Development of Profile Monitor for Soft X-ray Beamline Using Diamond Detector

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We have designed and constructed the profile monitor using diamond detector which is operating in photo-conduction mode. The size of the diamond foil is 50mm×40mm×0.24mm(Fig. 1). The detective area is 0.5 millimeter square, which is between two right-angled electrodes. The diamond foil is clamped with a cooper holder. The holder can be moved horizontally and vertically with stepping motors. The vacuum chamber is under the condition of ultra high vacuum during measurements.

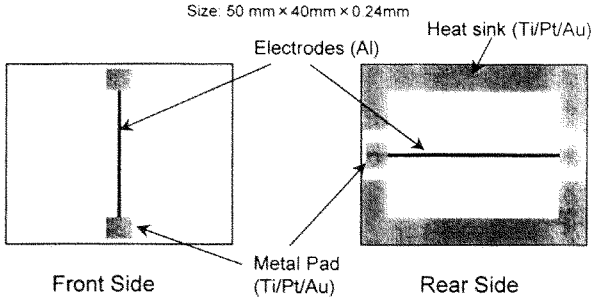

Figure 1 Schematic view of the CDV diamond

The insertion devise of BL27SU is a figure-8 undulator of the in-vacuum type, which has an asymmetric power distribution in the horizontal direction. The front-end is designed to have large aperture to diagnose the power distribution even in the optical hatch. This monitor has been installed 35m from the source point.

Figure 2 and Figure 3 show the results of the profile measurement of the power distribution for the ID gap=80mm and 50mm, respectively. The bias voltage was +100V on the electrode of the front side and the signal current was from the other.

In this experiment, we have demonstrated the operation of this monitor and observed the profiles of the radiation of the figure-8 undulator directly.

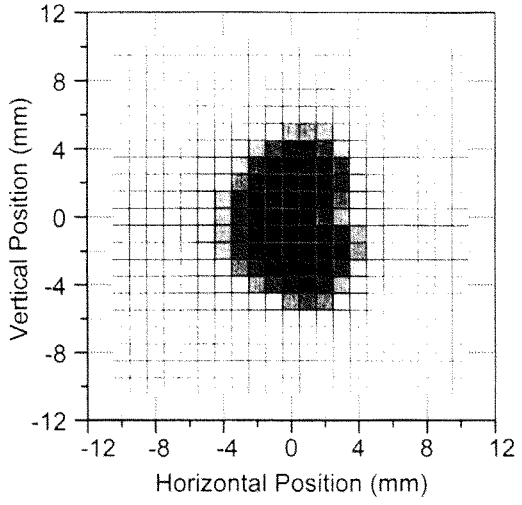

Figure 2 Profile for ID gap=80mm (Ring Current=14.9mA)

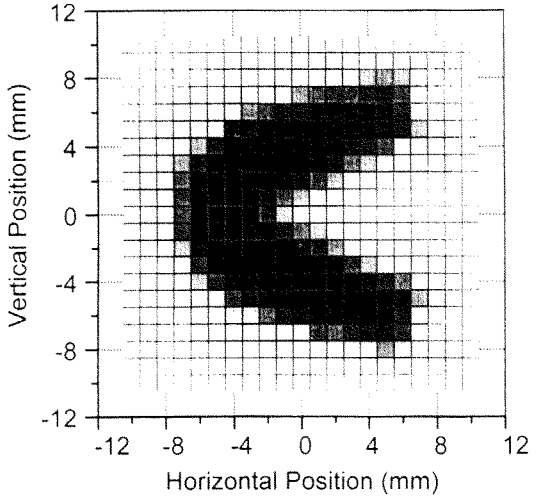

Figure 3 Profile for ID gap=50mm (Ring Current=1.0mA)