

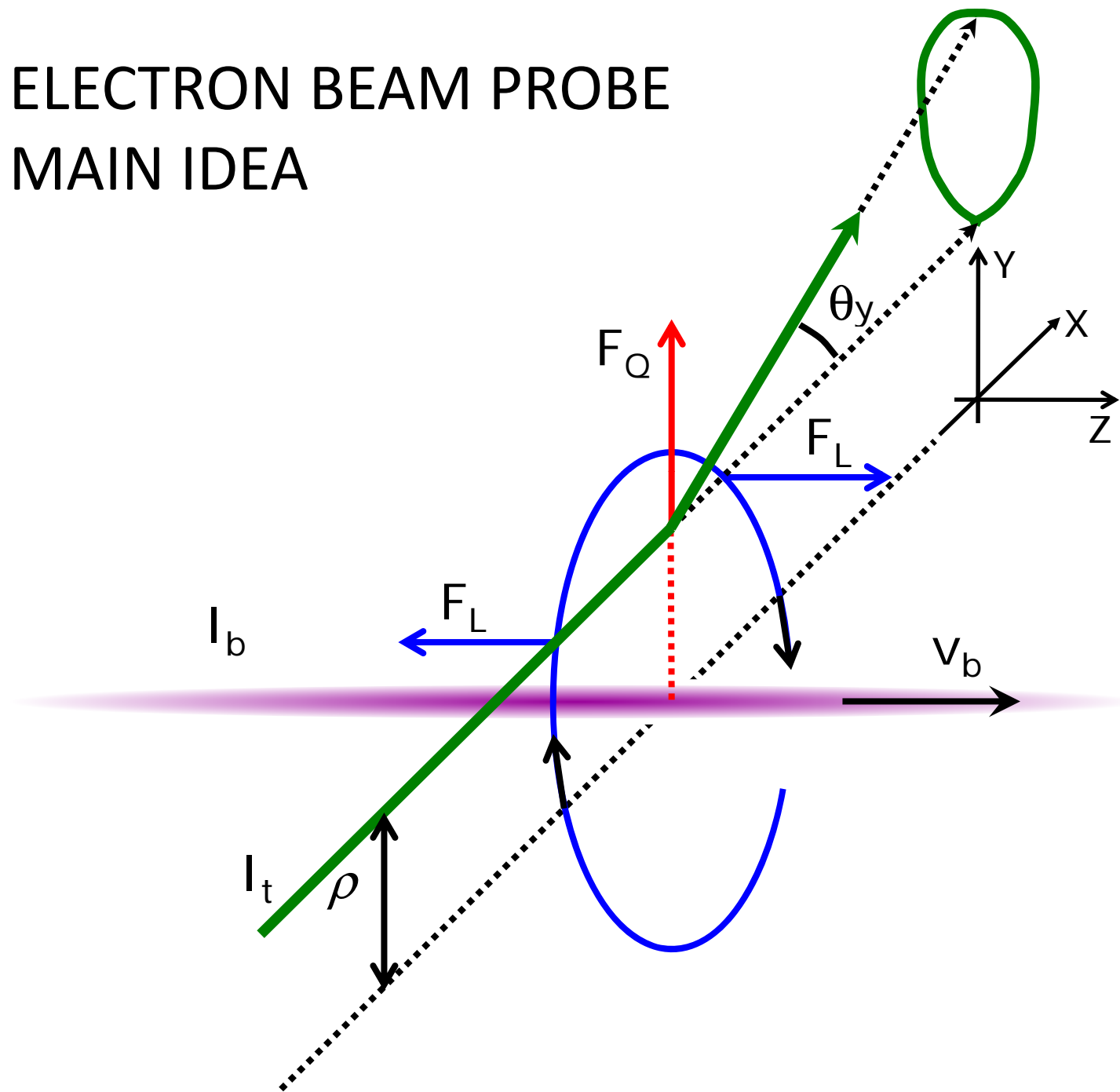
Electron Beam Probe for ILC

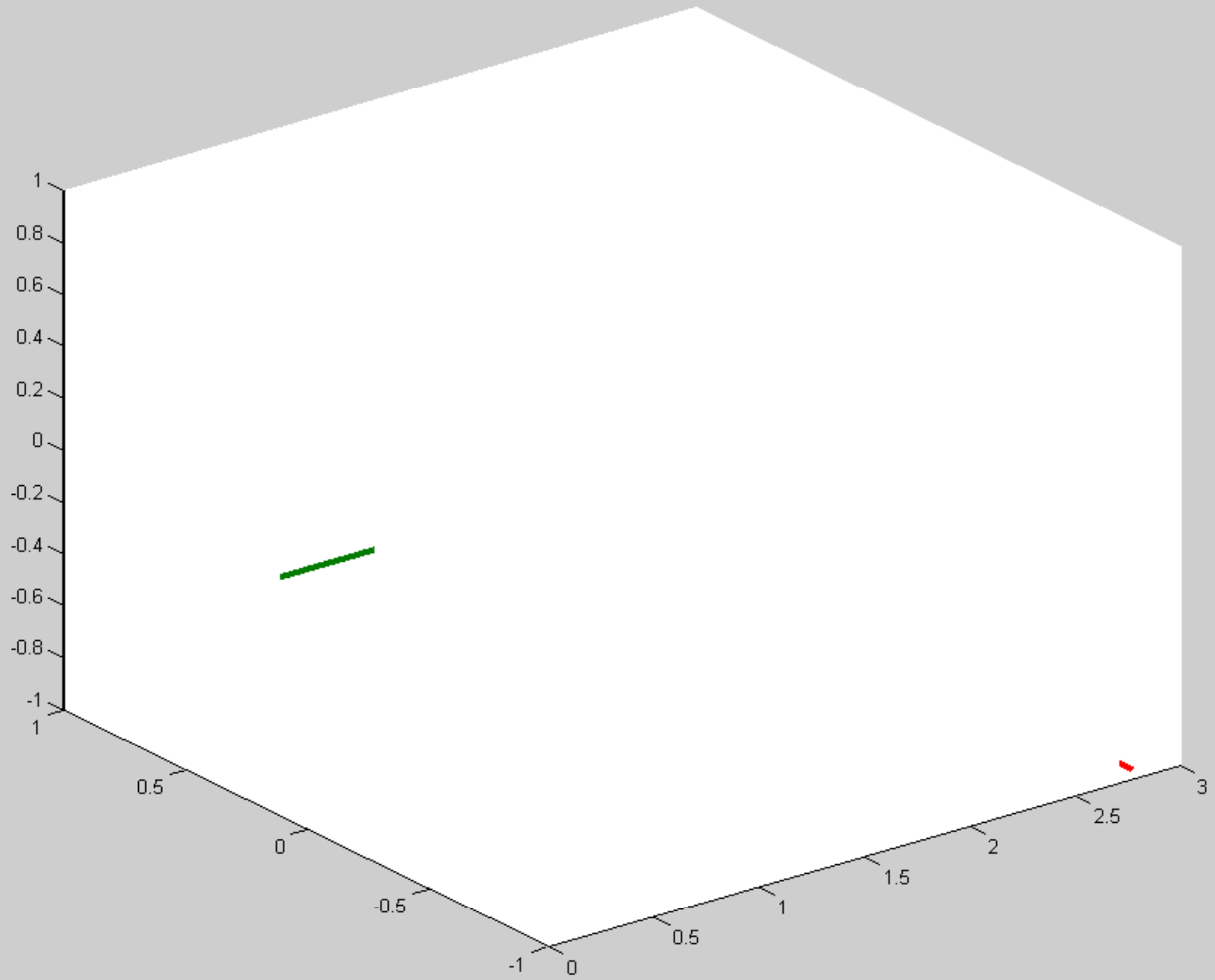
*Dmitriy Malyutin, Pavel Logatchov,
Alexandr Starostenko, Andrey Korepanov.*

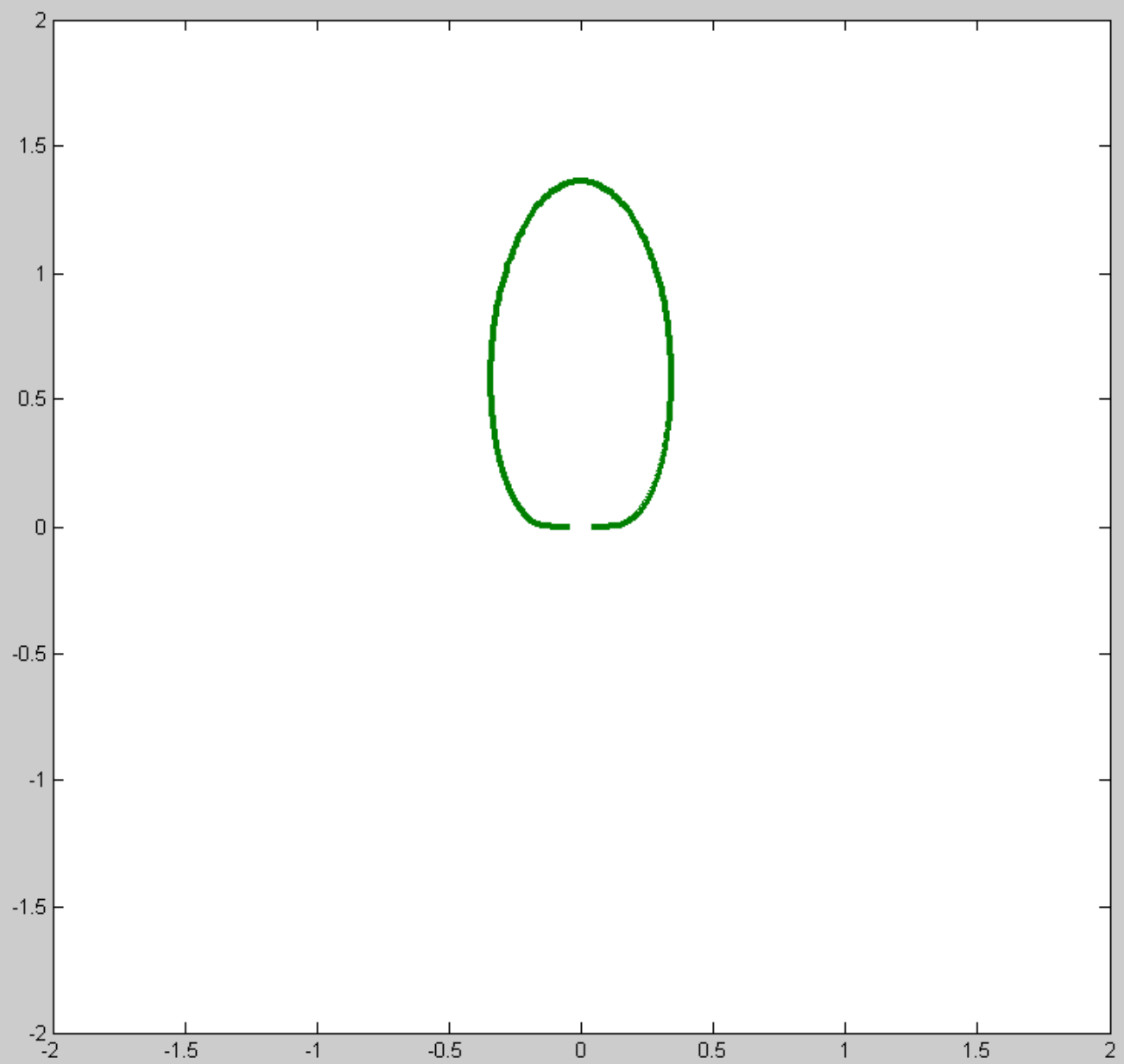
Budker Institute of Nuclear Physics.

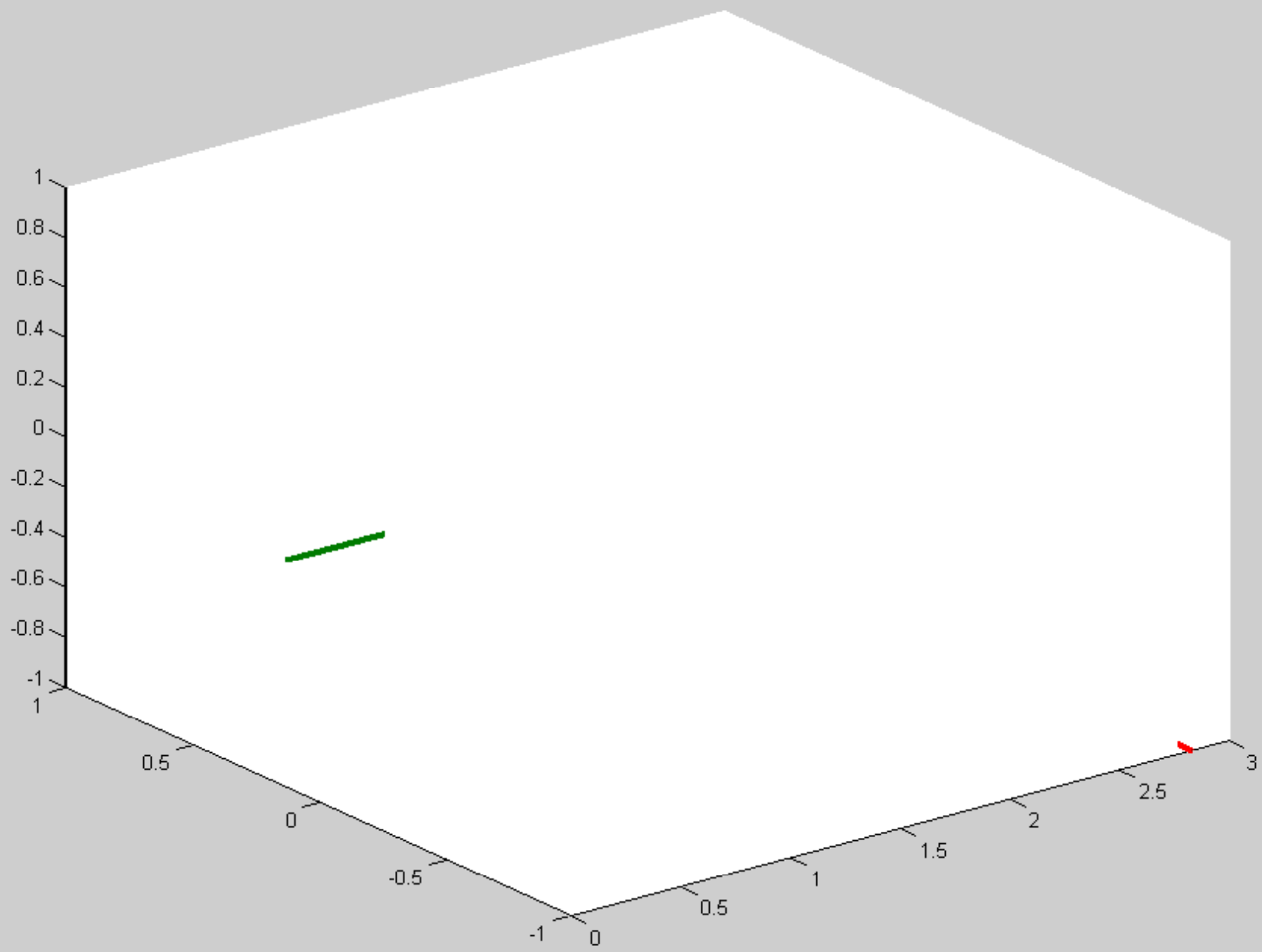
NANOBEAM 2008, Novosibirsk

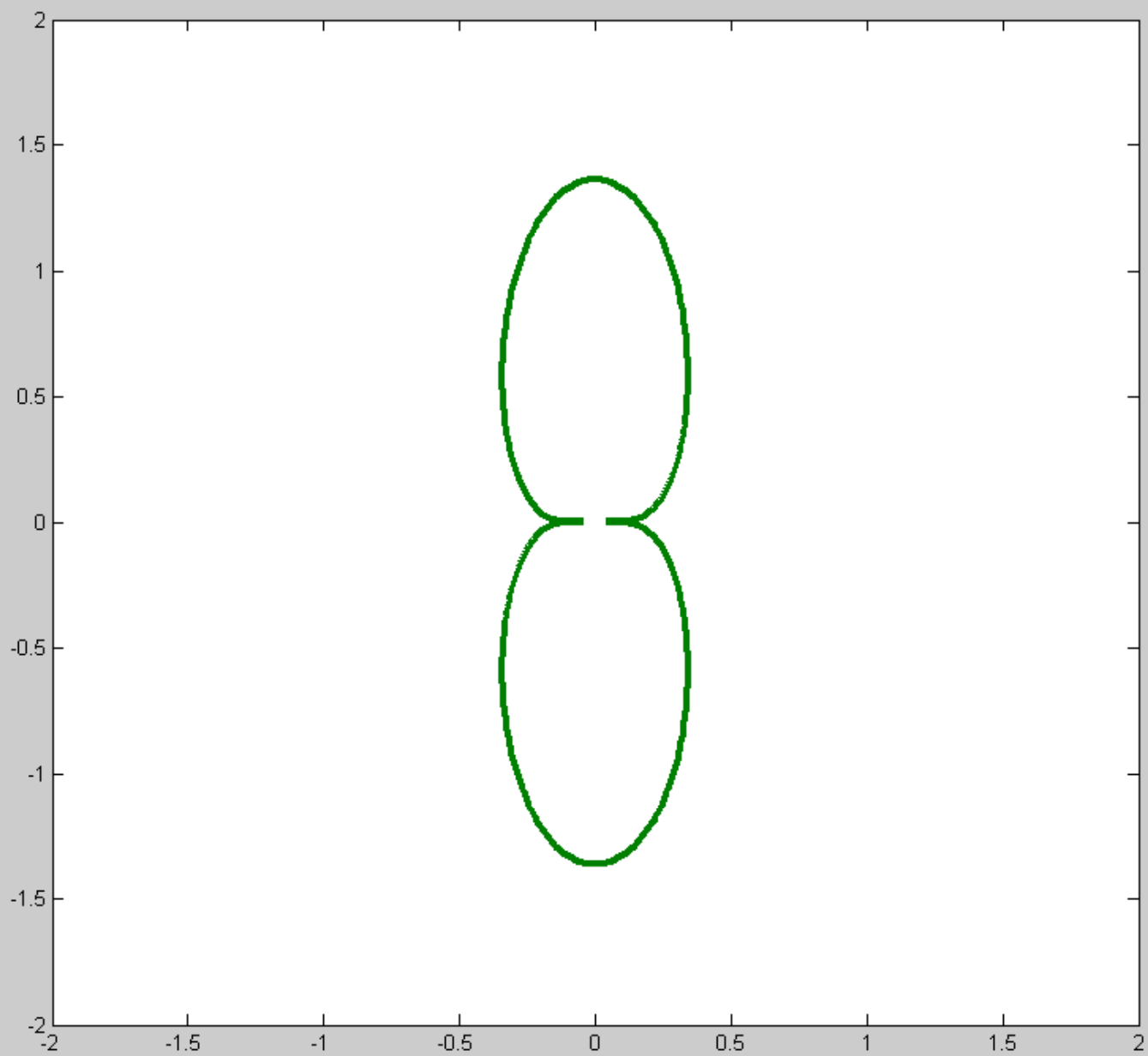
ELECTRON BEAM PROBE MAIN IDEA





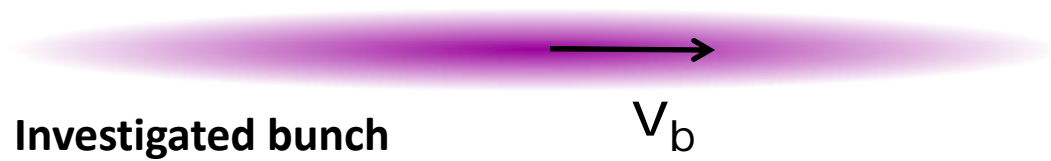






ELECTRON BEAM PROBE

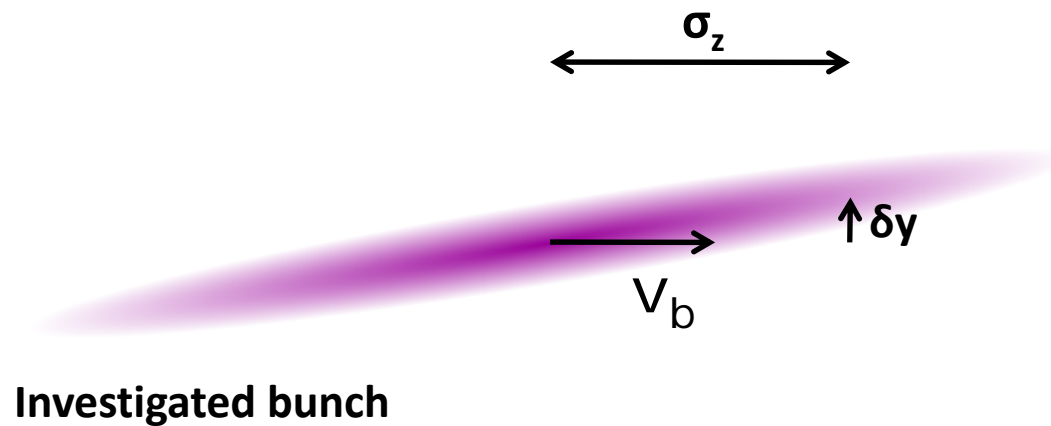
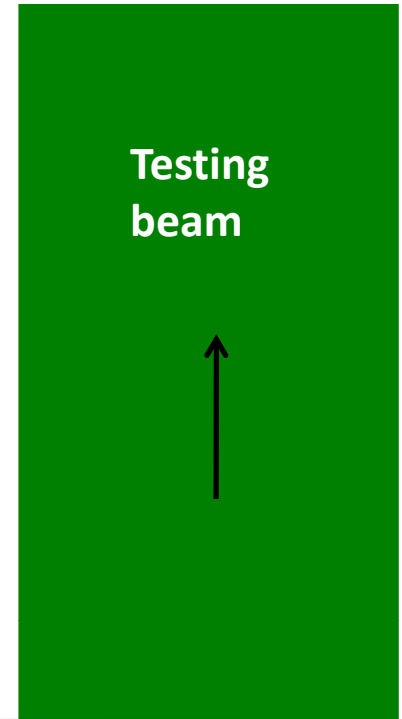
Bunch tilting measurements



X-Z

top view

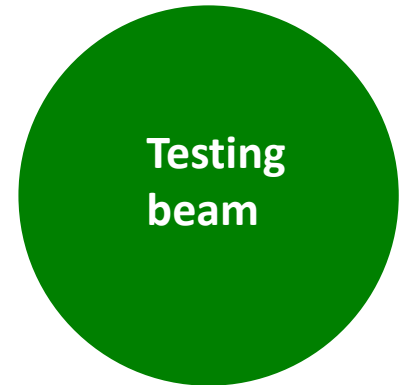
Testing beam



Y-Z

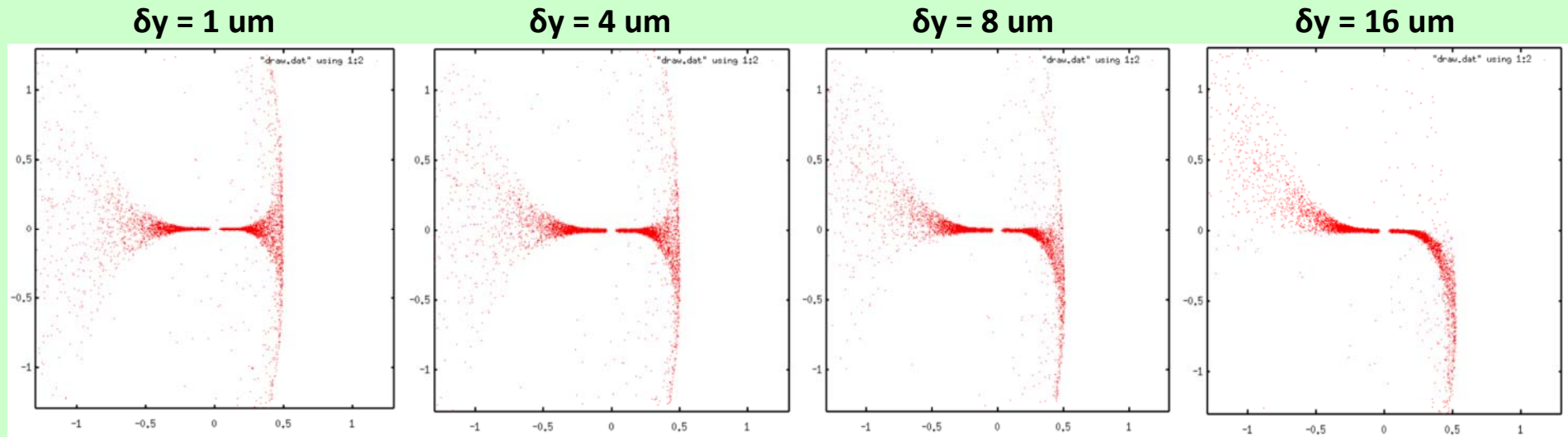
side view

Testing beam



ELECTRON BEAM PROBE

Bunch tilting measurements simulation



Screen images for increasing amplitude of the bunch tilt δy .

(the bunch head is δy up at $+\sigma_z$ and the tail is δy down at $-\sigma_z$)

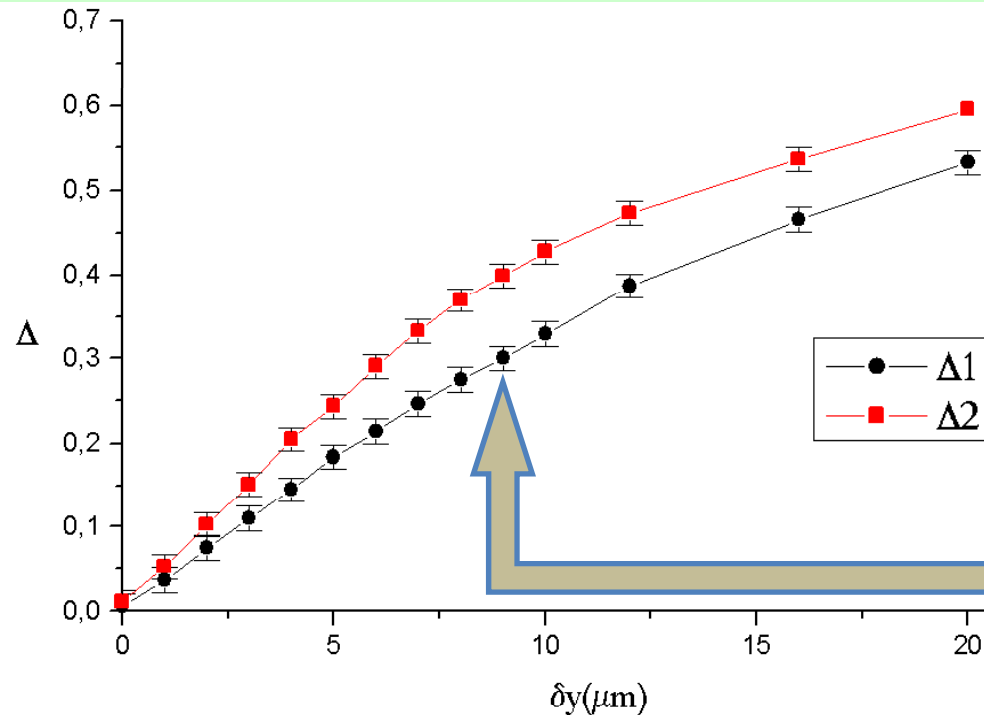
The asymmetry monotonically increase with increase of beam tilt

Electron Beam Probe parameters
 $E = 200 \text{ keV}$, $I = 2 \text{ mA}$.

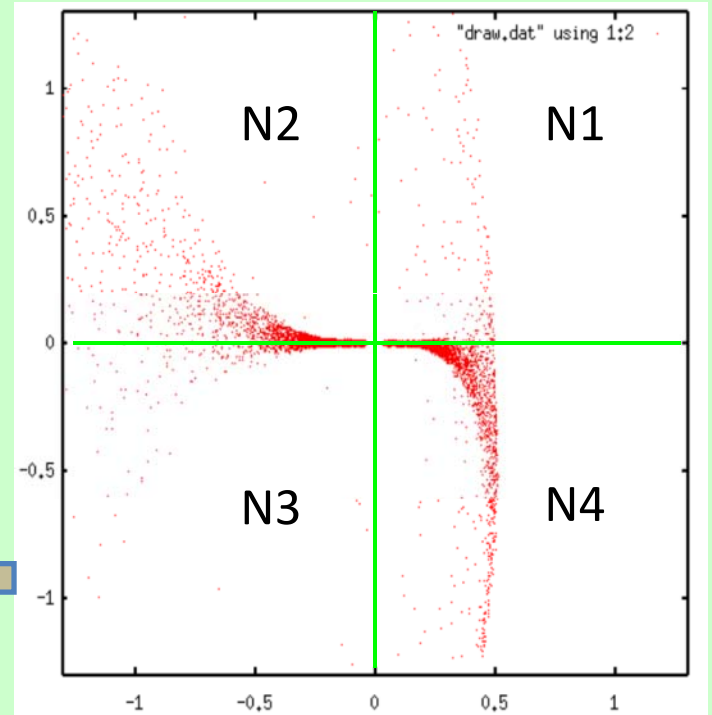
Bunch parameters:
 $\sigma_z = 0.1 \text{ mm}$, $\sigma_x = \sigma_y = 10 \text{ um}$, $N_e = 0.7 \cdot 10^{10}$

ELECTRON BEAM PROBE

Bunch tilting measurements simulation



The image asymmetry dependence on the bunch tilting amplitude



Testing beam image for $\delta y = 8 \mu\text{m}$

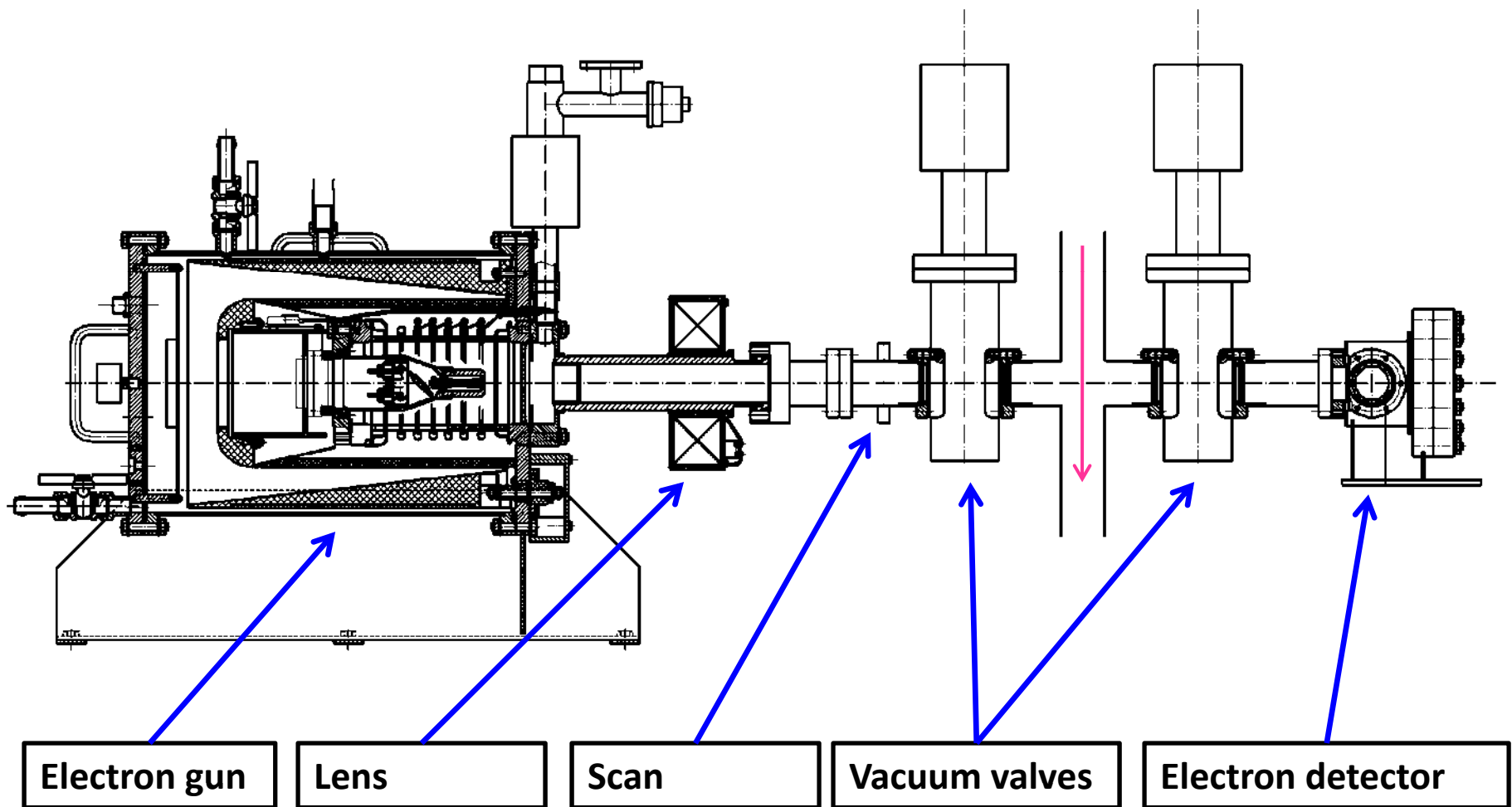
$$\Delta_1 = (N_4 - N_1) / (N_4 + N_1)$$

$$\Delta_2 = (N_2 - N_3) / (N_2 + N_3)$$

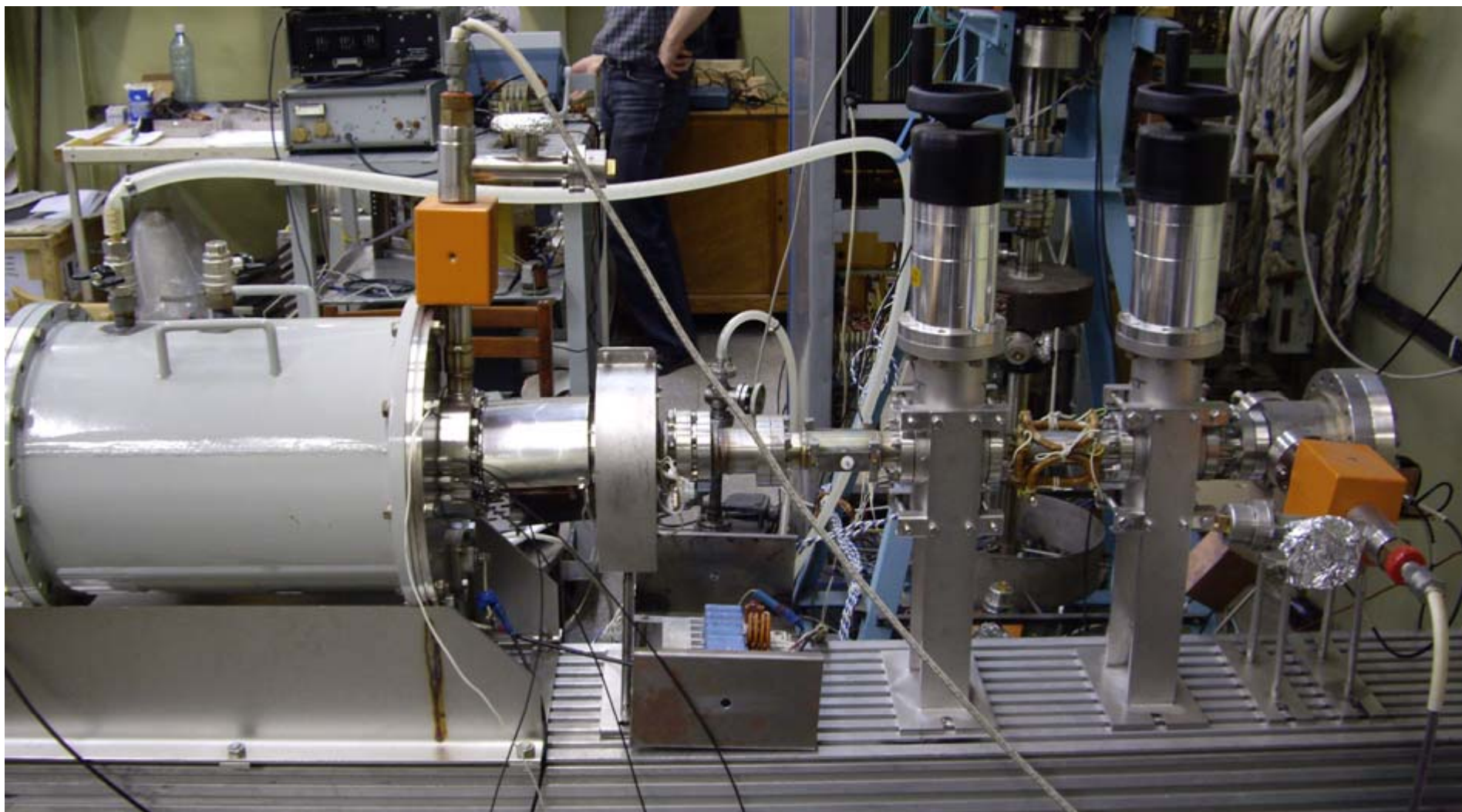
Electron Beam Probe parameters
 $E = 200 \text{ keV}$, $I = 2 \text{ mA}$.

Bunch parameters:
 $\sigma_z = 0.1 \text{ mm}$, $\sigma_x = \sigma_y = 10 \mu\text{m}$, $N_e = 0.7 \cdot 10^{10}$

ELECTRON BEAM PROBE DRAFT



ELECTRON BEAM PROBE PHOTO



ELECTRON BEAM PROBE

MAIN PARAMETERS

Electron beam energy	20...200 keV
Electron beam duration	1 us
Electron beam current	1 mA
Electron beam repetition rate	1...10 Hz

ELECTRON BEAM PROBE STATUS

- Now, mechanical part of EBP is ready and is under testing in BINP
- Beam at energy 200 keV was obtained
- Beam spot size at the energy 200 keV on a screen – 1 mm
- Beam current – 1 mA
- Beam repetition rate – 10 Hz

