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UVSOR Workshop
on THz CSR

UVSOR

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FAR-INFRARED SPECTROSCOPY BY SYNCHROTRON RADIATION AT THE UVSOR FACILITY

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Abstract

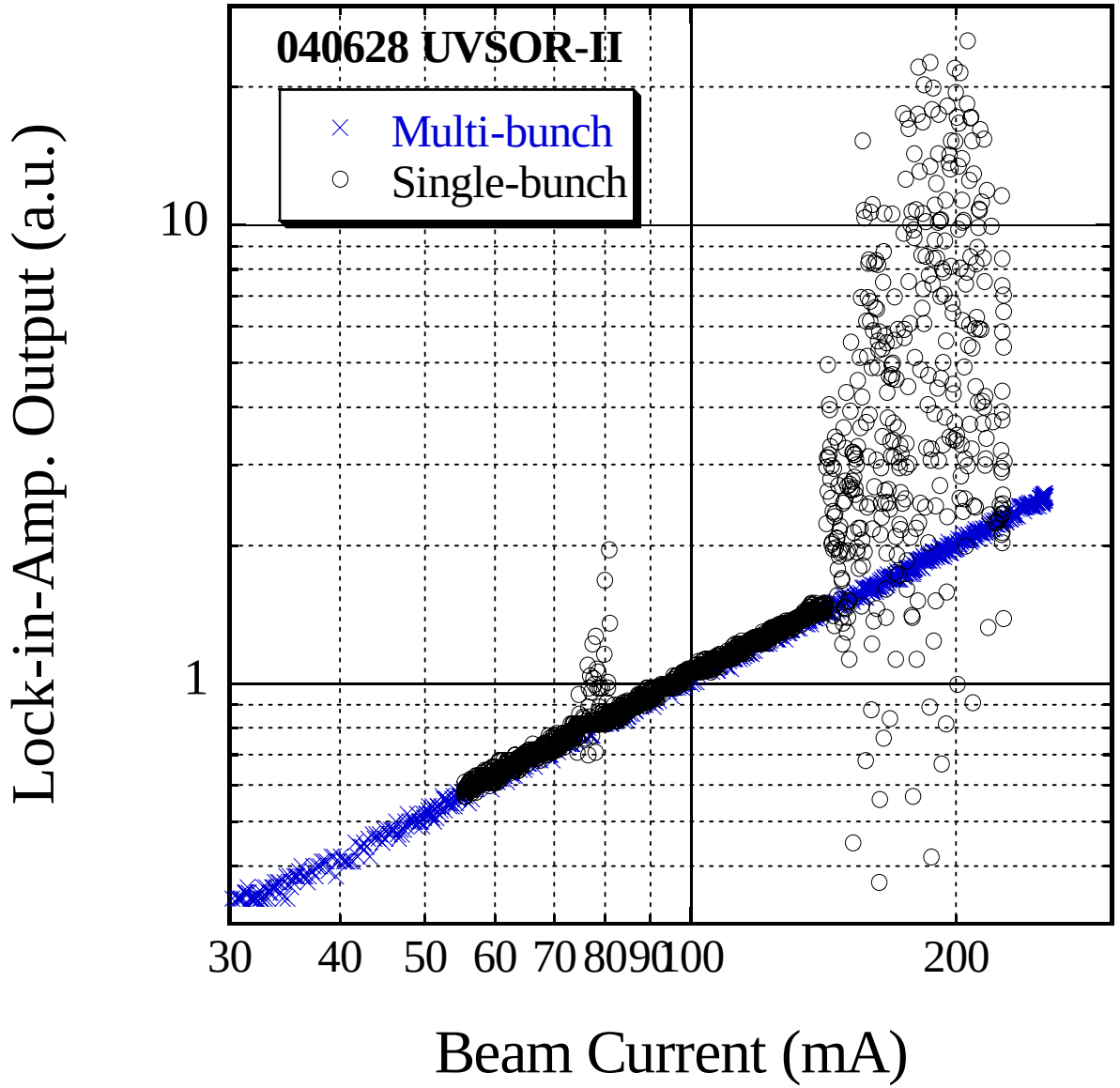
At the UVSOR Facility, Institute for Molecular Science, the practical use of the synchrotron radiation as a far-infrared light source has started. A spectroscopic system has been constructed at the beam line BL6A1 of UVSOR storage ring, which covers the wavenumber region from 5 to 250 cm^{-1}. The cross sectional diameter of the light beam at the sample position is as small as 3 mm with the angular divergence of about 100 mrad. The system has been made mainly for the transmission and reflection measurements of small samples with small angular divergence by the use of the high brightness of the synchrotron radiation. Examples of observed transmission and reflectivity spectra are shown.

The present system covers the wave number region from 5 to 250 cm^{-1}. The diameter of the aperture is given in Fig. 2 in millimeter units. When the diameter is larger than 3 mm, the response does not change in the high energy region. In the low energy region, the intensity decreases more rapidly with the decrease of the diameter of the aperture because of the diffraction effect. This result indicates that the diameter of the light beam at the sample position is about 3 mm.

The intensity of the radiation was confirmed to be proportional to the ring current when the current was less than 100 mA. Response curves were obtained at different ring currents and they are normalized by the current of 45 mA in Fig. 2. The intensity of the mercury lamp through the 3 mm aperture is shown for comparison by the dashed curve in Fig. 2. It can be seen that the synchrotron radiation through the same aperture is about five times more intense at the ring current of 45 mA. The UVSOR is designed for a ring current of 500 mA, at which the intensity of the synchrotron radiation will be far more intense than that of the mercury arc lamp.

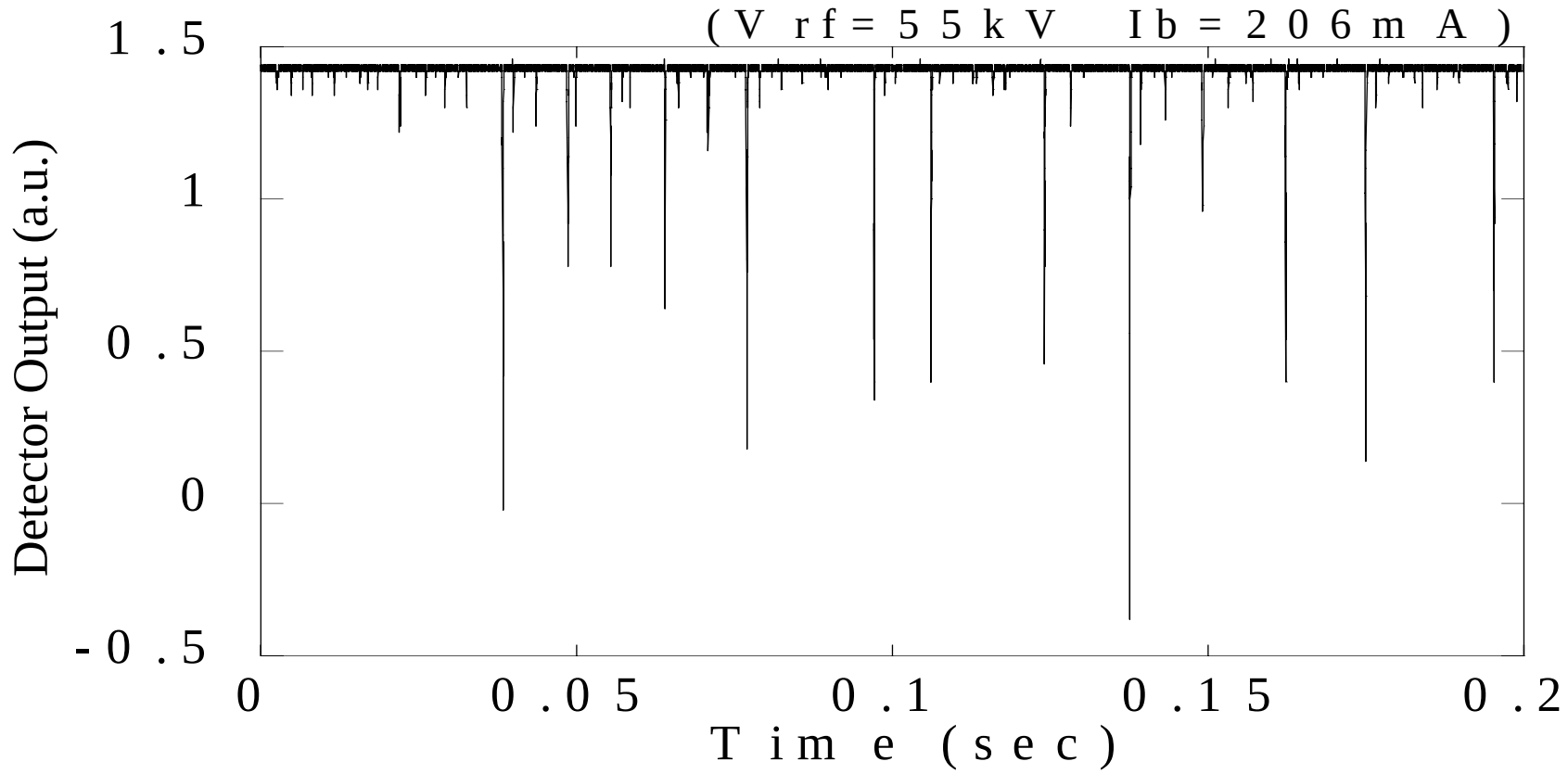
THz Bursts at UVSOR-II

Y. Takashima et al., Jpn. J. Appl. Phys., 44, 35 (2005) L1131



THz Bursts at UVSOR-II(cont.)

Y. Takashima et al., Jpn. J. Appl. Phys., 44, 35 (2005) L1131



Peak Intensity is ~10^4 higher than normal SR. ⇒ CSR

Oh, our little storage ring
can do such a great thing !

This is something like
Bubble Economy ?

$$P = P_0(N_e + N_e^2 f), \quad (1)$$

$$f = \left(\int \cos(2\pi z / \lambda) S(z) dz\right)^2, \quad (2)$$

Great potential, anyway.

Let’s enjoy
hot discussions
on this fascinating subject.