Upgrade of UVSOR

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UVSOR, a 750 MeV synchrotron light source, was constructed early in 1980's. This second generation light source had been operated for about 20 years, providing soft X-rays, VUV and infrared radiation to nation-wide users. In 2003, the light source was upgraded to UVSOR-II [1]. The magnetic lattice was changed to have smaller emittance and more straight sections [2]. Now, the storage ring is routinely operated with small emittance of 27 nm-rad. The ring has totally eight straight sections and six of them are available for insertion devices. Three undulators were newly constructed and installed [3]. Now, totally four undulators are in operation. Two of them are of in-vacuum type and others are of variably polarized type. To suppress strong Touschek effect, a new RF cavity was constructed and successfully commissioned in 2005. Upgrades of the injector and the radiation shields are in progress, preparing for top-up operation in near future.

The smaller emittance and the higher peak current of UVSOR-II gives a higher gain of the existing free electron laser in the deep UV region. A high power lasing around 215 nm exceeding 1 W was successfully demonstrated. Some users experiments have started. A Ti:Sa laser which can be synchronized with the RF acceleration of UVSOR-II was introduced in 2005. New light source technologies based on laser/e-beam interactions are being developed. Intense coherent terahertz pulses were successfully produced by the laser bunch slicing method [5]. Coherent harmonic generation in deep UV region was successfully demonstrated [6].

References
[1] M. Katoh et al., AIP Conf. Proc. 705 (2004) 49
[2] M. Katoh et al., NIM A467-468 (2001) 68
[3] A. Mochihashi et al., AIP Conf. Proc. 705 (2004) 259
[4] M. Hosaka et al., presented at FEL Conf. 2006(Berlin)
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[6] M. Labat et al., presented at FEL Conf. 2006 (Berlin)

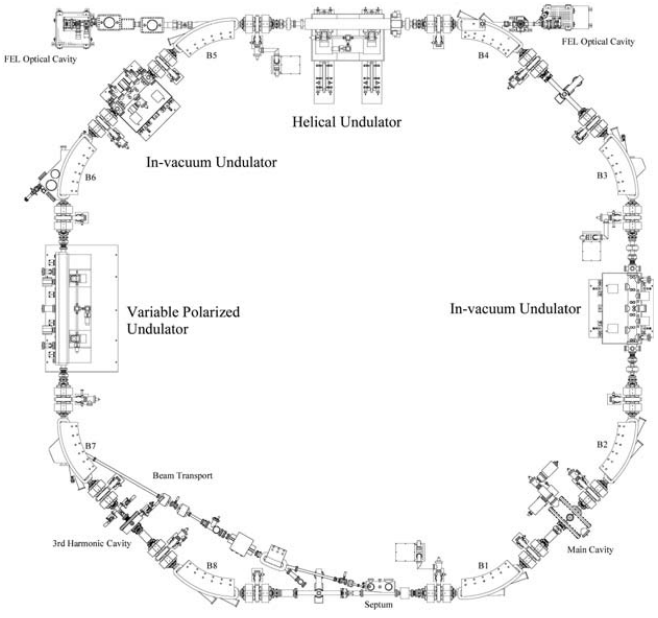

Fig. 1. Present configuration of UVSOR-II

Table 1: Main Parameters of UVSOR-II

Electron Energy	750 MeV
Circumference	53.2 m
Straight Sections	4m x 4, 1.5m x 4
Natural Emittance	27 nm-rad
Natural Energy Spread	4.2×10^{-4}
Natural Bunch Length	160 psec
RF Frequency	90 MHz
RF Voltage	100 kV*
Filling Beam Current	350 mA*

Note: *In multi-bunch operation for SR users.

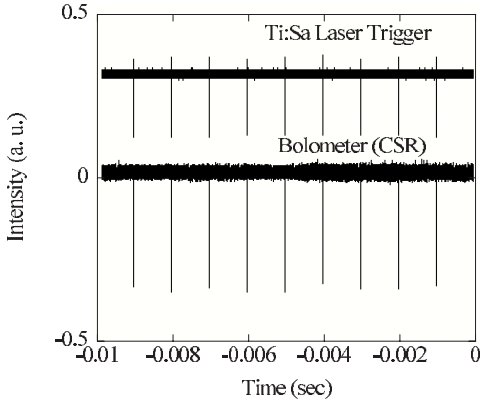

Fig. 2. Coherent terahertz radiation produced by laser bunch slicing.