

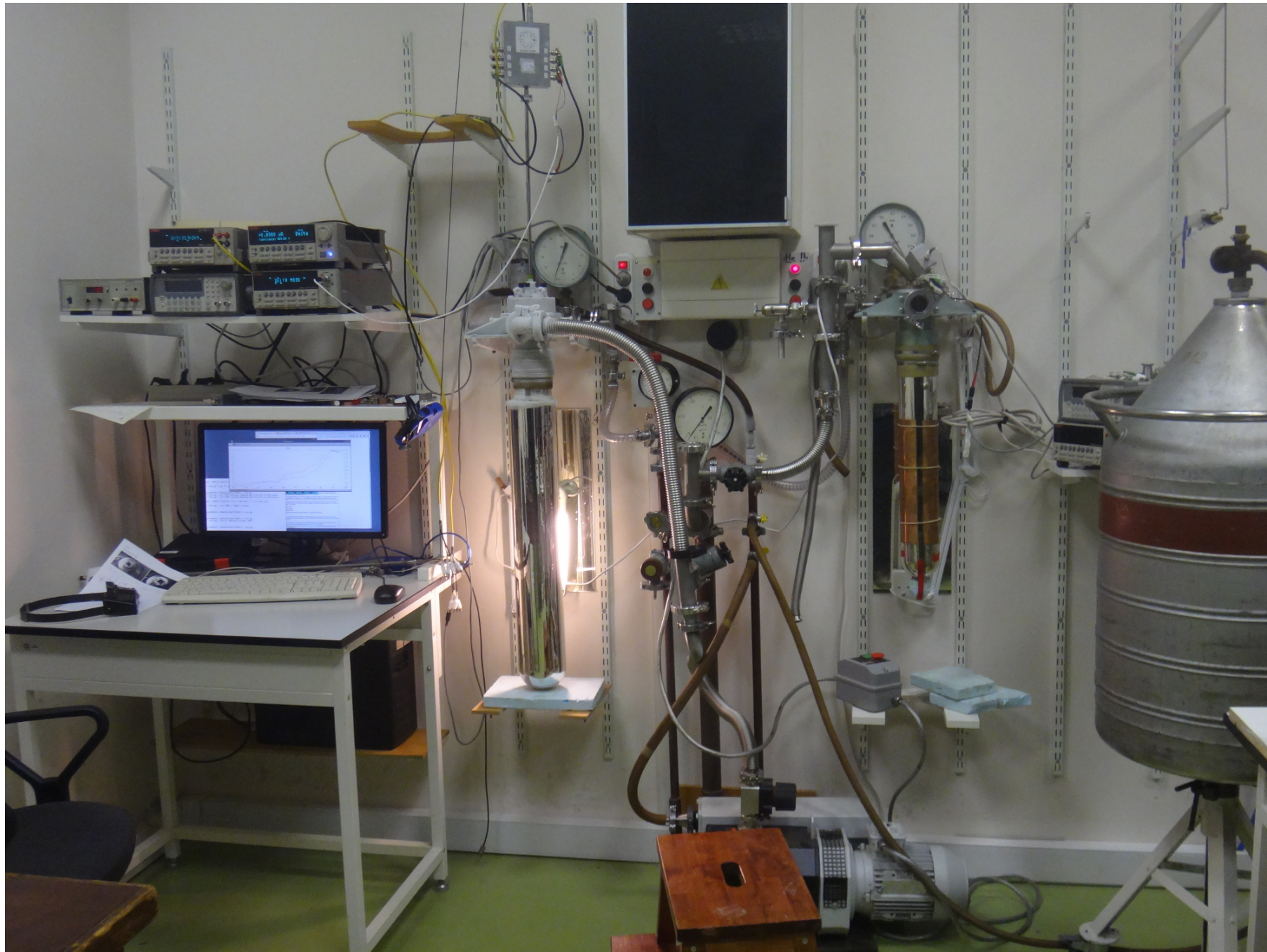
EINSTEIN project meeting, Moscow, Russia, June 4-5, 2018

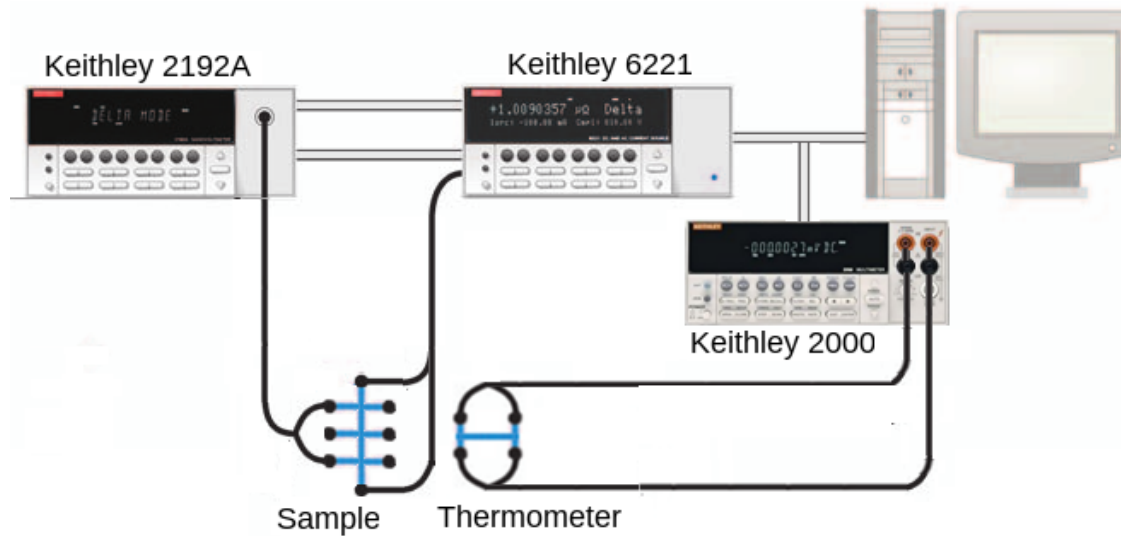
Transport properties of thin superconducting aluminum films.

V.V. Zavyalov

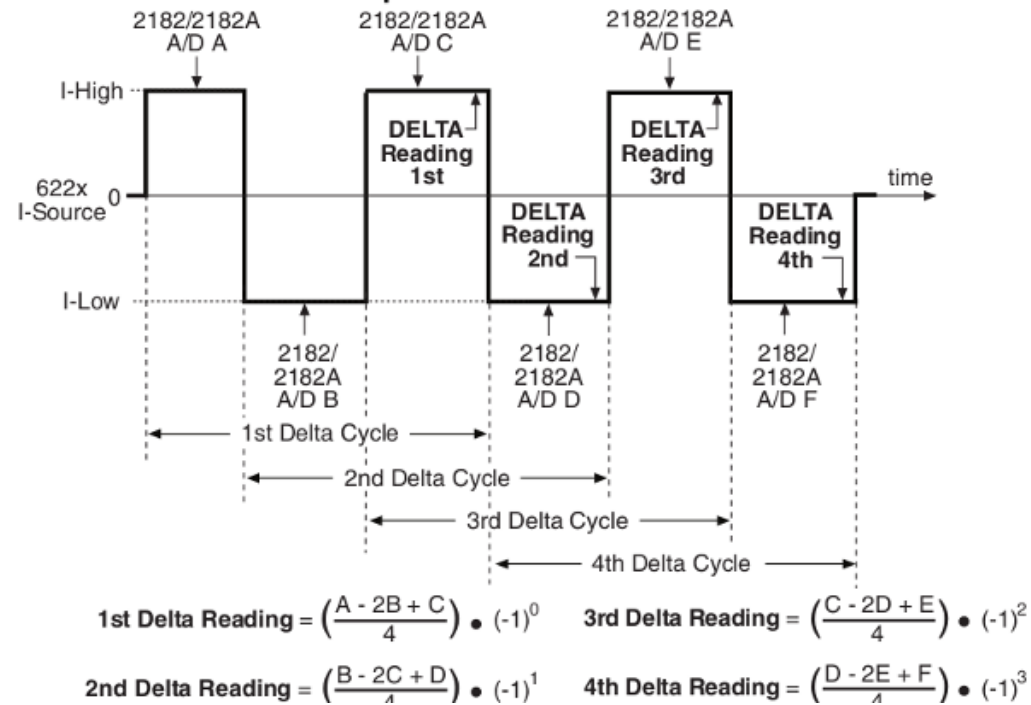
Golokolenov I.A., Sedov E.A., Zavyalov V.V., Konstantinidis G.,
Chatzopoulos Z.

P.L. Kapitza Institute for Physical Problems Kosygina 2, Moscow, Russia;





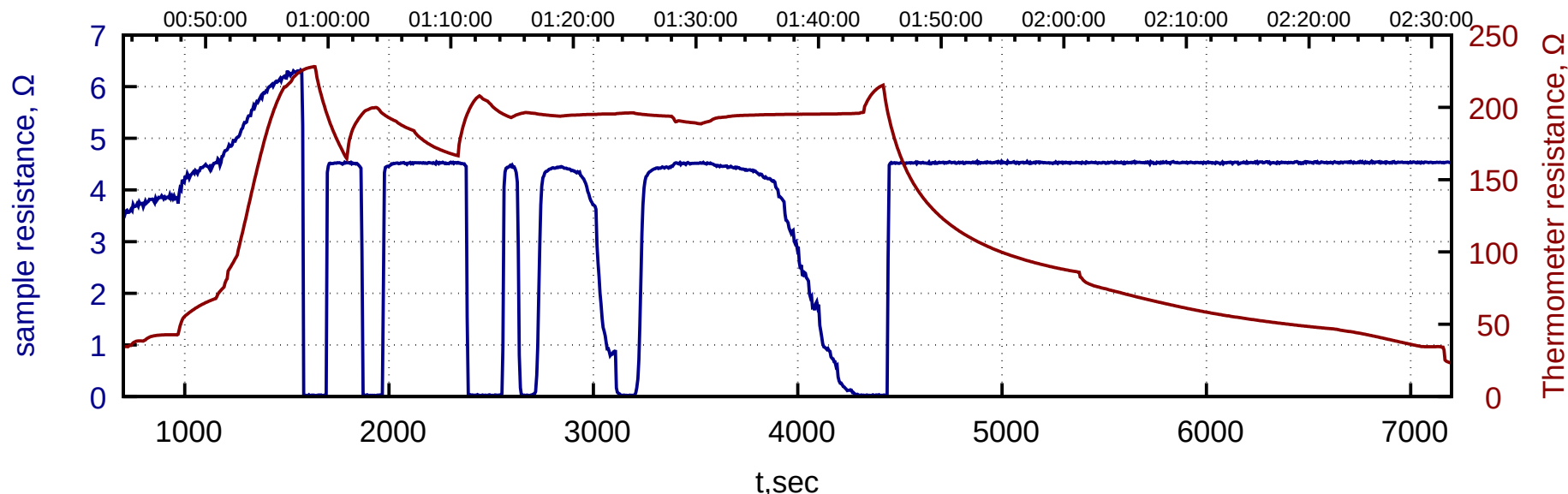
Delta measurement technique



An example of graphs obtained in the measurement process.

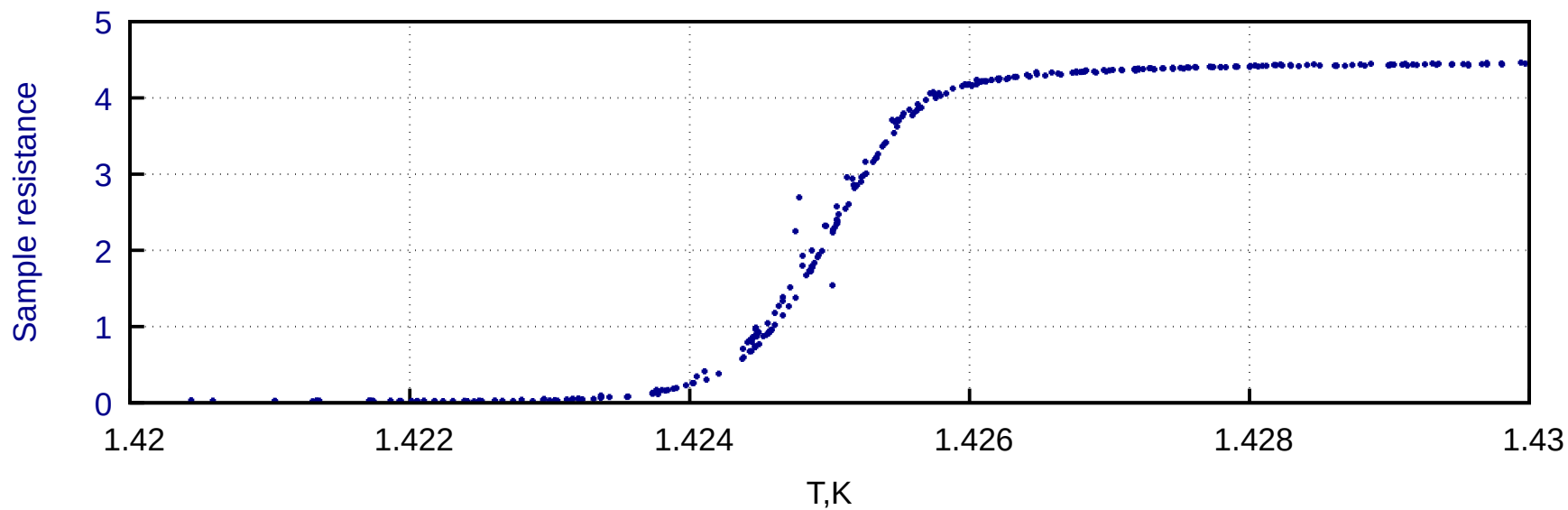
|../180528/0031a t=700:7200cek|

The survey.



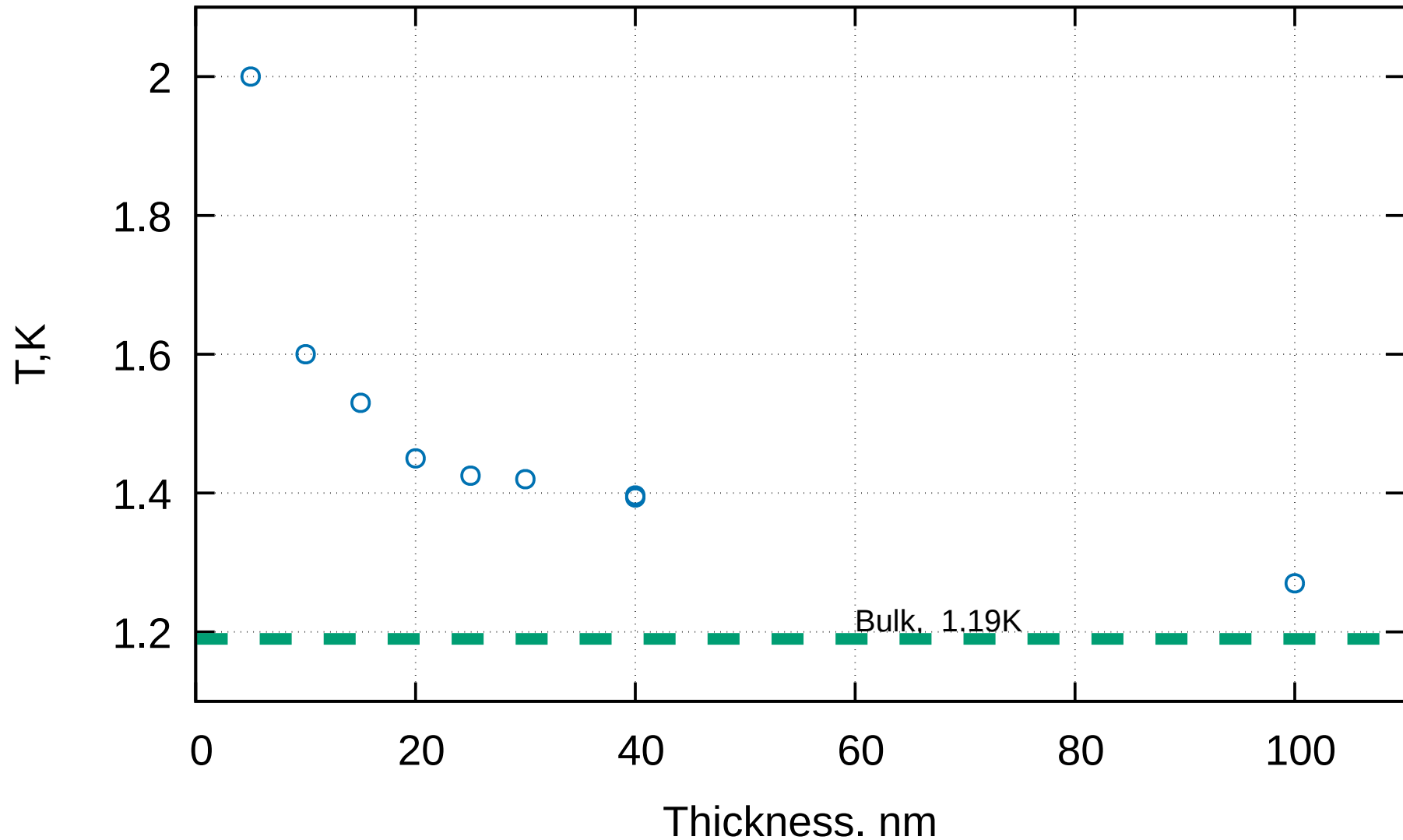
|../180528/0031b t=1700:5000cek|

Al sample 25 nm.



Seven samples (5 to 40 nm) were measured with this setup.

Superconducting transition temperature of thin Al samples

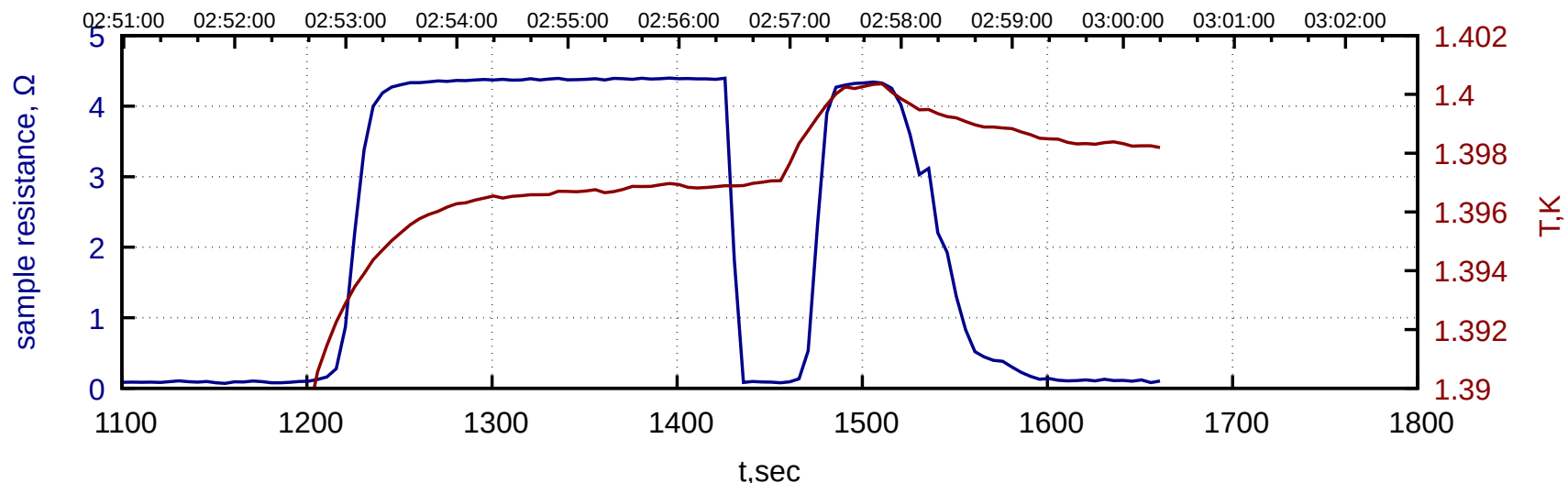


Does The earth's magnetic field distort the results?

When the magnetic field (0.8 G) was created by a NdFeB magnet under the cryostat, T_c decreased by 3 mK.

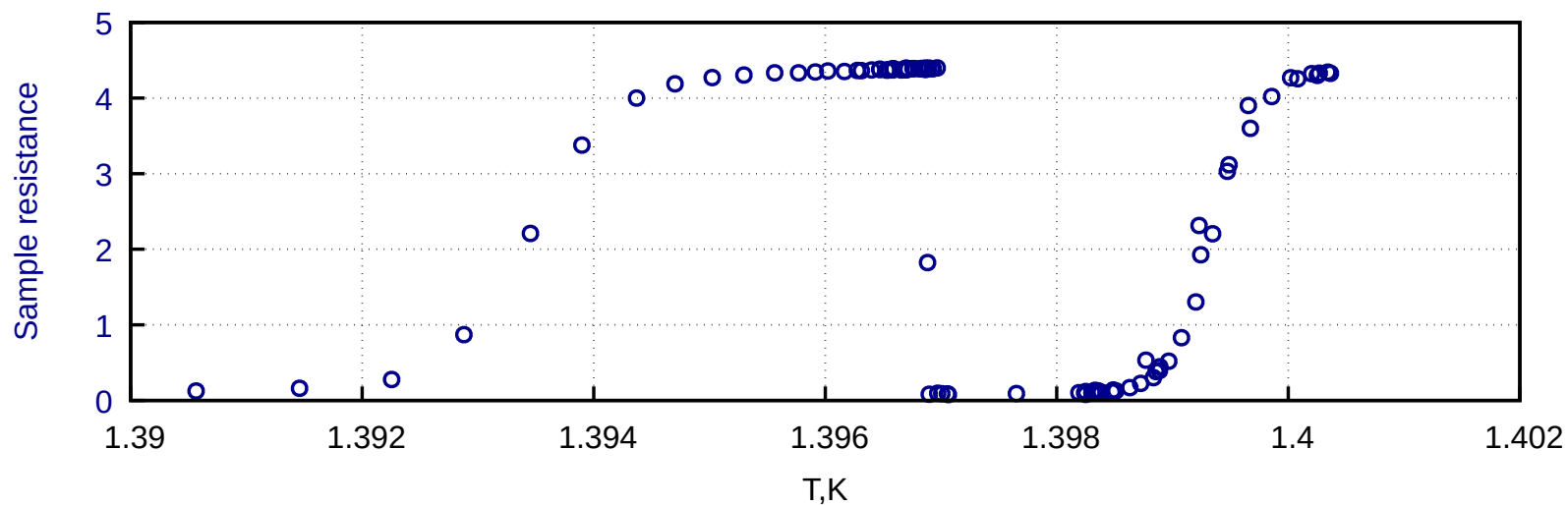
../180531/0232 t=1100:1800cek

Al film-Ebeam-40 nm No7, ($I = 1 \mu\text{A}$)



../180531/0232 t=1100:1800cek

Al film-Ebeam-40 nm No7, ($I = 1 \mu\text{A}$)



RESULTS

- The setup for rapid measurement of the superconducting transition temperature — $T_c > 1.36$ with a sensitivity of 1 mK was assembled.
- The use of Keitley (6221 and 2192a) devices operating in Delta mode, allowed to make measurements at low currents (100 nA) and obtain the temperature resolution of better than 1 mK.
- Measurements on seven samples of Al films with thicknesses from 5 to 40 nm were made.
- The sensitivity of the installation allows to reliably record the T_c shift in small magnetic fields.