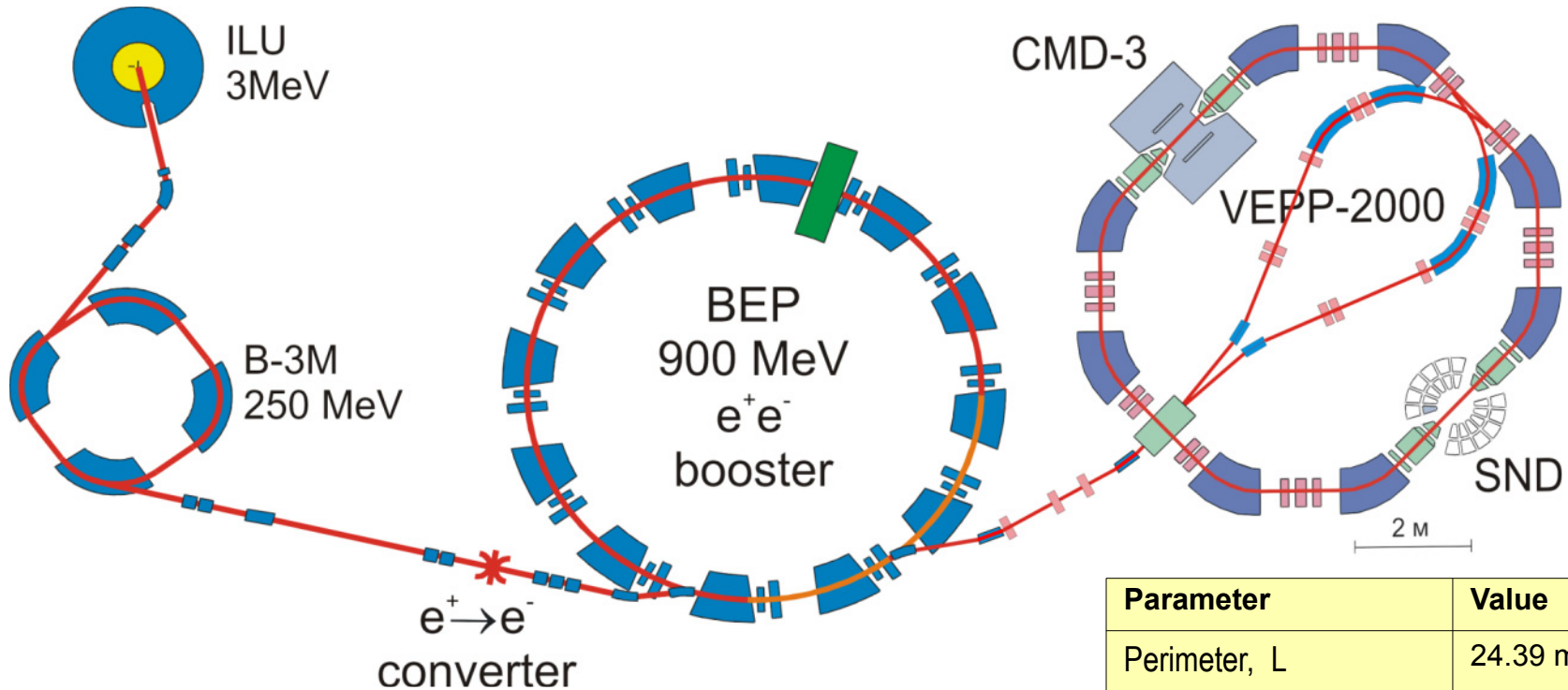


STATUS OF THE ELECTRON- POSITRON COLLIDER VEPP-2000

A.L. Romanov

BINP SB RAS, Novosibirsk, Russia

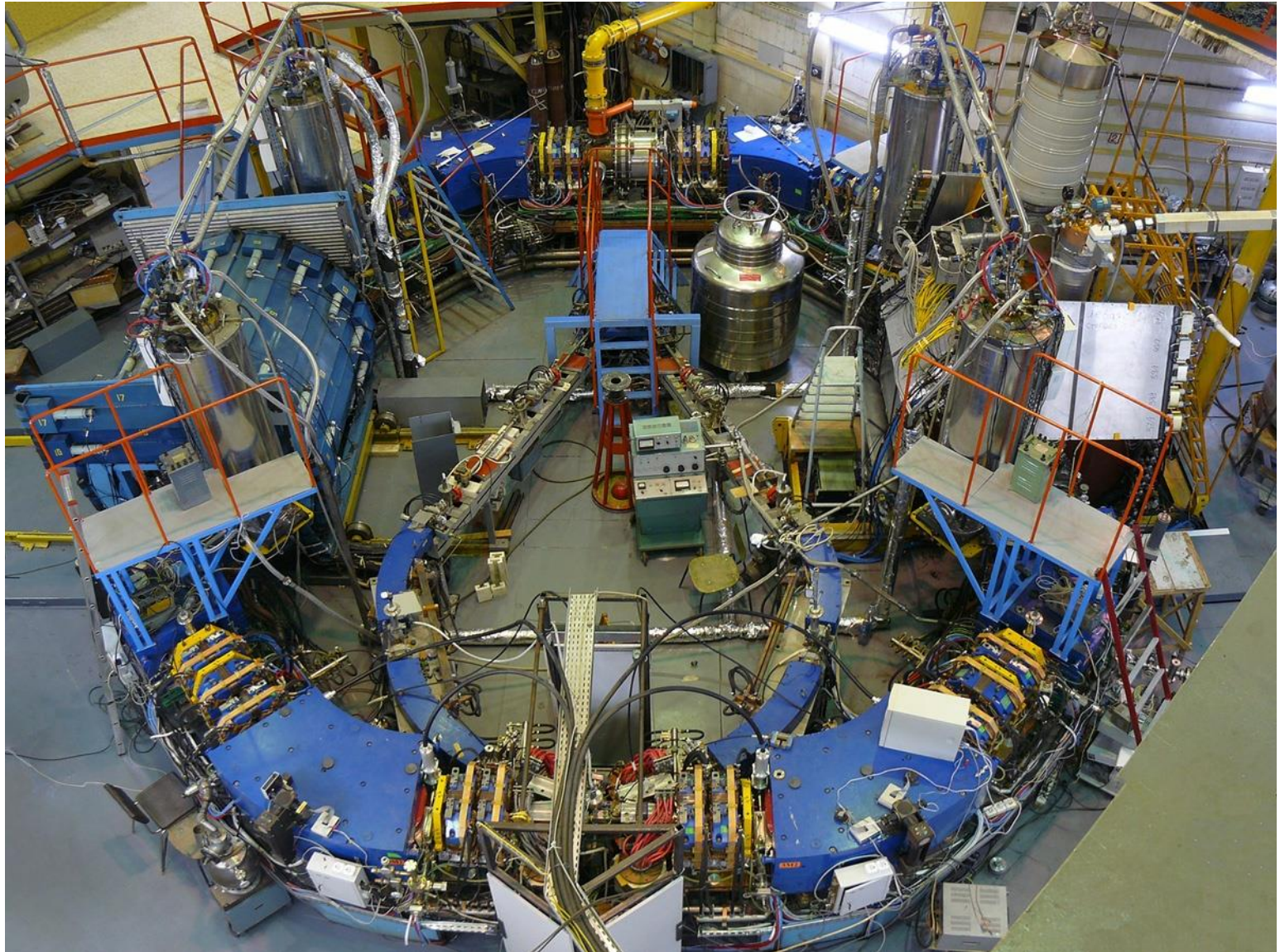
VEPP-2000 overview



- VEPP-2000: $L = 1 \times 10^{32} \text{ cm}^{-2}\text{s}^{-1}$ @ $E=1\text{GeV} \Rightarrow \dot{N} = 6 \times 10^7 \text{ s}^{-1}$
- ILU-B-3M-BEP: $2 \times 10^7 \text{ e}^+/\text{sec}$
- Realization of the “round colliding beam” concept

Parameter	Value
Perimeter, L	24.39 m
Energy, E	0.2 – 1 GeV
Main dipole field., B	24 kGs
Final focus field., B_{sol}	130 kGs
Beta @ IP, β^*	2 – 10 cm
Emittance, ε	2.2×10^{-7} mrad
Beam-beam ξ	0.15
Num. of particles, N^\pm	10^{11}
Luminosity, L	$1 \times 10^{32} \text{ cm}^{-2}\text{s}^{-1}$

VEPP-2000 overview



VEPP-2000 overview

Main optics:

- 8 main dipoles
- 24 quadrupoles
- 4 s.c. final focus solenoids

Correction:

- 20 horizontal steerers
- 16 vertical steerers
- 12 sextupoles
- 12 skew-quadrupoles

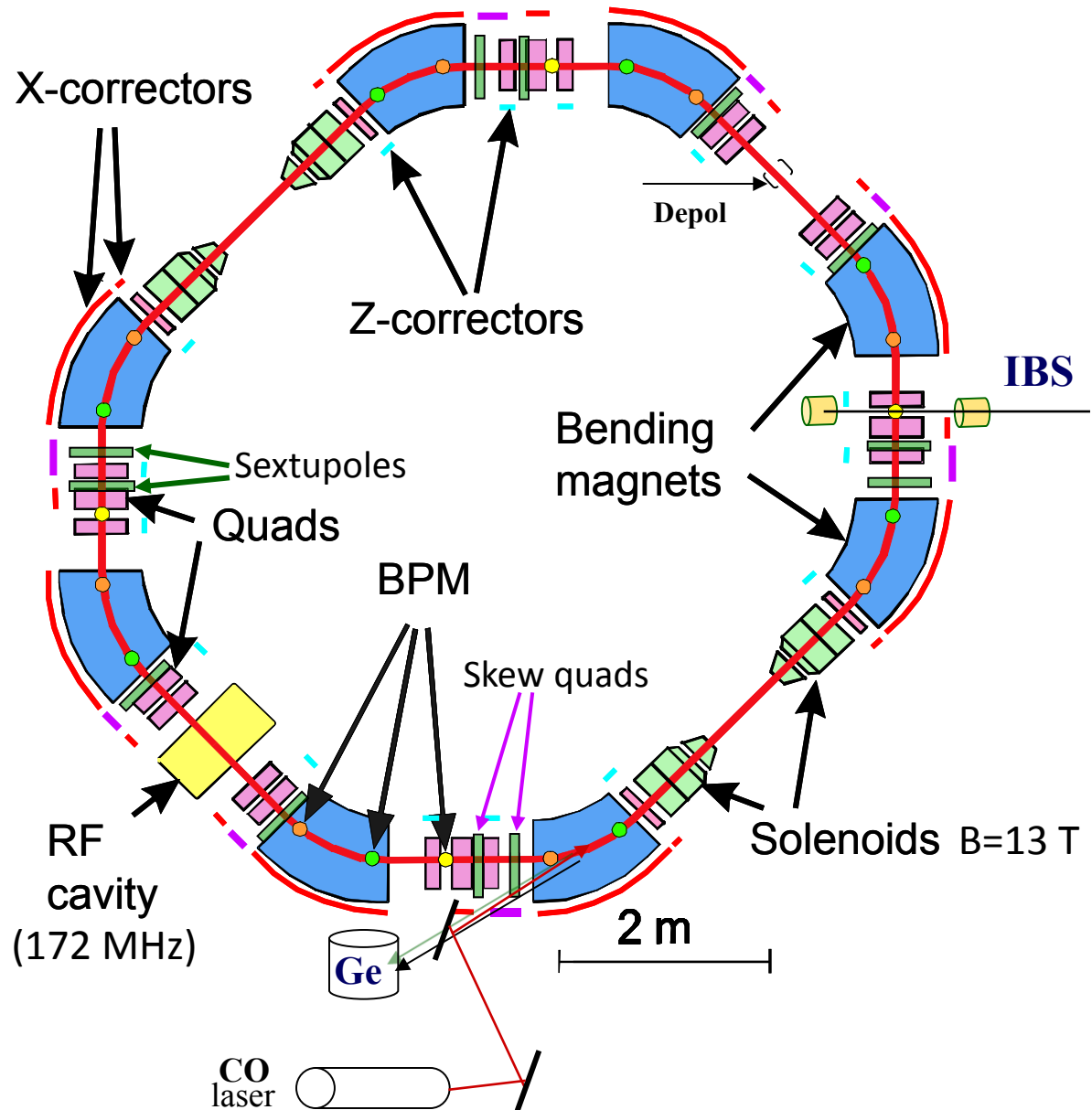
Diagnostics:

- 16 CCD
- 4 pickups
- 1 DCCT
- 2 PMT (e^+ , e^-)
- 2 Phi-dissectors

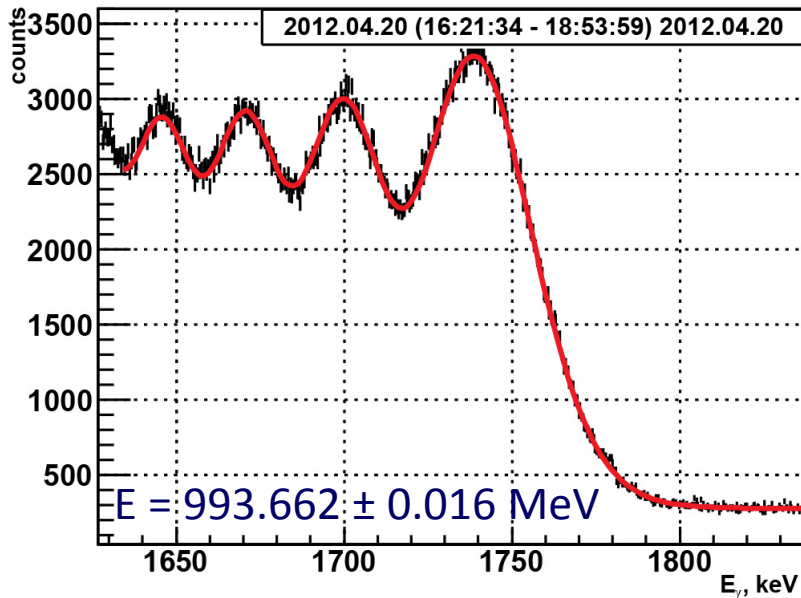
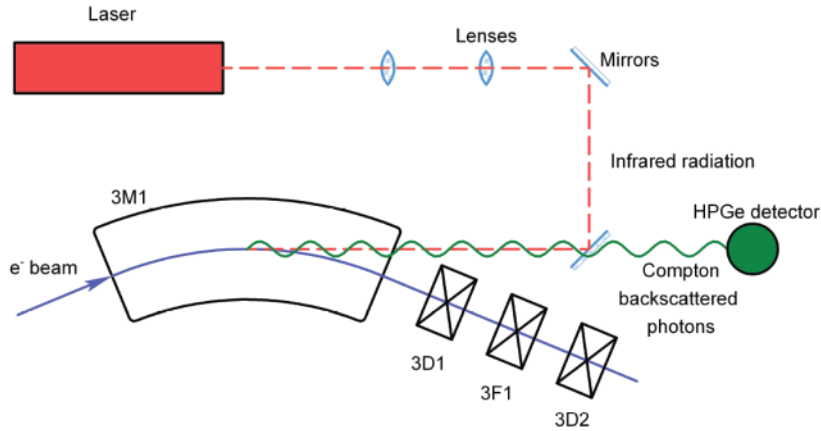
Energy calibration:

- 8 NMR in each main dipole
- CBS
- Resonant depolarisation

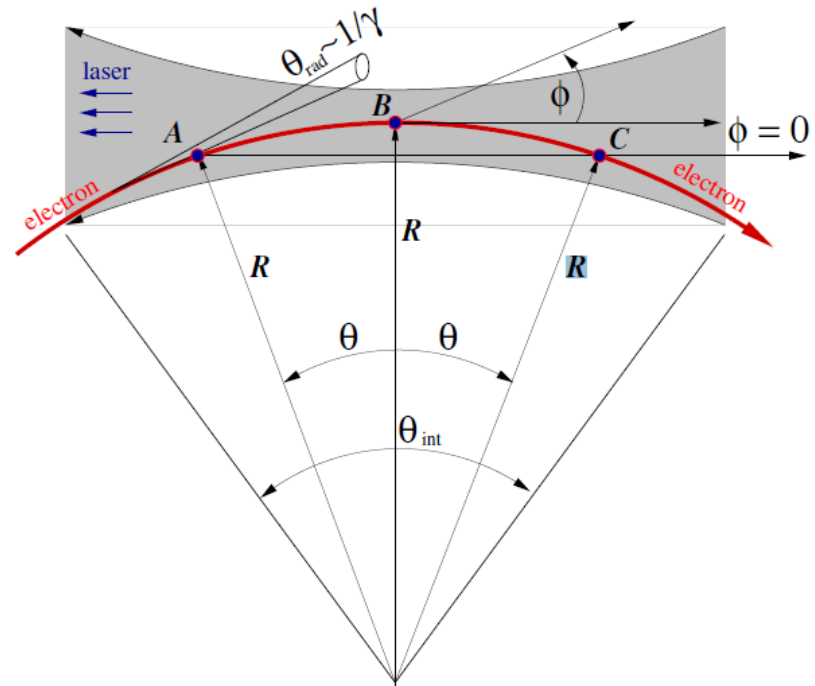
Detectors: CMD-3, SND



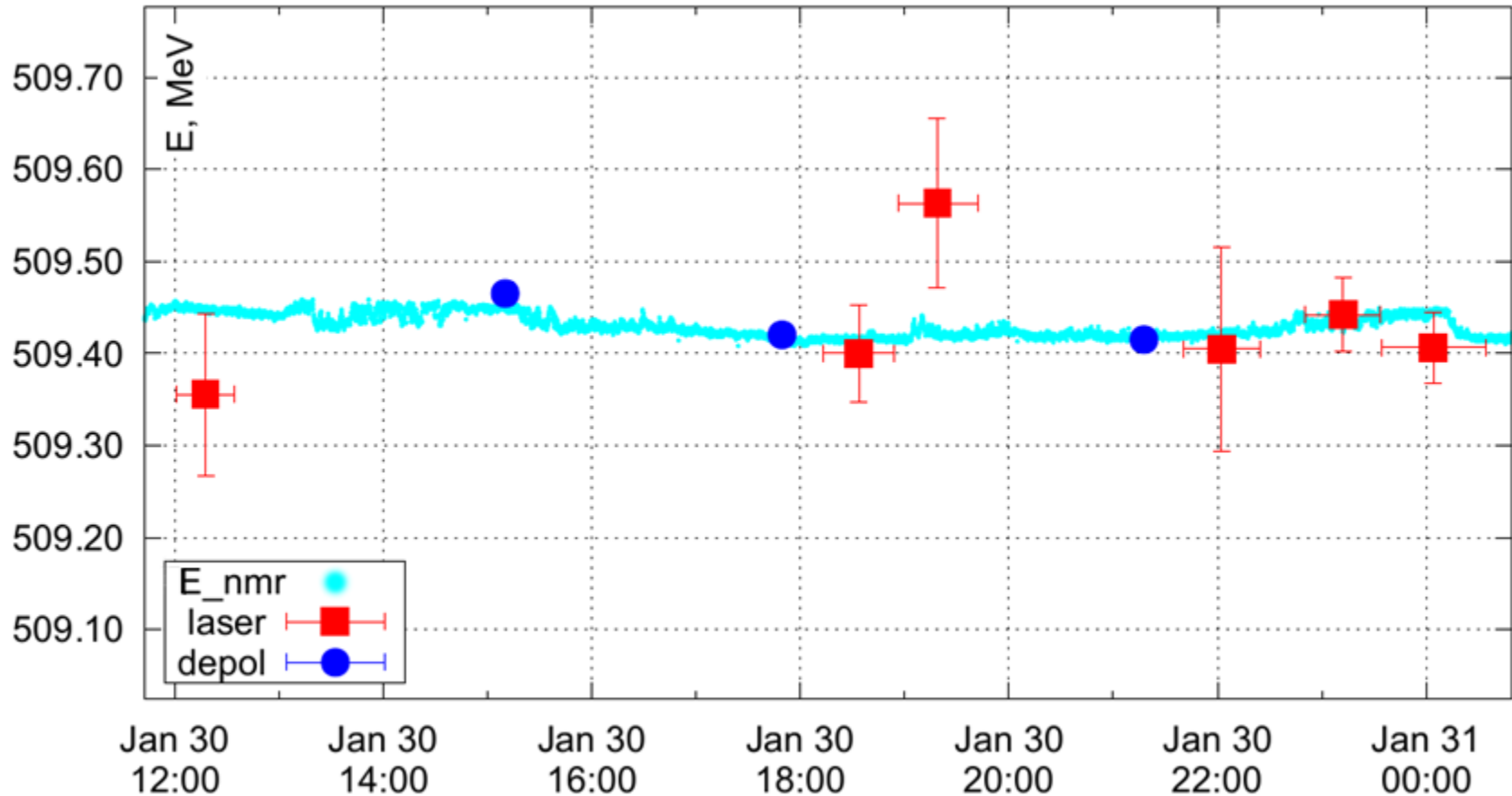
Energy calibration: CBS



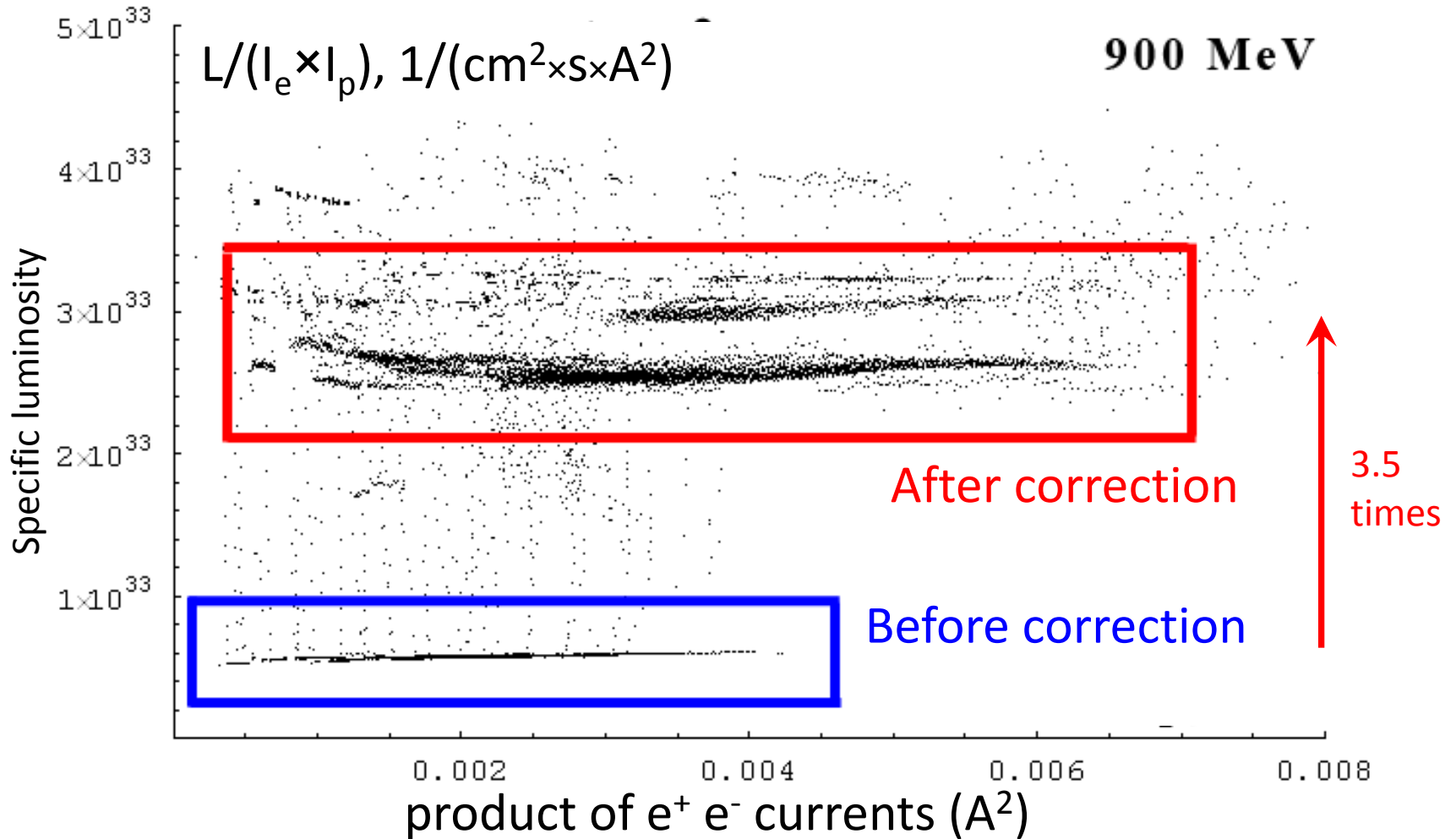
- Short interaction length:
 - interference of light from A and C at the detector
 - Lower statistics
- Complex edge structure compensates low statistics.



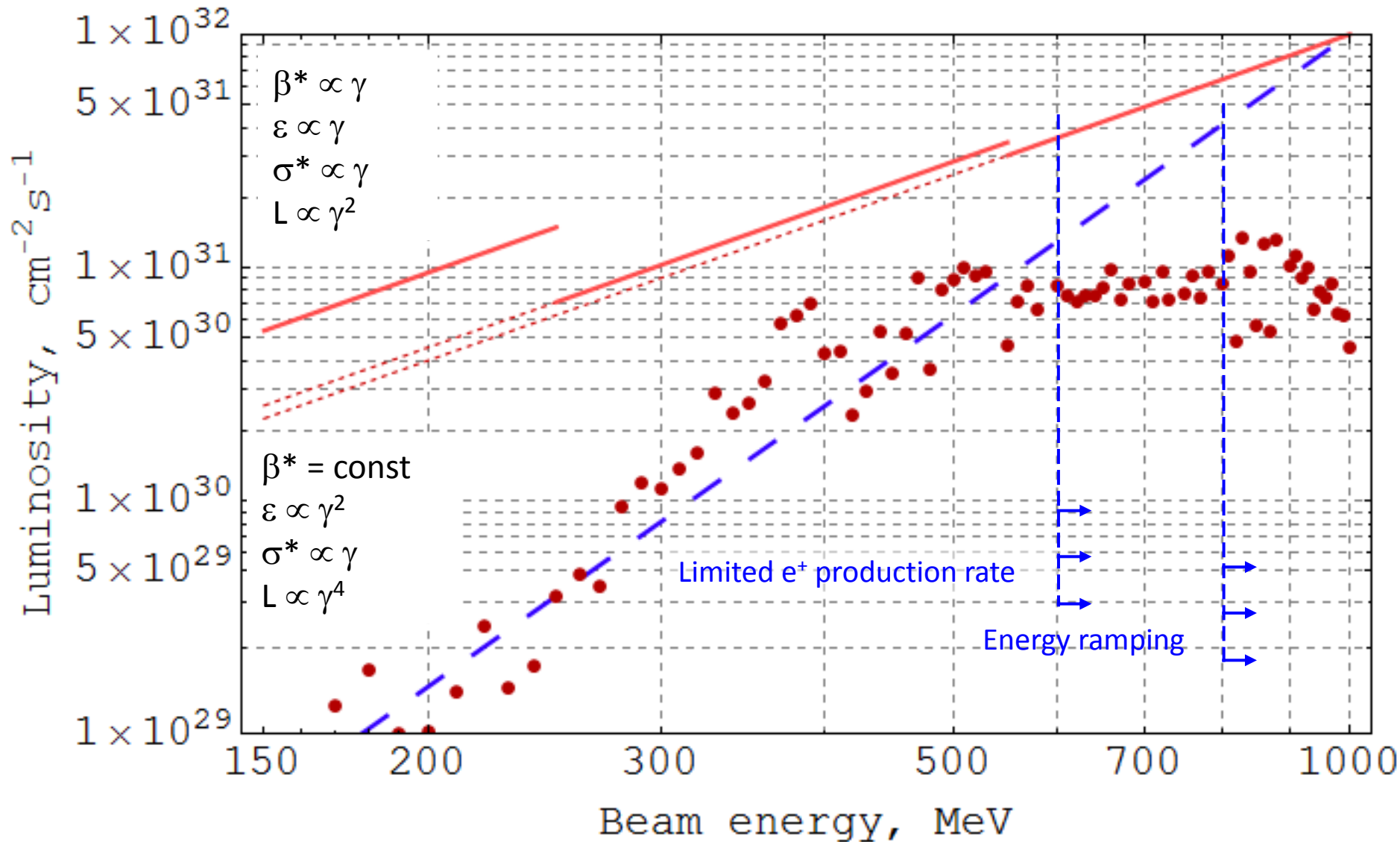
Energy calibration: comparison



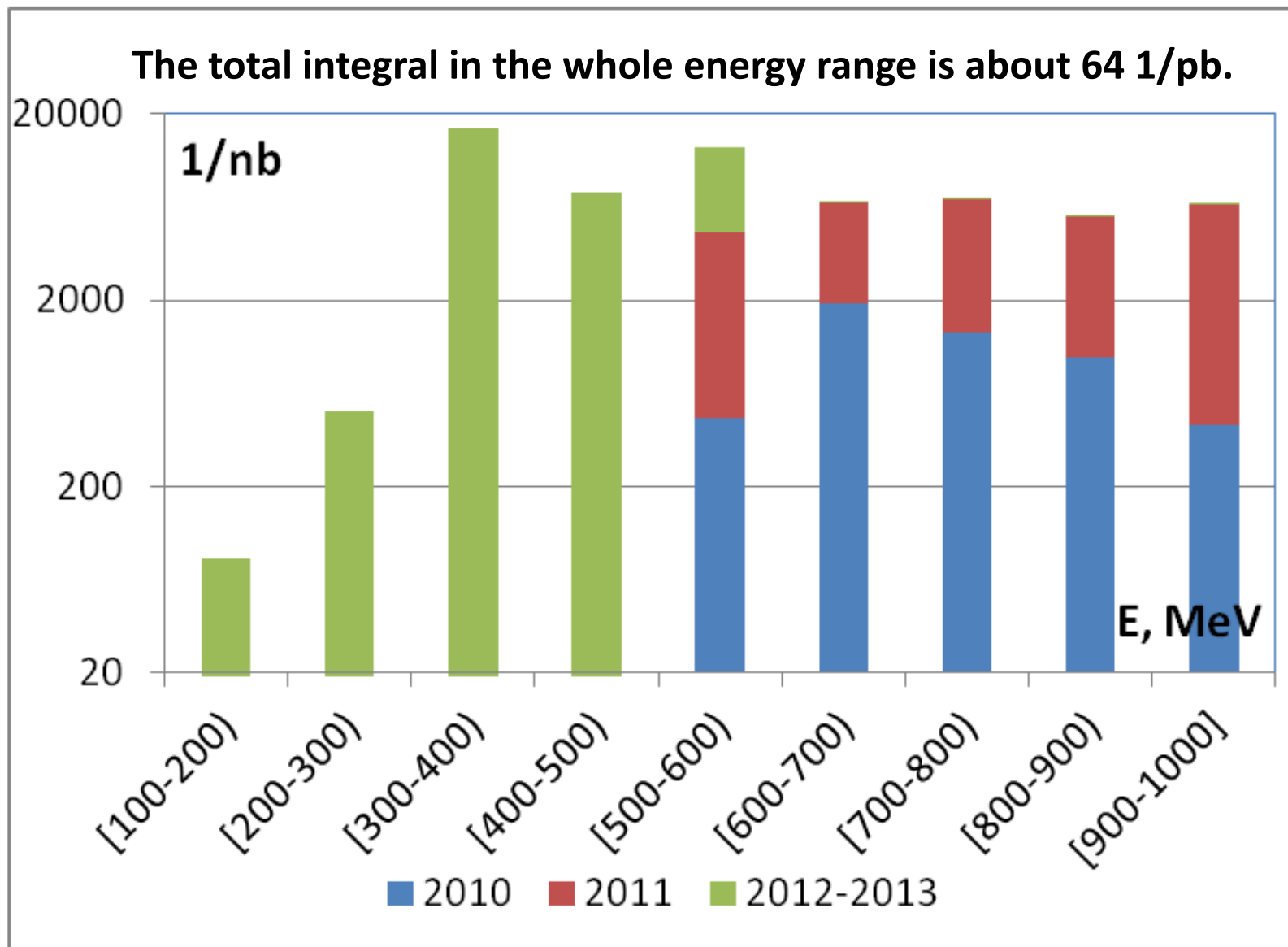
Lattice correction result at 900MeV



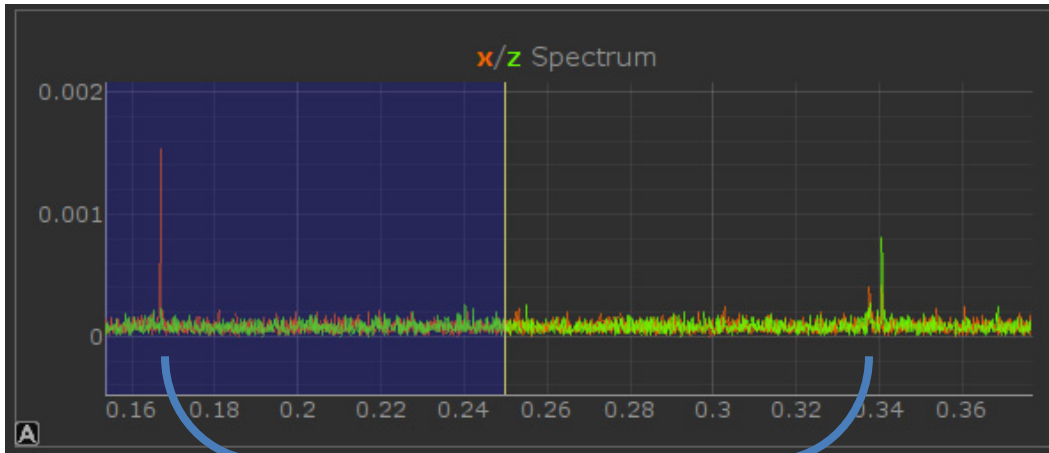
Luminosity dependence on energy



VEPP-2000 luminosity integral



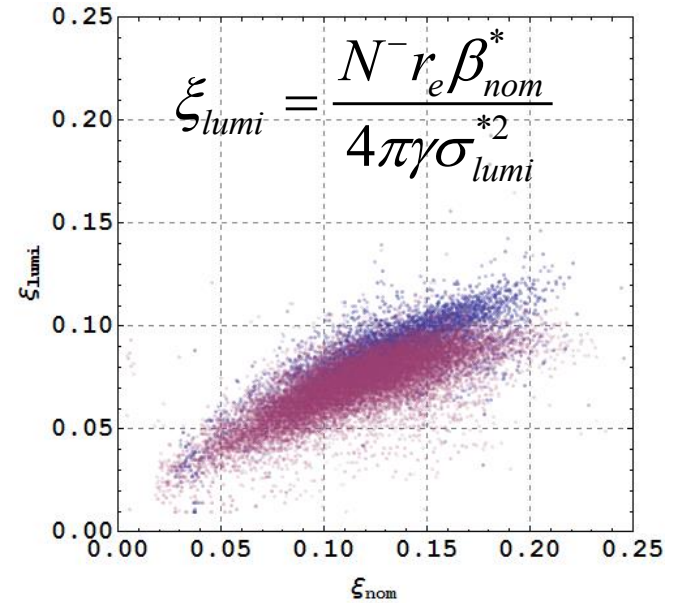
VEPP-2000 performance at 392.5 MeV



$$\Delta\nu = 0.174$$

$$\xi = 0.125$$

$$\Delta\nu = \arccos(\cos(\pi\nu_0) - 2\pi\xi \sin(\pi\nu_0)) / \pi - \nu_0$$



Purple dots URF = 35 kV

Blue dots URF = 17 kV

VEPP-2000 upgrade

	2013						2014												
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
VEPP-5 (3×10^8 e ⁺ /sec)	■	■																	
Channel K-500	■	■	■	■	■	■	■	■	■	■	■	■							
BEP upgrade	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
BEP-VEPP2000 channels	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
VEPP-2000 modifications	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

■ - Manufacturing

■ - Assembling

■ - commissioning

Channel K-500

Injection complex

VEPP-2000

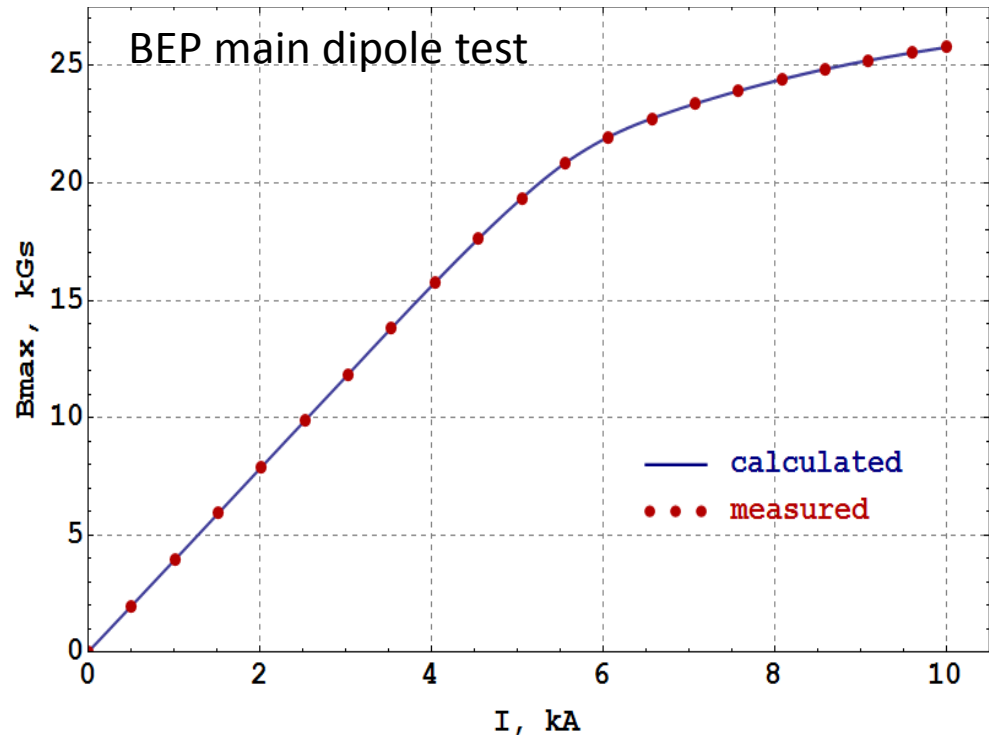
BEP

Damping
ring

Linac

VEPP-2000 upgrade: BEP

- Prototype of the BEP main dipole is tested.
- Quadrupole prototype manufacturing is in progress.
- The vacuum chamber will be re-shaped by compressing and milling the old one.



VEPP-2000 upgrade: K-500



Conclusion

- The total integral in the energy range 160÷1000 MeV is about 64 1/pb.
- The world record of the beam-beam parameter $\xi = 0.125$ obtained during the regular run.
- Data collection in lowest energy range for the e^+e^- colliders down to 160 MeV per bunch.
- The upgrade is in progress aimed to enable the design luminosity $L = 1 \times 10^{32} \text{ cm}^{-2}\text{s}^{-1}$.