APPENDIX

ORGANIZATION

Staff

Director

Katsumi	KIMURA	Professor

Scientific Staff

Light Source

Goro	ISOYAMA	Associate Professor
Hiroyuki	HAMA	Research Associate
Shirou	TAKANO	Research Associate

Beam Line

Makoto	WATANABE	Associate Professor
Masao	KAMADA	Associate Professor
Atsunari	HIRAYA	Research Associate
Shin-ichiro	TANAKA	Research Associate

Technical Staff

Kusuo	SAKAI	Section Chief Engineer
Osamu	MATSUDO	Unit Chief Engineer
Toshio	KINOSHITA	Engineer
Masami	HASUMOTO	Engineer
Jun-ichiro	YAMAZAKI	Engineer
Eiken	NAKAMURA	Engineer

Secretary

Yasuno	YAMAGUCHI	

Guest Scientist

Kazuhiko	SEKI	Adjunct Associate Professor from Hiroshima Univ.
Koichiro	OBA	Visiting Research Fellow from HAMAMATSU PHOTONICS K. K.

Representative of Beam Lines

BL1A	Makoto	WATANABE	UVSOR
BL2A	Kosuke	SHOBATAKE	Dept. Molecular Assemblies

BL2B2	Katsumi	KIMURA	Dept. Molecular Assemblies
BL3B	Kosuke	SHOBATAKE	Dept. Molecular Assemblies
BL4A	Shinri	SATO	Dept. Molecular Assemblies
BL4B	Kosuke	SHOBATAKE	Dept. Molecular Assemblies
BL6B	Kyuya	YAKUSHI	Dept. Molecular Assemblies
BL6A2	Masao	KAMADA	UVSOR
BL8B2	Hiroo	INOKUCHI	IMS
Others	Makoto	WATANABE	UVSOR
	Masao	KAMADA	UVSOR

Steering Committee (April 1990 - March 1992)

Katsumi	KIMURA	IMS Chairman
Jun-ichi	CHIKAWA	Nat. Lab. High Energy Phys.
Junji	FUJITA	Nat. Inst. Fusion Science
Masao	KOTANI	Gakushuuin Univ.
Kaizo	NAKAMURA	Okayama Univ.
Yukinori	SATO	Tohoku Univ.
Tadamase	SHIDA	Kyoto Univ.
Shigemasa	SUGA	Osaka Univ.
Kazuhiko	SEKI	IMS and Hiroshima Univ.
Ichiro	HANAZAKI	IMS
Kyuya	YAKUSHI	IMS
Kosuke	SHOBATAKE	IMS
Norio	MORITA	IMS
Makoto	WATANABE	IMS
Goro	ISOYAMA	IMS
Masao	KAMADA	IMS

JOINT STUDIES (fiscal year 1990)

Special Project	: 3
Cooperative Research	: 28
Use of Facility	: 104
Users' Meeting	: 1
Workshop on Beam Dynamics and Free Electron Laser	: 1
Users' Time	: 39 Weeks

LIST OF PUBLICATION

1)"Anisotropic Reflectivity of Black Phosphorus in the Far-Infrared Region"

T.Nanba, M.Ikezawa, I.Shirotani and H.Inokuchi

Proc. 12th Int. Conf. Infrared and Millimeter Waves (IEEE, 1987) p.231.

2)"Phonon Polaritons in Thin Films and Microcrystals of MnO"

S.Mochizuki

J. Phys.: Condens. Matter **1** (1989) 10351.

3)"Na K-XANES and EXAFS Studies in Sodium Halides"

T.Murata, T.Matsukawa and S.Naoe

Physica B **158** (1989) 610.

4)"Decay of the 4d Hole States of Xe Studied by Photoelectron-Photoelectron Coincidence Spectroscopy"

K.Okuyama, J.H.D.Eland and K.Kimura

Phys. Rev. A **41** (1990) 4930.

5)"Energy-Band Dispersion in Oriented Thin Films of Pentatriacontan-18-One by Angle-Resolved Photoemission with Synchrotron Radiation"

N.Ueno, K.Seki, N.Sato, H.Fujimoto, T.Kuramochi, K.Sugita and H.Inokuchi

Phys. Rev. B **41** (1990) 1176.

6)"Optical Spectra of Cadmium Halide Crystals in 3-30 eV Region"

M.Fujita, H.Nakagawa, H.Matsumoto, T.Miyanaga, M.Watanabe, K.Fukui, E.Ishiguro, Y.Fujii and Y.Sakisaka

J. Phys. Soc. Jpn. **59** (1990) 338.

7)"Lattice Relaxation of Self-Trapped Excitons in Binary Mixed Crystals of KCl and KBr"

K.Tanaka, K.Kan'no and Y.Nakai

J. Phys. Soc, Jpn. **59** (1990) 1474.

8)"Effect of Dilatational Strain on the Self-Trapped Exciton Luminescence of Alkali Halides"

M.Itoh, S.Hashimoto and N.Ohno

J. Phys. Soc. Jpn. **59** (1990) 1881.

9)"Core Absorption Spectra of Crystalline and Amorphous GeTe Thin Films"

K.Fukui, T.Saito, S.Kondo, Y.Fujii, Y.Sakisaka and M.Watanabe

J. Phys. Soc. Jpn. **59** (1990) 4161.

10)"Self-Trapped Exciton Luminescence in Mixed $K_{1-x}Rb_xI$ Crystals"

M.Itoh, N.Ohno and S.Hashimoto

J. Phys. Soc. Jpn. **59** (1990) 4534.

11)"Identity of Self-Trapped Exciton Configurations for the π Emission of NaI and the σ Emission of KI"

M.Itoh, S.Hashimoto, N.Ohno and K.Kan'no

J. Phys. Soc. Jpn. **60** (1991) 61.

12)"Photoionization Efficiency Curves in the Threshold Region for $Bi_n(n < 4)$ Molecules"

Y.Saito, A.Kajita, T.Yasue, M.Hayashi, A.Ichimiya, T.Gotoh, Y.Shigeta, S.Takagi, Y.Tazawa and S.Ohtani

Physica Scripta. **41** (1990) 51.

13)"Electronic and Geometric Structures of Oligothiophenes Studied by UPS and MNDO: π-Band Evolution and Effect of Disorder"

H.Fujimoto, U.Nagashima, H.Inokuchi, K.Seki, N.Nakahara, J.Nakayama, M.Hoshino and K.Fukuda

Physica Scripta. **41** (1990) 105.

14)"Decay Time Measurements of Intrinsic Luminescence in Alkali Halides Using Single-Bunched Light Pulses from UVSOR"

K.Kan'no, K.Tanaka, H.Kosaka, T.Mukai, Y.Nakai, M.Itoh, T.Miyanaga, K.Fukui and M.Watanabe

Physica Scripta. **41** (1990) 120.

15)"Density Effect on Photoionization Process in Supercritical Xenon Fluids Doped with TMAE (Tetrakis-Dimethylaminoethylene)"

K.Nakagawa, A.Ejiri, K.Kimura and M Nishikawa

Physica Scripta. **41** (1990) 140.

16)"Angle-Resolved Photoemission from Oriented Thin Films of Long Alkyl Molecules: Valence Band Dispersion"

N.Ueno, H.Fujimoto, N.Sato, K.Seki and H.Inokuchi

Physica Scripta. **41** (1990) 181.

17)" Dissociative Double Ionization Following Valence and Al: 2p Core Level Photoexcitation of $Al(CH_3)_3$"

S.Nagaoka, I.Koyano and T.Masuoka

Physica Scripta. **41** (1990) 472.

18)"Photochemical Reactions of Molecules on Alkali Halide Surfaces Induced by Undulator Radiation"

M.Watanabe, H.Nakagawa, T.Miyanaga, H.Matsumoto, M.Fujita and K.Fukui

Physica Scripta. **T31** (1990) 154.

19)"Polystyrene Thin Film Formed by Synchrotron Radiation Chemical Vapor Deposition"

H.Yamada, M.Nakamura, H.Katoh, T.Hayakawa, S.Moita, S.Hattori, H.Ohashi and K.Shobatake

J. Appl. Phys. **67** (1990) 2613.

20)"Simultaneous Generation of Optical Absorption Bands at 5.14 and 0.452 eV in 9 SiO_2:GeO_2 Glasses Heated under an H_2 Atmosphere"

K.Awazu, H.Kawazoe and M.Yamane

J. Appl. Phys. **68** (1990) 2713.

21)"O_2 Molecules Dissolved in Synthetic Silica Glasses and Their Photochemical Reactions Induced by ArF Excimer Laser Radiation"

K.Awazu and H.Kawazoe

J. Appl. Phys. **68** (1990) 3584.

22)"Formation of NH(c $^3\Pi$), NH(A $^3\Pi$), and NCO(A $^2\Sigma$) in the VUV Photolysis of HNCO"
K.Uno, T.Hikida, A.Hiraya and K Shobatake
Chem. Phys. Lett. **166** (1990) 475.

23)"Photoionization of $(O_2)_2$, $(O_2)_3$, and Ar-O_2 in the 50-100 nm Region: State Selective Ionization of O_2 in a Framework of Van Der Waals Molecules"
M.Ukai, K.Kameta, K.Shinsaka, Y.Hatano T.Hirayama, S.Nagaoka and K.Kimura
Chem. Phys. Lett. **167** (1990) 334.

24)"Ionic Fragmentation Processes in Organometallic Molecules of Group II-V Elements Following (n-1)d Core Photoionization"
S.Nagaoka, S.Suzuki, U.Nagashima, T.Imamura and I.Koyano
J. Phys. Chem. **94** (1990) 2283.

25)"Super-Polished silicon Carbide Mirror for High-Power Operation of Excimer Lasers in a Vacuum Ultraviolet Spectral Range"
K.Kurosawa, W.Sasaki, M.Okuda, Y.Takigawa, K.Yoshida, E.Fujiwara and Y.Kato
Rev. Sci. Instrum. **61** (1990) 728.

26)"Si-O Bond Breaking in SiO_2 by Vacuum Ultraviolet Laser Radiation"
Y.Takigawa, K.Kurosawa, W.Sasaki, K.Yoshida, E.Fujiwara and Y.Kato
J. Non-Crystal. Solids **116** (1990) 293.

27)"Photoexcitation of $M(CH_3)_2$ (M=Zn, Cd, Hg) compounds in the 106-270 nm region"
T.Ibuki, A.Hiraya and K.Shobatake
J. Chem. Phys. **92** (1990) 2797.

28)"Ultraviolet Photoemission Study of Oligothiophenes: π-Band Evolution and Geometries"
H.Fujimoto, U.Nagashima, H.Inokuchi, K.Seki, Y.Cao, H.Nakahara, J.Nakayama, M.Hoshino and K.Fukuda
J. Chem. Phys. **92** (1990) 4077.

29)"Vacuum Ultraviolet Photochemistry of $CHFCl_2$ and $CHFBr_2$. Absorption Spectra and CHF($\tilde{A}$ ^{1}A") Radical Formation"
T.Ibuki, A.Hiraya, K.Shobatake, Y.Matsumi and M.Kawasaki
J. Chem. Phys. **92** (1990) 4277.

30)"Negative-ion Mass Spectrometric Study of Ion Pair Formation in the Vacuum Ultraviolet. I. $N_2O \rightarrow O^- + N_2^+$"

K.Mitsuke, S.Suzuki, T.Imamura and I.Koyano

J. Chem. Phys. **92** (1990) 6556.

31)"Negative-ion Mass Spectrometric Study of Ion-Pair Formation in the Vacuum Ultraviolet. II. $OCS \rightarrow S^- + CO^+$, $O^- + CS^+$ and $CO_2 \rightarrow O^- + CO^+$

k.Mitsuke, S.Suzuki, T.Imamura and I.Koyano

J. Chem. Phys. **93** (1990) 1710.

32)"Visible and UV Spectra of a Polydiacetylene with a Side Group Conjugated to the Main Chain"

K.Ichimura, T.Kobayashi, H.Matsuda, H.Nakanishi and M.Kato

J. Chem. Phys. **98** (1990) 5510.

33)"A New Type of Luminescence Mechanism in Large Band-Gap Insulators: Proposal for Fast Scintillation Materials"

S.Kubota, J.Ruan(Gen), M.Itoh, S.Hashimoto and S.Sakuragi

Nucl. Instrum. Methods Phys. Res. A **289** (1990) 253.

34)"Far-Infrared Absorption in Nickel and Copper Microcrystals"

S.Mochizuki, K.Ishi and A.Johgo

Phys. Stat. Sol. (b) **157** (1990) K137.

35)"Suppression of Increase in Impurity in Single-Bunch Mode for the UVSOR Storage Ring"

M.Tobiyama, T.Kasuga, H.Yonehara, M.Hasumoto, T.Kinoshita, O.Matsudo, K.Nakamura, K.Sakai and J.Yamazaki

Jpn. J. Appl. Phys. **29** (1990) 210.

36)"Optical and Mechanical Properties of Hard Hydrogenated Amorphous Carbon Films Deposited by Plasma CVD"

H.Yokoyama, M.Okamoto, T.Yamasaki, K.Takahiro, Y.Osaka and T.Imura

Jpn. J. Appl. Phys. **29** (1990) 2815.

37)"Synchrotron Radiation-Excited Etching of SiO_2 with SF_6 at 143 and 251 Å Using Undulator Radiation"

K.Shobatake, H.Ohashi, K.Fukui, A.Hiraya, N.Hayasaka, H.Okano, A.Yoshida, and H.Kume

Appl. Phys. Lett. **56** (1990) 2189.

38)"New Aspects of Intrinsic Luminescence in Alkali Halides"

K.Kan'no, K.Tanaka and T.Hayashi

Rev. Solid State Sci. **4** (1990) 383.

39)"Auger-Free Luminescence Under Core Level Excitation of Ionic Crystals"

M.Itoh, S.Kubota, J.Ruan(Gen) and S.Hashimoto

Rev. Solid State Sci. **4** (1990) 467.

40)"Photo-Induced Production of CN^--Ions on the Crystal Surface of KCl"

H.Nakagawa, M.Fujita, T.Miyanaga, H.Matsumoto, K.Fukui and M.Watanabe

Rev. Solid State Sci. **4** (1990) 741.

41)"Time-of-Flight Measurement of Desorbed Particles from Solid Rare Gases Using Synchrotron Radiation"

M.Sakutai, T.Hirayama and I.Arakawa

Vacuum **41** (1990) 217.

42)"Characterization of Multilayer Reflectors for the Soft X-Ray Region Using Synchrotron Radiation"

M.Sakurai, J.Fujita, K.Yamashita, M.Ohtani, I.Hatsukade, K.Tamura, H.Nagata, Y.Suzuki and S.Seki

Vacuum **41** (1990) 1234.

43)"Photon Stimulated Desorption of Excited Neutrals from the Surface of Solid Ar"

I.Arakawa and M.Sakurai

Desorption Induced by Electronic Transitions DIET IV (Springer-Verlag Berlin, Heidelberg, 1990) p. 246.

44)"Surface Alterations of SiO_2 optics by 9.8 and 8.5 eV Laser Photons"

Y.Takigawa, K.Kurosawa, W.Sasaki, M.Okuda, K.Yoshida, E.Fujiwara, Y.Kato and Y.Inoue

J. Non-Crystalline Solids **125** (1990) 107.

45)"Time- and Spacial-Resolved Luminescence Spectroscopy of Muscle Fibers Using Synchotron Radiation from UVSOR"

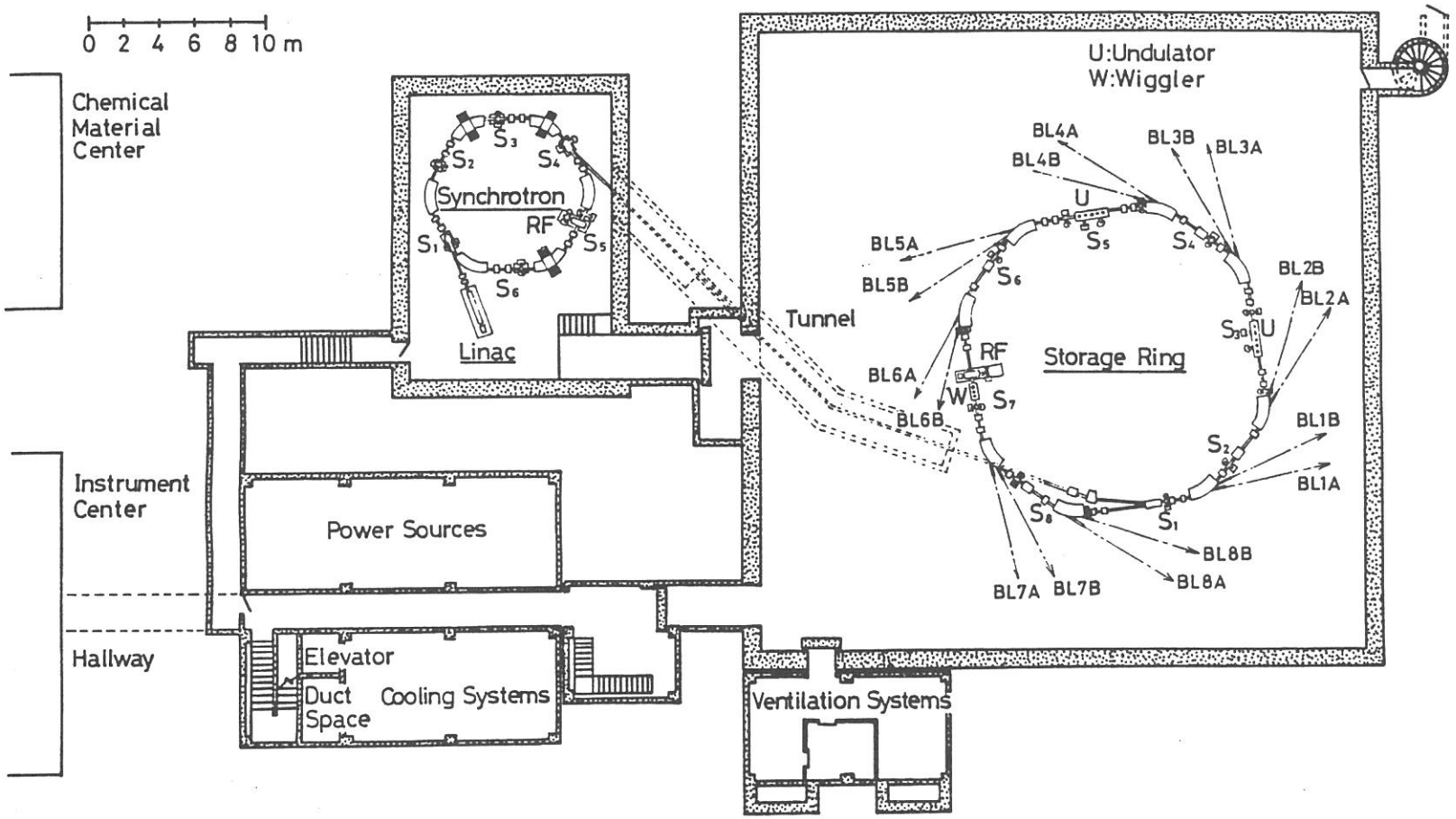
M.Taniguchi, S.Toyonaga, N.Watanabe and K.Osada

2nd Europ. Conf. Prog. in X-Ray Synchrotron Radiation Research **25** (1990) 999.

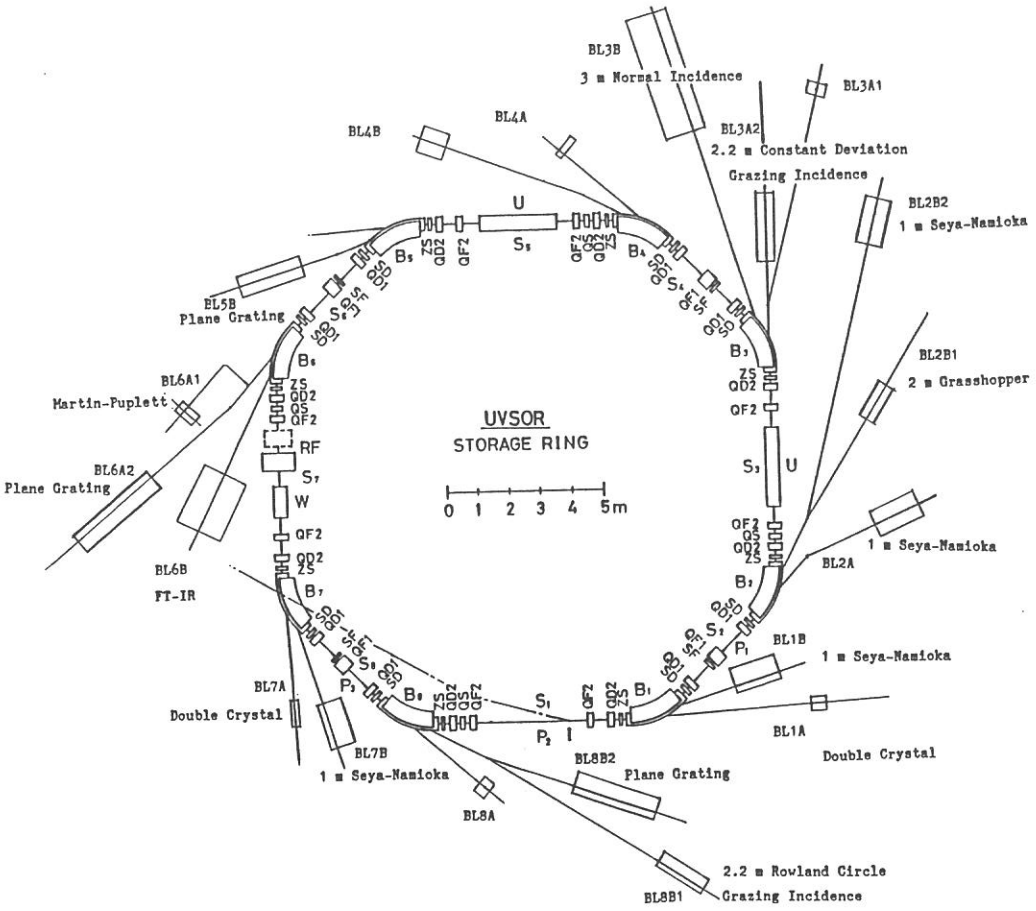
46)"Growth of SiO_2 Thin Film by Photo-CVD Using Synchrotron Orbital Radiation"

M.Okuyama, M.Nakamura and Y.Hamakawa

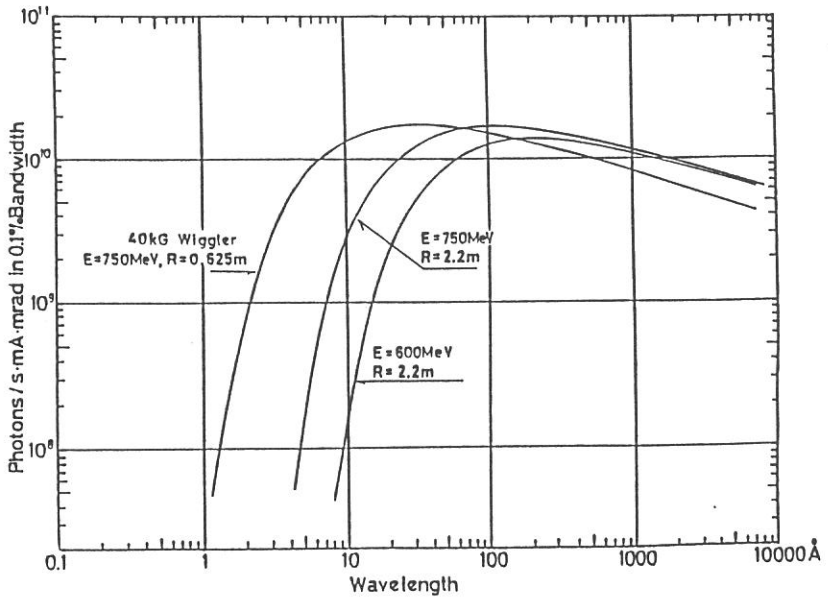
Solid-State Electronics **33** (1990) 149.



Plan view of the basement of the UVSOR Facility.



The UVSOR storage ring and the beam lines.



Intensity distribution of the UVSOR radiation.

Table I. Main Parameters of the UVSOR Accelerator Complex

Linac	
Energy	$E = 15$ MeV
Frequency	$f_{RF} = 2.856$ GHz
Synchrotron	
Energy	$E = 600$ MeV
Beam Current	$I = 32$ mA
Circumference	$C = 26.6$ m
Superperiodicity	$N_{superperiodicity} = 6$
Bending Radius	$\rho = 1.8$ m
Harmonic Number	$h = 8$
RF Frequency	$f_{RF} = 90.115$ MHz
Repetition Rate	$f_{rep} = 2.6$ Hz
Storage Ring	
Energy	E=750 MeV
Critical Energy of SR	$\varepsilon_c = 425$ eV
Beam Current (Nominal)	
Multi-Bunch	$I = 200$ mA
Single-Bunch	$I = 60 \sim 70$ mA
Beam Lifetime	$\tau = 180$ min.at I=200mA
Circumference	$C = 53.2$ m
Superperiodicity	$N_{superperiodicity} = 4$
Bending Radius	$\rho = 2.2$ m
Betatron Wave numbers	
Horizontal	$Q_x = 3.19$
Vertical	$Q_y = 2.22$
Momentum Compaction Factor	$\alpha = 0.032$
RF Frequency	$f_{RF} = 90.115$ MHz
RF Voltage	$V_{RF} = 50$ kV
Natural Emittance	
Horizontal	$\varepsilon_x = 1.15 \times 10^{-7}$ π m rad
Vertical[a)]	$\varepsilon_y = 1.15 \times 10^{-8}$ π m rad
Beam Sizes	
Horizontal	$\sigma_x = 0.39$ mm
Vertical[a)]	$\sigma_y = 0.27$ mm
Bunch Length	$\sigma_l = 170$ psec

a) 10 % coupling is assumed.

Table 2. Beam Lines at UVSOR

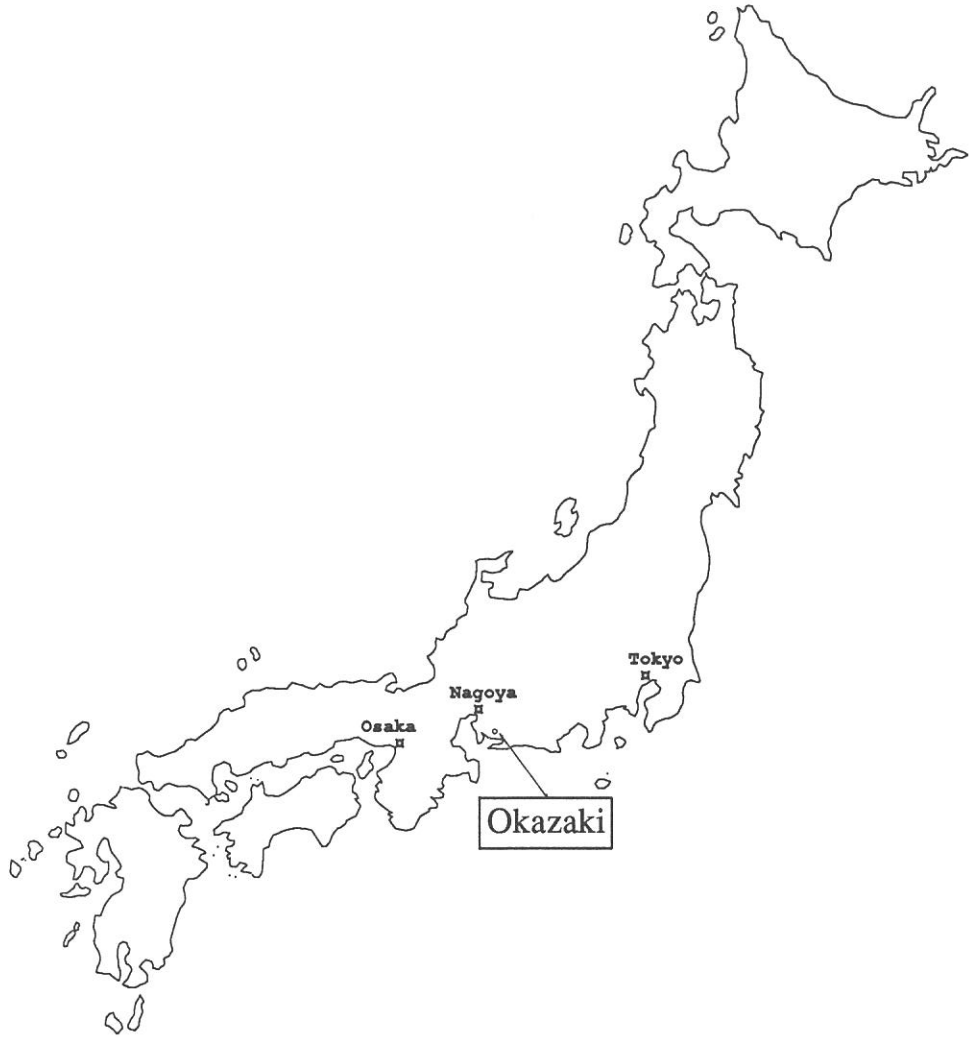
Beam Line	Monochromator, Spectrometer	Wavelength Region	Acceptance Angle(mrad)		Experiment
			Horiz.	Vert.	
BL1A	Double Crystal	15 - 8 Å	4	1	Solid
BL1B	1m Seya-Namioka	6500 - 300 Å	60	6	Gas &Solid
BL2A	1m Seya-Namioka	4000 - 300 Å	40	6	Gas
BL2B1	2m Grasshopper	600 - 15 Å	10	1.7	Gas & Solid
BL2B2	1m Seya-Namioka	2000 - 300 Å	20	6	Gas
BL3A1	None (Filter, Mirror)		(U) 0.3	0.3	Gas & Solid
BL3A2	2.2m Constant Deviation	1000 - 100 Å	10	4	Gas & Solid
	Grazing Incidence		(U) 0.3	0.3	
BL4A	None		6	6	Irradiation
BL4B	None		8.3	6	Irradiation
BL3B	3m Normal Incidence	4000 - 300 Å	20	6	Gas
BL5B	Plane Grating	2000 - 20 Å	10	2.2	Calibration[#]
BL6A1	Martin-Pupplet	5 mm - 50 μm	80	60	Solid
BL6A2	Plane Grating	6500 - 80 Å	10	6	Solid
BL6B	FT-IR	200 - 1.7 μm	70	25	Solid
BL7A	Double Crystal	15 - 8 Å	2	0.3	Solid
		15 - 2 Å	(W) 1	0.15	Solid
BL7B	1 m Seya-Namioka	6500 - 300 Å	40	8	Gas & Solid
BL8A	None (Filter)		25	8	Irradiation, User's Instrm.
BL8B1	2.2 m Rowland Circle Grazing Incidence	440 - 20 Å	10	2	Gas & Solid
BL8B2	Plane Grating	6500 - 80 Å	10	6	Solid

[#] National Institute for Fusion Science

U: with an undulator, W: with a wiggler

LOCATION

Ultraviolet Synchrotron Orbital Radiation (UVSOR) Facility, Institute for Molecular Science (IMS) is located at Okazaki. Okazaki (population 300,000) is 260 km southwest of Tokyo, and can be reached by train in about 3 hours from Tokyo via New Tokaido Line (Shinkansen) and Meitetsu Line.



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