Eighteenth International Conference on Infrared and Millimeter Waves

6-10 September 1993

FINAL PROGRAM

MON AM	OPENING CEREMONY, PRIZE GIVING AND PLENARY LECTURE 1: M.F. KIMMITT			
	FEL I	DETECTORS AND SOURCES I	GAS LASERS I	SPECTROSCOPY I
MON PM	FEL II	DETECTORS AND SOURCES II	GAS LASERS II	SPECTROSCOPY II
TUES AM	PLENARY LECTURE 2: H.P. GUSH, E.H. WISHNOW AND M. HALPERN			
	WINDOWS FOR HIGH POWER APPLICATIONS	DETECTORS AND SOURCES III	SCATTERING	SPECTROSCOPY III
TUES PM	PLASMA DIAGNOSTICS	DETECTORS AND SOURCES IV	WAVEGUIDES I	SPECTROSCOPY IV
WED AM	PLENARY LECTURE 3: M. THUMM			
	GYROTRON I	QUASI-OPTICAL COMPONENTS I	WAVEGUIDES II	BIOLOGICAL EFFECTS
WED PM	GYROTRON II	QUASI-OPTICAL COMPONENTS II	INSTRUMENTATION I	POST DEADLINE
THURS AM	PLENARY LECTURE 4: D.R. TILLEY			
	GYROTRON III	QUASI-OPTICAL COMPONENTS III	INSTRUMENTATION II	SPECTROSCOPY V
THURS PM	GYROTRON IV	QUASI-OPTICAL COMPONENTS IV	INSTRUMENTATION III	SPECTROSCOPY VI
FRI AM	PLENARY LECTURES 5 & 6: G.E. PECKHAM AND R.A. SUTTIE: B.J. KERRIDGE			
	GYROTRON V	ASTRONOMICAL AND ATMOSPHERIC SYSTEMS JOINT SESSION		SPECTROSCOPY VII

The program listed in this Digest is the final conference program. A number of changes have been made from the preliminary program. Please disregard the preliminary program and use only the program given here.

Morning sessions begin at 0830 hours. Afternoon sessions begin at 1400 hours.

On Monday morning there will be a short opening ceremony at 0830 hours, followed by the presentation of the Kenneth J Button Prize to Professor Jun-ichi Nishizawa. The plenary lecture by Dr M F Kimmitt will then be given. On the other four days the plenary lectures will begin at 0830 hours.

Apart from Monday, Plenary Lectures are allotted 1 hour: 50 minutes for presentation and 10 minutes for questions. *Invited Keynote* papers are allotted 30 minutes: 25 minutes for presentation and 5 minutes for questions. Contributed papers are allotted 15 minutes: 12 minutes for presentation and 3 minutes for questions.

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CONFERENCE ORGANISATION:

This Program has been organised through the efforts of the following individuals:

General Chairman: Kenneth J Button
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Program Chairman: James R Birch
Technical Exhibit: Thomas Dumelow
Digest Editors: James R Birch and Terence J Parker
Proceedings (Journal) Editor: Kenneth J Button

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T Dumelow (Essex)
M F Kimmitt (Essex)
S R P Smith (Essex)
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Liquan He, Southeast University, Nanjing

FOREWARD

The Eighteenth International Conference on Infrared and Millimeter Waves is held from September 6th to September 10th, 1993, at the University of Essex in Colchester, UK. The scope of the Conference covers progress in all areas of infrared and millimeter wave science and technology, and the large number of contributions (more than 300) received from more than 25 countries demonstrates the importance of the field and the need for the Conference.

The Local Organising Committee and the Program Committee would like to take this opportunity to thank all authors whose high quality work has contributed to the success of this Conference.

The organisation of the Conference would not have been possible without the generous sponsorship of the following organisations:

SPIE - The International Society for Optical Engineering

The University of Essex

The Association of British Spectroscopists

European Office of the United States Army

United States Air Force European Office of Aerospace Research and Development

QMC Instruments Ltd

The Optical Group of the Institute of Physics

The generous support of commercial organisations and other institutions which have provided financial support is also gratefully acknowledged, and the names of these organisations are listed elsewhere in the Digest.

We also wish to thank the University of Essex for providing the infrastructure and facilities which were essential for organising this conference.

T J Parker
Chairman of the Local Organising Committee

TECHNICAL EXHIBIT

The Technical Exhibit will be held in Room LTB 4 which is on the Ground Floor of the Lecture Theatre Block to the right of the Foyer. The Technical Exhibit will be held for two full days (Tuesday, September 7th, and Wednesday, September 8th).

We wish to express our thanks to the companies and organisations listed below which have expressed their interest in taking part at the time of going to press.

Thomas Dumelow
Technical Exhibit Manager.

A B Millimetre, Paris, France

Bruker Spectrospin Ltd, Coventry, UK

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CONFERENCE PUBLICATIONS

Conference Digest

The Conference Digest for the Eigteenth International Conference again attests to the strength of the field of infrared and millimeter waves.

The Digest is a convenient, timely reference in the field of infrared and millimeter waves. Copies of the Digest may be purchased from SPIE at the address given on the title page. Papers in the Digest may be referred to in journal articles by citing the SPIE Volume Number. Many libraries throughout the world acquire SPIE publications for their collections. For this reason a paper contributed to the Digest represents an important research contribution.

The Digest Editors would especially like to thank Mrs Barbara Hopkins and Mr G D King for their valuable assistance during the preparation of this Digest.

The Proceedings.

Conference delegates are encouraged to submit a full length manuscript for publication in the monthly journal "International Journal of Infrared and Millimeter Waves". Papers published in this journal by conference delegates constitute the proceedings of the conference.

Authors must prepare final manuscripts on camera-ready templates (available from K J Button) to save time and expense. There is no page charge and there is no limit on the length of your manuscript. Your manuscript will be published in about eight weeks (no deadline). Manuscripts may be sent to K J Button at the address below at any time, before or after the Conference. Those who cannot attend the Conference this year are urged to send their manuscript for publication in the Proceedings anyway. We may miss seeing you, but we do not want to miss the chance of learning about your work.

Please send your manuscripts to:

Kenneth J Button
Box 372455
Satellite Beach
Florida 32937-0455
USA

Fax: (407) 777 7293

Nineteenth International Conference on Infrared and Millimeter Waves.

The next conference in this series, the Nineteenth International Conference on Infrared and Millimeter Waves, will be held in Sendai, Japan, from October 17th to 21st, 1994. Professor Jun-ichi Nishizawa of Tohoku University will be the conference chairman. His address is:

Professor Jun-ichi Nishizawa
Research Institute of Electrical Communication
Tohoku University
2-1-1 Katahira
Aoba-ku
Sendai 980
Japan

Kenneth J Button Prize

On the occasion of the 15th International Conference on Infrared and Millimeter Waves a prize was initiated by the Program Council "to be awarded for outstanding contributions to the field of infrared and millimeter waves". It was later agreed, following a suggestion by the chairman of the 1991 conference, to formally name the prize the "Kenneth J Button Prize" in recognition of Professor Kenneth J Button's outstanding contributions to the Infrared and Millimeter Wave Community, both as a scientist and as the initiator and driving force of this series of conferences.

The 1993 prize committee consists of:

K J Button, Satellite Beach, Florida, USA
M von Ortenberg, Humboldt University of Berlin, Berlin, Germany
D H Martin, Queen Mary and Westfield College, London, UK
T J Parker, University of Essex, Colchester, UK
J R Birch, National Physical Laboratory, Teddington, UK
R J Temkin, MIT, Cambridge, Mass, USA
J C Wiltse, Georgia Tech Research Institute, USA
K Mizuno, Tohoku University, Sendai, Japan
K Sakai, Kobe, Japan

The 1993 Kenneth J Button Prize is awarded to Professor Jun-ichi Nishizawa, Tohoku University, Sendai, Japan.

Please note that the Prize will be presented at the opening ceremony on Monday, September 6, 1993, and not as previously announced.

T J Parker
Chairman, 1993 Kenneth J Button Prize Committee.

Kenneth J Button Prize

awarded to

Professor Jun-ichi Nishizawa

The Kenneth J Button Prize for 1993 is awarded to Professor Jun-ichi Nishizawa for outstanding contributions to the field of Infrared and Millimeter Waves. Professor Nishizawa has made major contributions throughout his career, not only by achieving a truly formidable range of outstanding scientific results, but also by stimulating the activity of our community through the organisation of international conferences.

During his career Professor Nishizawa has been credited with many notable inventions. These have included: p-i-n diodes and p-n-i-p (n-p-i-n) transistors in co-operation with p-i-n photo diodes (1950), ion implantation (1950), avalanche photo diodes (1952), semiconductor injection lasers (1957), solid state focusing optical fibres (1964), and the transit time effect negative-resistance diode (1954), including the use of avalanche and tunnel injection (1958), hyper abrupt variable capacitance diodes (1959), semiconductor inductance (1957), the static inductance transistor (SIT) (1950, 1971), etc.. He is currently carrying out research specialising in the development of static induction transistors (to operate at higher frequencies and higher power), the high speed thyristor, the high speed low power dissipation integrated circuit and a growth technique for III-V compound semiconductors. The latter involves a temperature difference method under controlled vapour pressure (TDM-CVP) which gives rise to high efficiency LEDs. He is also researching long life laser diodes based on perfect silicon crystal technology obtained by lattice constant compensation. Professor Nishizawa also originated electro-epitaxy (1955) and photo-epitaxy (1961). He discovered the avalanche effect in semiconductors and explained the backward character of the p-n junction by this effect (1953).

Presentation of the Prize.

The Prize will be presented at the opening ceremony which begins at 08.30 on Monday, September 6, 1993. Please note that this is not as previously announced.

NPL
National Physical Laboratory

MEASUREMENT SERVICES AND RESEARCH FACILITIES AT NEAR-MILLIMETRE AND INFRARED WAVELENGTHS

The National Physical Laboratory is the United Kingdom's centre for measurement standards. In recent years the Division of Electrical Science of NPL has pioneered many measurement techniques and applications at wavelengths from several millimetres to those of the thermal infrared.

It can make available its measurement services, research facilities and general consultancy in this spectral region. The research programme of the Division includes:

- spectroscopic techniques for the characterisation of the optical and dielectric properties of materials, components and devices at temperatures from 4.2 to 1300 K
- radiometric techniques for emissivity studies
- spectroscopic techniques for the determination of hemispherical transmittance and reflectance
- power, frequency and spectral calibrations
- development of thin film NbN and YBCO Josephson junctions as high harmonic mixers, and of other devices for superconducting electronics

Facilities include:

- a range of Fourier transform spectrometers
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We can supply thin superconducting films of Nb, NbN and YBCO on various substrates.

If you have a measurement, calibration or application problem, please contact J.R.Birch at the conference or at:

Division of Electrical Science, National Physical Laboratory
Teddington, Middlesex TW11 0LW, UK
Tel: 081 943 6784 Fax: 081 943 6098

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SESSION P

PLENARY LECTURES

P.1	SUBMILLIMETRE WAVES - THE EARLY YEARS - M.F. Kimmitt, Department of Physics, University of Essex, Colchester CO4 3SQ, U.K.
P.2	ROCKET MEASUREMENT OF THE SUBMILLIMETER COSMIC BACKGROUND SPECTRUM - H.P. Gush, E.H. Wishnow and M. Halpern, Department of Physics, U.B.C. Vancouver, B.C. Canada, V6T1Z1.
P.3	PROGRESS IN DEVELOPMENT OF HIGH POWER GYROTRONS - M. Thumm*, Kernforschungszentrum Karlsruhe, Institut für Technische Physik, *also Universität Karlsruhe, Institut für Höchstfrequenztechnik und Electronik, D-7500 Karlsruhe 1, Germany.
P.4	FAR INFRARED SPECTROSCOPY OF MANUFACTURED SOLIDS - D.R. Tilley, Department of Physics, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, U.K.
P.5	CRITICAL TECHNOLOGIES FOR ATMOSPHERIC COMPOSITION MEASUREMENTS BY MICROWAVE LIMB SOUNDING - G.E. Peckham and R.A. Suttie, Heriot-Watt University, Edinburgh, Scotland.
P.6	POTENTIAL OF MILLIMETRE/SUB-MILLIMETRE HETERODYNE INSTRUMENTS TO SOUND ATMOSPHERIC COMPOSITION - B.J. Kerridge, Rutherford Appleton Laboratory, Chiltern, Didcot, Oxon, OX11 OQX, UK.

SESSION M1

Monday AM | **FEL - I** | September 6

M1.1 THE ENEA COMPACT MILLIMETRE WAVE FEL (*Invited Keynote*) - A.Doria, G.P.Gallerano, E.Giovenale, M.F.Kimmitt, G.Messina and A.Renieri. ENEA, Area INN, Dipartimento Sviluppo Tecnologie di Punta, P.O. Box 65, 00044 Frascati, (Rome) Italy.

M1.2 STATUS OF THE DESIGN OF THE 200 GHz FOM-FUSION-FEM - A.G.A.Verhoeven, W.A.Bongers, B.S.Q.Elzendoorn, A.M.van Ingen, P.Manintveld, A. Tulupov, M.J. van der Wiel and W.H. Urbanus, FOM-Instituut voor Plasmafysica, 'Rijnhuizen', Association EURATOM-FOM, P.O. Box 1207, 3430 BE Nieuwegein, The Netherlands; V.L.Bratman, G.G.Denisov, A.V. Savilov and M.Yu. Shmelyov, Institute of Applied Physics, Ulyanova Ulitsa 46, Nizhni Novgorod, Russia, H.-U.Nickel, and M.Thumm, IHE Universität Karlsruhe and ITP Kernforschungszentrum Karlsruhe, Germany; W.Kasparek, J.Pretterebner and D.Wagner, Institut fur Plasmaforschung, Stuttgart University, Germany; C. Shang and M. Caplan, Lawrence Livermore National Laboratory, Livermore, CA, U.S.A.

M1.3 A COMPACT RELATIVISTIC ELECTRON BEAM SOURCE FOR GENERATION OF FAR - INFRARED RADIATION, C.R.Jones and J.M.Dutta. North Carolina Central University, Durham, USA.

M1.4 DESIGN OF A TUNABLE 4-MW FREE ELECTRON MASER FOR HEATING FUSION PLASMAS - M.Caplan, G. Kamin, C.C.Shang and W. Lindquist, Lawrence Livermore National Laboratory, P.O. Box 808, L-637, Livermore, CA 94551, USA.

M1.5 ULTRA-SHORT PULSES OF COHERENT MILLIMETER-WAVE RADIATION FROM A PREBUNCHED FEL - G.P.LeSage, P.G. Davis, S. Fochs, F.V. Hartemann, D.B.McDermott and N.C.Luhmann Jr, Department of Electrical Engineering, University of California, Los Angeles, CA 90024, USA; S.C. Hartman, S. Park, R.S. Zhang and C.Pellegrini, Department of Physics, University of California, Los Angeles, CA 90024, USA.

M1.6 OROFEMITRON - THE NEW TYPE OF SMITH-PURCELL AMPLIFIERS.- Yuri A. Romantsov, Radio Astronomy Institute of Ukrainian Acad. of Sc., Department of Microwave Electronics, Kharkov, 310002, Ukraine.

M1.7 MICROWAVE OSCILLATOR - THE OROTRON WITH THE DC MAGNETIC NONUNIFORMITY - A.Shmat'ko and E. Odarenko, Kharkov State University, Department of Radiophysics, Freedom Square 4, 310077 Kharkov, Ukraine.

M1.8 STUDY AND DEVELOPMENT OF SUB MM RANGE VACUUM SOURCES IN THE INSTITUTE OF RADIOPHYSICS AND ELECTRONICS OF UKRAINIAN ACADEMY OF SCIENCES - V.D. Yeremka, G.Ya.Levin and A.Ya.Usikov, Inst. of Radiophysics and Electronics of Ukrainian Academy of Sciences, 12 Acad. Proskura st., Kharkov, 310085, Ukraine.

SESSION M2

Monday AM | **DETECTORS AND SOURCES - I** | September 6

M2.1 OPTIMIZATION OF FIR PHOTODETECTORS FOR BOTH LOW - AND HIGH-BACKGROUND OPERATION - S.E.Church, A.G. Murray, M.J.Griffin and P.A.R. Ade, Department of Physics, Queen Mary and Westfield College, Mile End Road, London E1 4NS, UK.

M2.2 BIB PHOTODETECTORS BASED ON ANTIMONY DOPED SILICON - G.Sirmain, S.Pasquier, C.Mény, P. Etiève*, W. Knap, P. Adet*, N. Fabre**, A. Murray***, M. Griffin*** and J. Léotin, Laboratoire de Physique des Solides, SNCMP-INSA, Complexe Scientifique de Rangueil, 31077 Toulouse-Cedex, France; *Tekelec Microwave, 91953 Les Ulis, France; **LAAS, 7 av. du Colonel Roche, 31077 Toulouse-Cedex, France; ***QMW, Mile End Road, London E1 4NS, UK.

M2.3 CHARACTERISTICS AND PERFORMANCE OF Ge:Ga FAR-INFRARED PHOTOCONDUCTORS FOR SPACE APPLICATIONS - N. Hiromoto, M.Fujiwara, T.Itabe, H. Shibai* and H. Okuda*, Communications Research Laboratory, Koganei, Tokyo 184, Japan; *Institute Space Astronaut. Sci., Sagamihara, Kanagawa 229, Japan.

M2.4 EFFECTS OF IONISING RADIATION IN Ge:Ga AND Ge:Be FAR-INFRARED PHOTOCONDUCTORS - M.C.Price, S.E.Church, M.J.Griffin and P.A.R. Ade, Department of Physics, Queen Mary and Westfield College, Mile End Road, London E1 4NS.

M2.5 THE NOISE AND OPTIMUM OPERATING TEMPERATURE OF HIGH T_C SUPERCONDUCTING INFRARED BOLOMETER - Chen Juxin, Shi Baoan, Wu Rujia, Gong Shuxing, Shanghai Inst. of Technical Physics, Shanghai 200083, PRC, Yang Caibing, Cao Xiaoneng, Institute of Electronics, Beijing 100080, PRC, Zhang Yinzi and Li lin, Institute of Physics, Beijing 100080, PRC.

M2.6 EXCITONIC DETECTORS OF INFRARED AND SUBMILLIMETER WAVES - G.K.Vlasov, D.N.Vylegzhanin and E.I.Chizhikova, Center for Program Studies, Russian Academy of Sciences, SU-117810 Moscow, Russia.

M2.7 NEW MICROWAVE DETECTOR - S.Ašmontas and A.Sužiedelis, Semiconductor Physics Institute, 2600 Vilnius, Lithuania.

M2.8 NEW HOT-CARRIER EFFECTS IN SUBMICRON STRUCTURES FOR INFRARED AND MILLIMETER WAVE RECEIVERS - V.B.Yurchenko, Kharkov Polytechnic Institute, Dept. Materials for Electronics and Solar Cells, 21 Frunze St., Kharkov 310002, Ukraine.

SESSION M3

Monday AM | **GAS LASERS - I** | September 6

M3.1 HIGH POWER TUNABLE 20 atm CO_2-LASERS AND THEIR OPFIRL APPLICATIONS (*Invited Keynote*) - W.Schatz and K.F.Renk, Institut für Angewandte Physik, Universität Regensburg, W-8400 Regensburg, Germany.

M3.2 MEASUREMENT OF POWER AND ENERGY - D.H.Martin, Department of Physics, Queen Mary and Westfield College, Mile End Road, London E1 4NS, UK.

M3.3 FAR INFRARED LASER LINES FROM CH_3OH AND ISOTOPES: A REVIEW - S.C.Zerbetto and E.C.C.Vasconcellos, Instituto de Física, "Gleb Wataghin", Depto. Electrônica Quântica, Universidade Estadual de Campinas - Cx.P.: 6165 13083.970, Campinas, SP, Brazil.

M3.4 NEW FIR LASER LINES FROM OPTICALLY PUMPED C_2H_3F, C_2H_3Cl, C_2H_3CN, $C_2H_2F_2$, C_2H_5F AND CF_2O - P.B. Davies, Yuyan Liu, Zhuan Lui*, Dept. of Chemistry, University of Cambridge, Lensfield Road, Cambridge CB2 1EW, UK; *Permanent Address: Wuhan Institute of Physics, the Chinese Academy of Sciences, Wuhan 430071, P.R. China.

M3.5 IDENTIFICATION OF SUBMILLIMETER CD2O LASER LINES - S.F.Dyubko and S.V.Syrota, Dept. of Quantum Radiophysics, Kharkov State University, Ukraine.

M3.6 A TABLE OF THE ABSORPTION STRONG LINES OF FORMIC ACID WHICH ARE COINCIDED WITH THE FIR LASERS FREQUENCIES - S.F.Dyubko and S.V.Syrota, Dept. of Quantum Radiophysics, Kharkov State University, Ukraine, 310077.

M3.7 TIME DEPENDENT SIMULATION OF OPTICALLY PUMPED FIR LASER FOR ARBITRARY POLARISATION CONFIGURATIONS - V.A.Batanov, A.O.Radkevich and A.L.Telyatnikov, Inst. of Physics and Technology, Krasikova 25A, Moscow, Russia.

M3.8 THEORETICAL RESEARCH AND DISCUSSION OF DYNAMICAL STATES OF OPTICALLY PUMPED SUBMILLIMETER LASER - Luo Liguo[1] Nie Dezhen[1], Chen Jishu[2] and Su Jinwen[3], [1]Department of Optics, Shandong University, Jinan, Shandong, 250100, P.R. China; [2]Department of Physics, Ningbo University, Ningbo, Zhejiang, 315211, P.R. China; [3]National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Academia Sinica, Shanghai, 200083, P.R. China.

M3.9 EXPERIMENTAL RESEARCH OF PULSATION AND CHAOS IN OPTICALLY PUMPED SUBMILLIMETER LASER - Luo Liguo[1], Chen Jishu[2] and Su Jinwen[3], [1]Department of Optics, Shandong University, Jinan, Shandong, 250100, P.R. China; [2]Department of Physics, Ningbo University, Ningbo, Zhejiang, 315211, P.R. China; [3]National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Academia Sinica., Shanghai, 200083, P.R. China.

SESSION M4

Monday AM | **SPECTROSCOPY - I** | September 6

M4.1 EXPERIMENTAL STUDIES WITH OPEN RESONATORS ON FREQUENCY DEPENDENT DIELECTRIC LOSS AT MM WAVELENGTHS (*Invited Keynote*) - V.V.Parshin, Applied Physics Institute, Russian Academy of Sciences, 603600, Nizhni Novgorod, Russia, R.Heidinger and G.Link, Kernforschungszentrum, D-7500 Karlsruhe 1, Germany.

M4.2 DIELECTRIC LOSS MEASUREMENTS BETWEEN 25-300 K WITH A HEMISPHERICAL FABRY-PEROT RESONATOR - R.Heidinger and G.Link, Kernforschungszentrum Karlsruhe, Association KfK-Euratom Institut für Materialforschung, Postfach 3640, D-76021 Karlsruhe, F.R.G.

M4.3 MONOCHROMATIC SUBMILLIMETER SPECTROMETRY IN STANDARDS AND MATERIAL CHARACTERISATION - R.Brazis, A.Namajunas, V.Gaidelis, L.Safonova and S.Bumeliene, Semiconductor Physics Institute, A. Gostauto 11, Vilnius 2600, Lithuania.

M4.4 PROPERTIES OF MATERIALS FOR PRACTICAL USE AT THE MM AND SUBMM WAVELENGTHS - V.V.Meriakri and E.E.Chigrai, Institute of Radioengineering and Electronics, Russian Academy of Sciences, Frjazino, Moscow region 141120, Russia.

M4.5 ON THE MEASUREMENT OF THE COMPLEX DIELECTRIC CONSTANT OF THE MEDIUM - Yu Rong and Xingguo Li, Dept. of Electronic Engineering, East China Institute of Technology, Nanjing, P.O. Code 210014, P.R. China.

M4.6 BIREFRINGENCE AND DICHROISM IN MAGNETIC FLUIDS, INDUCED BY MAGNETIC FIELD, IN FREQUENCY RANGE 36GHz-600 GHz - A.V.Semenov and E.A.Vinogradov, Submillimeter-Range Physics Laboratory, General Physics Institute, Russian Academy of Science, 117942 Moscow, Russia.

M4.7 MM-WAVE DIELECTRIC MEASUREMENTS WITH AN ELECTRIC-FIELD CROSS-CORRELATION FOURIER TRANSFORM SPECTROMETER - Ding Hanyi and Zhang Guangzhao, Electronics Dept., Zhongshan University, Guangzhou 510275, P.R. China.

M4.8 TWO-FREQUENCY QUASI-OPTICAL RADIOSPECTROMETER FOR SUBSTANCE INVESTIGATIONS - A.A.Vertiy, I.V Ivanchenko and N.A.Popenko, Institute of Radiophysics and Electronics, Academy of Sciences of the Ukraine, 310085 Kharkov, Ukraine.

M4.9 DIELECTRIC LOSSES IN GASES UNDER IONISING RADIATION - J.Mollá, A.Ibarra and E.R.Hodgson, Inst. Investigación Básica. CIEMAT, Ed. 2. Av. Complutense, 22. E-28040 Madrid, Spain.

SESSION M5

Monday PM | **FEL - II** | September 6

M5.1 SMITH PURCELL RADIATION IN THE RELATIVISTIC LIMIT (*Invited Keynote*) - J.E. Walsh, Department of Physics and Astronomy, Dartmouth College, 6127 Wilder Laboratory, Hanover, N.H. 03755-3528, USA.

M5.2 THE ANALYSIS OF ELECTROMAGNETIC WAVE AMPLIFICATION IN QUASI-OPTICAL WAVEGUIDE WITH ELECTRON BEAM (SELECTRON) - N.L.Romashin, A.I. Kleev* and V.A. Solntsev**, Institute of Radioengineering and Electronics, Russian Academy of Sciences, Marx av. 18, Moscow 103907, Russia; *P.L.Kapitza Institute for Physical Problems, Russian Academy of Sciences, ul. Kosygina 2, Moscow 117334, Russia; **MIEM, B.Vuzovsky, 3/12, Moscow 109028, Russia.

M5.3 THE INFLUENCE OF e-BEAM PHASE SPACE ON FEL PERFORMANCE - Zili Weng and Yijin Shi, Institute of Atomic Energy, P.O. Box 275(18) 102413 Beijing, P.R. China.

M5.4 NON-LINEAR THEORY OF TWO-STREAM SUPERHETERODYNE FREE ELECTRON LASERS - V.V.Kulish, S.A.Kuleshov and A.V.Lysenko. Sumy Physical-Technology Institute, 2 Rymski-Korsakov St., Sumy 244007, Ukraine.

M5.5 ENTROPYLIKE QUANTITY OF THE EQUILIBRIUM ELECTRONS IN A COLLECTIVE FREE-ELECTRON LASER - Shi-Chang Zhang, Qing-Xiang Liu and Yong Xu, Southwest Jiaotong University, Dept. of Applied Physics, Chengdu, Sichuan 610031, P.R. China.

M5.6 CHERENKOV RADIATION FROM A FINITE EMISSION LENGTH - M.Ikezawa, Institute for Scientific Measurements, Tohoku University, Sendai 980, Japan.

M5.7 OBSERVATION OF COHERENT MILLIMETER WAVE RADIATION FROM AN INTENSE ELECTRON BUNCH FOR BEAM DIAGNOSTICS - Juzo Ohkuma, Shuichi Okuda, Toichi Okada and Kiyomi Sakai*, Radiation Laboratory, The Institute of Scientific and Industrial Research, Osaka University, Mihogaoka, Ibaraki, Osaka 567, Japan; *Communications Research Laboratory, Kansai Advanced Research Center, Iwaoka, Nishiku, Kobe 651-24, Japan.

M5.8 EXPERIMENTAL INVESTIGATIONS OF AN EXTERNAL FEEDBACK SYSTEM FOR WAVELENGTH SELECTION OF HIGH POWER MICROWAVE RADIATION IN A FREE ELECTRON MASER REGIME - V.A.Bogachenkov, V.A.Papadichev, I.V.Sinilschikova and O.A.Smith, P.N.Lebedev Physical Institute, Moscow 117924, Russia.

M5.9 THE MAGNETIC FIELD PROFILE AND e-BEAM TRANSPORT IN THE DOUBLE HELIX LINEARLY POLARIZED WIGGLER - Hu Jianpin, Wang Pingshan, Hu Kesong, Chen Yutao, Southwest Institute of Applied Electronics, P.O. Box 523, No.65, Chengdu, Sichuan, P.R. China.

SESSION M6

Monday PM | **DETECTORS AND SOURCES - II** | September 6

M6.1 A SUB-MILLIMETRE WAVE SIS RECEIVER - B.N. Ellison+, S.M.X. Claude+, A. Jones+, D.N. Matheson+, L.T. Little* and S.R. Davies*, +Space Science Department, Rutherford Appleton Laboratory, Didcot, Oxon, OX11 OQX; *Electronic Engineering Laboratory, University of Kent at Canterbury, Canterbury, Kent, CT2 7NT, UK.

M6.2 HIGH SPEED HOT-ELECTRON SUPERCONDUCTING BOLOMETER - G.N.Gol'tsman and E.M.Gershenzon, Moscow State Pedagogical University, 1 M. Pirogovskaja Str., Moscow 119435, Russia.

M6.3 PICOSECOND DETECTION OF INFRARED RADIATION WITH $YBa_2Cu_3O_{7-\delta}$ THIN FILMS - M.Danerud*, M. Zorin#, M.Lindgren††, V. Trifonov#, B. Karasik#, E.M. Gershenzon#, G.N. Gol'tsman# and D. Winkler*, *Department of Physics, ††Department of Optoelectronics and Electrical Measurements, Chalmers University of Technology, S-412 96 Göteborg, Sweden; #Department of Physics, Moscow State Pedagogical University, 1 Malaya Pirogovskaja, Moscow 119435, Russia.

M6.4 NORMAL STATE $YBa_2Cu_3O_{7-}$ FILMS: A NEW FAST DETECTOR FOR FAR INFRARED LASER RADIATION - S. Zeuner, P.G. Huggard, K. Goller, H. Lengfellner and W. Prettl, Institut für Angewandte Physik, Universität Regensburg, 93040 Regensburg, Germany.

M6.5 TRANSVERSE MIR FAST RESPONSE IN PbSe FILMS - S.Marchetti and R.Simili, IFAM-CNR, via del giardino 7, 56100 Pisa, Italy.

M6.6 A MINIATURIZED BOLOMETER ARRAY FOR FIR LASER SPECTROSCOPY - P.T.Lang*, K.F.Mast*, K.F. Renk** and W. Schatz**, *MPI für Plasmaphysik, EURATOM Association, W-8046 Garching; **Institut für Angewandte Physik, Universität Regensburg, W-8400 Regensburg, Germany.

M6.7 NANOSECOND RESPONSE TIME DETECTORS FOR MILLIMETRE WAVE FELS - M.F.Kimmitt, A. Doria*, G.P. Gallerano* and E. Giovenale*, Department of Physics, University of Essex, Colchester CO4 3SQ, UK; *Dipartimento Sviluppo Tecnologie di Punta, ENEA, PO Box 65-00044, Frascati, Italy.

M6.8 PHYSICAL GROUNDS OF HIGH-SENSITIVE DETECTION OF IR RADIATION IN THE CRYSTAL AT ROOM TEMPERATURE - G.K.Vlasov, N.A.Dolgikh and E.I.Chizhikova, Center of Program Studies, Russian Academy of Sciences, SU-117810 Moscow, Russia

M6.9 PBZT INFRARED MATERIAL AND DETECTOR - Wu Ping* and Kang Lin**, *Department of Physics, Nanjing Aeronautical Institute, 210016 Nanjing, P.R. China; **Department of Information Physics, Nanjing University, 210008 Nanjing, P.R. China.

SESION M7

Monday PM | **GAS LASERS - II** | September 6

M7.1 A DUAL CHANNEL OPTICALLY PUMPED FIR LASER SYSTEM FOR PLASMA DIAGNOSTICS - B.W.Davis and R.S.Thomas, Edinburgh Instruments Ltd., Riccarton, Edinburgh, EH14 4AP, UK.

M7.2 IMPROVEMENTS OF THE CHARACTERISTICS OF A HIGH-POWER OPTICALLY-PUMPED FAR-INFRARED LASER AND ITS APPLICATION - T.Hori, N.Hiromoto and A. Yamamoto*, Communications Research Laboratory, 4-2-1 Nukui-kita, Koganei, Tokyo 184, Japan; *National Space Development Agency of Japan, 1-29-6 Hammamatsu-cho, Minato-ku, Tokyo 105, Japan.

M7.3 OPFIRL INVESTIGATION OF AMMONIA - W.Schatz and K.F.Renk, Institut für Angewandte Physik, Universität Regensburg, W-8400 Regensburg, Germany.

M7.4 SYNCHRONIZATION EFFECTS IN BROADBAND FIR RAMAN SCATTERING IN NH3 - S.Marchetti and R.Simili, IFAM-CNR, Via del giardino 7, 56100, Pisa, Italy.

M7.5 DENSITY-MATRIX MODELLING OF THREE-PHOTON 1+1+1(UV+IR+UV) RESONANCE IONIZATION OF IRON - A.L.Telyatnikov*, O.R. Jones and H.H.Telle, Physics Department, University College of Swansea, Singleton Park, Swansea SA2 8PP, Wales, UK; *Present address: Institute of Physics and Technology of Russian Academy of Sciences, Krasikova 25A, Moscow, Russia, 117218.

M7.6 TUNING AND SPECTRA FEATURES OF CONTINUOUSLY TUNABLE CH_3F RAMAN LASER - V.A.Batanov, A.O.Radkevich and A.L.Telyatnikov, Institute of Physics and Technology of Russian Academy of Sciences, Krasikova 25A, Moscow, Russia, 117218.

M7.7 NEW APPROACH FOR NUMERICAL SIMULATION OF THE NON-STEADY-STATE INFRARED LASER BEAM STRUCTURE - L.V.Yurchenko, Institute of Radiophysics and Electronics of the Academy of Sciences of Ukraine, 12 Proskura st., Kharkov 310085, Ukraine.

M7.8 OPTIMUM PUMP BEAM PROFILING IN A RAMAN LASER - V.A.Batanov, V.S.Petriv and A.O.Radkevich, Institute of Physics and Technology of the Russian Academy of Sciences, 117218 Moscow, Krasikova 25A, Russia.

M7.9 DEPOLARIZATION OF OUTPUT LASER RADIATION IN HCN LASER - Yu.Ye.Kamenev, Ye.M.Kuleshov, V.P.Radionov and A.A.Filimonova, Institute of Radiophysics and Electronics of Academy of Sciences of Ukraine, 12 Acad. Proscura st., Kharkov 310085, Ukraine.

SESSION M8

Monday PM — **SPECTROSCOPY - II** — September 6

M8.1 FAR INFRARED REFLECTANCE STANDARDS (*Invited Keynote*) - E.A.Nicol and J.R.Birch, National Physical Laboratory, Teddington, Middlesex TW11 OLW, UK.

M8.2 MODELLING OF INTRINSIC MM-WAVE ABSORPTION IN LOW LOSS DIELECTRICS WITH COMPLEX CRYSTAL STRUCTURE - G.Link and R.Heidinger, Kernforschungszentrum Karlsruhe, Association KfK-Euratom Institut für Materialforschung, Postfach 3640, Karlsruhe, F.R.G.

M8.3 TEMPERATURE DEPENDENCE OF THE OPTICAL CONSTANTS OF POLYETHYLENE IN THE REGION OF THE 73 CM^{-1} LATTICE MODE - J.R.Birch and Kong Fan Ping, NPL, Teddington, Middlesex, TW11 OLW, UK.

M8.4 DIRECT DETERMINATION OF THE FAR INFRARED COMPLEX REFRACTIVE INDEX OF InAs AT 300 AND 100 K - A.K.Wan Abdullah, School of Physics, Universiti Sains Malaysia, Malaysia, T.J.Parker, Univ. of Essex, Colchester CO4 3SQ, UK, and C.Patel, Department of Nuclear Physics, Univ. of Oxford, OX1 3RH, UK.

M8.5 A VARIABLE TEMPERATURE DISPERSIVE FOURIER TRANSFORM SPECTROMETER FOR COMPLEX REFLECTION MEASUREMENTS ON OPAQUE SOLIDS - J.R.Birch and P.G.Quincey, NPL, Teddington, Middlesex, TW11 OLW, UK.

M8.6 REFRACTOMETRY OF OIL PRODUCTS IN MILLIMETER AND SUBMILLIMETER RANGE - A.B.Latyshev, D.A.Loukianov and A.V.Semenov, General Physics Institute, Russian Academy of Science, 117942, Moscow, Russia.

M8.7 CHARACTERIZATION OF MATERIALS BY SUBMILLIMETER MULTIBEAM TECHNIQUES - B.P.Gorshunov, G.Gruner, I.V.Fedorov, G.V.Kozlov, I.I. Tkachev and A.A.Volkov, General Physics Institute, Russian Academy of Science, 38 Vavilov str., 11792 Moscow, Russia; B. Holzapfel, G. Saemann-Ischenko, Institute of Physics, University of Erlangen, Erwin-Rommel Strasse, D-8520 Erlangen, Germany.

M8.8 CHARACTERISATION OF MICROWAVE CERAMICS AT SUBMILLIMETRE WAVES - I.V.Fedorov, G.A.Komandin, G.V.Kozlov and A.A. Volkov, General Physics Institute, Russian Academy of Sciences, 38 Vavilov str., 117942 Moscow, Russia; E.A.Nenasheva, "Gyricond" Research Institute, St. Petersburg, Russia and J.Petzelt, Institute of Physics, Na Slovance 2, Prague, Czechia.

M8.9 INFRARED SPECTRA OF WOOL FIBERS γ-IRRADIATED IN MIXTURES OF SOLVENTS - S.M.Rabie, M.A.Moharram* and O.M.Mahmoud*, Middle Eastern Regional Radioisotope Center for the Arab Countries, Cairo, Egypt; *National Research Centre, Cairo, Egypt.

SESSION Tu 1

Tuesday AM | **WINDOWS** | September 7

Tu1.1 DEVELOPMENT OF BROADBAND VACUUM WINDOWS FOR HIGH-POWER MILLIMETER WAVE SYSTEMS - H.-U.Nickel*, H.Massler and M.Thumm*, Universität Karlsruhe, Institut für Höchstfrequenztechnik und Elektronik, Kaiserstraβe 12, D-76131 Karlsruhe, Germany, also *Kernforschungszentrum Karlsruhe, Institute für Technische Physik, P.O. Box 3640, D-76021 Karlsruhe, Germany.

Tu1.2 THE OPTICAL CONSTANTS, AT ELEVATED TEMPERATURES, OF SOME POTENTIAL WINDOW MATERIALS FOR HIGH POWER AND PLASMA DIAGNOSTIC APPLICATIONS.- J.R.Birch, E.A.Nicol, T.P.Hughes* and D.V.Bartlett*, Division of Electrical Science, National Physical Laboratory, Teddington, Middlesex TW11 OLW, U.K.; *JET Joint Undertaking, Abingdon, Oxon OX14 3EA, UK.

Tu1.3 ANTI-REFLECTION TREATMENTS FOR JET MILLIMETRE WAVE DIAGNOSTIC WINDOWS.- T.P.Hughes, S.D.Richards and D.V. Bartlett, JET Joint Undertaking, Abingdon, Oxon OX14 3EA, UK.

Tu1.4 ELECTRICAL ANALYSIS OF WIDEBAND AND DISTRIBUTED WINDOWS USING TIME-DEPENDENT FIELD CODES - C.C.Shang and M.Caplan, University of California, Lawrence Livermore National Laboratory, Livermore, CA 94551, USA; H.-U. Nickel and M.Thumm, IHE Universität Karlsruhe and ITP Kernforschungszentrum Karlsruhe, Germany.

Tu1.5 ON THE USE OF A HYBRID MODE MIXTURE FOR LOWERING THE THERMAL LOAD PEAK IN CERAMIC WINDOWS FOR MM-WAVE ECRH EXPERIMENTS - F.Billè*, S. Cirant**, L.Manià*, G. Solari** and G.Viciguerra*; *DEEI - Universita di Trieste, Via A. Valerio 10, 34127, Trieste, Italy; **Istituto di Fisica del Plasma - Assoc. EURATOM-ENEA-CNR, Via Bassini 15-20133 Milano, Italy.

Tu1.6 EFFECT OF WINDOW TOLERANCES ON GYROTRON PERFORMANCE - J.Jelonnek and K.Schünemann. Technische Universität Hamburg-Harburg, Germany.

Tu1.7 INCREASE OF GYROTRON WINDOW CARRYING CAPACITY BASED ON OPTIMIZATION OF OUTPUT WAVEBEAM STRUCTURE - V.I.Belousov, G.G.Denisov, V.I.Malygin, D.V.Vinogradov, V.E.Zapevalov and S.A.Malygin*, Institute of Applied Physics, Nizhny Novgorod, Russia; *R&D Institute "Salut", Nizhny Novgorod, Russia.

Tu1.8 NEW WINDOW MATERIALS FOR HIGH POWER GYROTRON - M.N. Afsar and Hua Chi, Department of Electrical Engineering, Tufts University, Medford, Massachusetts 02155 - 5528, U.S.A.

Tu1.9 RADIATION INDUCED REDUCTION OF SILICON LOSS TANGENT - A. Ibarra, J. Mollá and E.R. Hodgson, Inst. Investigación Básica, CIEMAT, Ed. 2. Av. Complutense, 22, E-28040 Madrid, Spain.

SESSION Tu 2

Tuesday AM	DETECTORS AND SOURCES - III	September 7

Tu2.1 ULTRALOW BACKGROUND RADIATION FAR INFRARED SPECTROSCOPY BASED ON THE MAGNETICALLY TUNABLE SELECTIVE SOURCES, FILTERS AND DETECTORS (*Invited Keynote*) - W.Knap, D.Dur, C.Chaubet and A.Raymond, Groupe d'Etude des Semiconducteurs, Université Montpellier II (CNRS - URA 357), Place E. Bataillon, 34095 Montpellier Cedex 05, France.

Tu2.2 THE FAR INFRARED p-Ge LASER: TRANSITION IDENTIFICATION AND EVIDENCE FOR STREAMING MOTION - C.R.Pidgeon and B.Murdin, Department of Physics, Heriot-Watt University, Riccarton, Currie, Edinburgh, UK; C.Kremser, K.Unterrainer and E.Gornik, Institut fur Festkorperelectronik, Technische Universitat Wien, A-1040, Austria.

Tu2.3 MODE STRUCTURE AND WAVELENGTH TUNABILITY OF THE p-Ge FAR-INFRARED HOT HOLE LASER - A.V.Muravjov, S.G.Pavlov, V.N.Shastin, Institute of Applied Physics, Russian Academy of Science, Nizhny Novgorod 603600, Russia; E.Bründermann, M.F.Kimmitt* and H.P.Röser, Max-Planck-Institut für Radioastronomie, D-W-5300 Bonn 1, Germany; *Permanent address: University of Essex, Colchester, CO4 3SQ, UK.

Tu2.4 FAR INFRARED RADIATION (FIR) SOURCES BASED ON IMPURITY EMISSION FROM SELECTIVELY DOPED MULTI QUANTUM WELLS (MQW) - D.Dur, W.Knap, C.Chaubet, A.Raymond, P. Vicente, A Dubois, I. Salesse, Groupe d'Etude des Semiconducteurs, Université Montpellier II (CNRS - URA 357), Place E. Bataillon, 34095 Montpellier, Cedex 05, France; B. Etienne, L2M/CNRS, 196 av. Henri Ravera, 92220 Bagneux Cedex, France; C.R. Stanley, M.B.E. Research Group, Department of Electronics and Electrical Engineering, University of Glasgow, Glasgow G12 811, UK.

Tu2.5 DIMINUTIVE AND SUPER DIMINUTIVE SURFACE WAVE MAGNETRONS OF MM RANGE - V.D. Yeremka, G.Ya.Levin, S.N.Terechin and A.Ya.Usikov, Institute of Radiophysics and Electronics, 12 Ac. Proskura st., Kharkov 310085, Ukraine.

Tu2.6 A FAR-INFRARED ACTIVE MEDIUM BASED ON SHALLOW ACCEPTOR STATES IN SEMICONDUCTORS - V.N.Shastin, A.V.Muravjov, E.E.Orlova and S.G.Pavlov, Institute of Applied Physics, Russian Academy of Science, Nizhny Novgorod 603600, Russia.

Tu2.7 A CLASS OF MICROWAVE SYNTHESISERS AND NOISE GENERATORS FOR MICROWAVE SPECTROSCOPY - V.L.Vaks, A.N.Panin, S.J.Pripolsin, F.Neubert, U.Mau, A.V.Smorgonski, V.V.Chodos and A.O.Schulechov. Analytik & Messtechnik GmbH, Chemnitz, Austria.

Tu2.8 TUNABLE FAR INFRARED (TuFIR) SPECTROSCOPY OF TRANSIENT MOLECULES - S.R.Boardman, C.H. Bryant, P.B. Davies and T.J.Sears*, Dept. of Chemistry, University of Cambridge, Lensfield Road, Cambridge CB2 1EW, UK; *Permanent address: Brookhaven National Laboratory, Upton, N.Y., USA, S.E.R.C. Visiting Fellow.

SESSION Tu 3

Tuesday AM	SCATTERING	September 7

Tu3.1 SCATTERING OF GUIDED MODES BY SPHERE IN A QUASI-OPTICAL WAVEGUIDE OF THE CLASS OF 'HOLLOW DIELECTRIC CHANNEL' - V.K.Kiselyev and T.M.Kushta. Inst. Radiophysics and Electronics, Academy of Sciences of Ukraine, 12 Acad. Proskura str., Kharkov, Ukraine.

Tu3.2 SCATTERING OF A DIELECTRIC-SLAB WAVEGUIDE EIGENMODE FROM AN INTERNAL PENETRABLE INHOMOGENEITY - A.G.Yarovoy. Kharkov State University, Department of Radiophysics, 4 Svobody Sq., Kharkov 310077, Ukraine.

Tu3.3 RIGOROUS ANALYSIS OF 3-D DISCONTINUITY PROBLEM IN DIELECTRIC WAVEGUIDE - Xinzhang Wu and Shanjia Xu, Department of Radio and Electronics, University of Science and Technology of China, Hefei, Anhui, 230027, P.R. China.

Tu3.4 ANALYSIS OF SCATTERING OF THE OPEN RESONATOR FIELD FROM THE CAVITY-BACKED APERTURE - O.Belous, V. Veremey A.Fisun and A.Fursov. Institute of Radiophysics and Electronics Ukrainian Academy of Sciences, 12 ac. Proskura st., Kharkov, 310085, Ukraine.

Tu3.5 RESONANT FREQUENCIES AND Q-FACTORS OF A SPHERICAL CAVITY LOADED BY AN ECCENTRIC DIELECTRIC SPHERE - Li-Yang Zhang, Pin Wang and Chang-Hong Liang, Dept. of Electromagnetic Engineering, Xidian University, Shaanxi 710071, P.R. China.

Tu3.6 TM POLARIZED WAVE SCATTERING FROM DIELECTRIC CYLINDER EMBEDDED IN A STRATIFIED MEDIUM.- A.G.Yarovoy and N.P.Zhuck, Kharkov State University, Kharkov 310077, Ukraine.

Tu3.7 VARIATIONAL SOLUTION OF RESONANT CAVITY FILLED WITH ANISOTROPIC PLASMA. - Kai Liu, Wenxun Zhang and Jimin Ying, Department of Radio Engineering, Southeast University, Nanjing 210018, P.R. China.

Tu3.8 OPEN RESONATOR WITH MODE SELECTION FOR MILLIMETER- WAVE DEVICES. - O.I.Belous, A.I.Fisun, A.M.Fursov, A.A.Kirilenko and V.I.Tkachenko, Inst. of Radiophysics and Electronics Ukranian Academy of Science, 12, Acad. Proskura st., Kharkov 310085, Ukraine.

Tu3.9 QUASI-OPTICS EIGENMODES OF THE WAVEGUIDE RESONATOR - A.I.Kleev. P.L.Kapitza Institute for Physical Problems, Russian Academy of Sciences, ul. Kosygina 2, Moscow, 117334, Russia.

SESSION Tu 4

Tuesday AM | **SPECTROSCOPY - III** | September 7

Tu4.1 FIR MULTIPHOTON ABSORPTION AND PHOTON DRAG EFFECTS IN DEGENERATE VALENCE BAND SEMICONDUCTORS - S.D.Ganichev*, E.L.Ivchenko, R. Ya. Rasulov, I.D.Yaroshetskii and B.Ya. Averboukh, A.F.Ioffe Physicotechnical Institute, Russian Academy of Sciences, St.Petersburg 194021, Russia; *Present address: Uni. Regensburg, Institute für Angewandte Physik III, 93040 Regensburg.

Tu4.2 FAR INFRARED MEASUREMENTS ON BAND NONPARABOLICITIES IN DOPED MULTIPLE QUANTUM WELL STRUCTURES - S.K.Kang[1], J.P.Bryant[1], T.Dumelow[1], T.J.Parker[1], C.T. Foxon[2], J.W. Orton[3] and J.J. Harris[4]; [1]Department of Physics, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, UK; [2]Department of Physics, University of Nottingham, University Park, Nottingham NG7 2RD, UK; [3]Department of Electrical and Electronic Engineering, University of Nottingham, University Park, Nottingham NG7 2RD, UK; [4]IRC for Semiconductor Materials, Blackett Laboratory, Imperial College, Prince Consort Road, London SW7 2BZ, UK.

Tu4.3 INVESTIGATION OF THE ELECTRON DISTRIBUTION IN $Cd_xHg_{1-x}Te$ SUPERLATTICES BY FAR INFRARED AND RAMAN SPECTROSCOPY - S.K.Kang[1], T.Dumelow[1], T.J.Parker[1], R.J.York[1], S.R.P.Smith[1], S.N. Ershov[2] and M.I. Vasilevski[2]; [1]Department of Physics, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, UK; [2]Faculty of Physics, Nizhni Novgorod State University, 37 Sverdlova Street, Nizhni Novgorod 603000, Russia.

Tu4.4 THE CONTROL OF GAP WIDTH IN THE LOW-DIMENSIONAL SYSTEMS WITH CDW INSTABILITY - A.I.Dmitriev, G.V. Lashkarev and D.A.Fedorchenko, Institution on Material Problems of Academy of Sciences of Ukraine, Kiev, Ukraine.

Tu4.5 DEFECT AND CLUSTERING MODES OF HgCdMnTe CRYSTALS - Yu.I.Mazur, S.I.Kriven, S.R.Lavorik and G.G.Tarasov, Institute of Semiconductors, Academy of Sciences of Ukraine, Kiev 252028, pr. Nauki 45, Ukraine.

Tu4.6 EXCITONIC LUMINESCENCE OF $Hg_{1-x-y}Cd_xMn_yTe$ CRYSTALS. - J.W.Tomm*, Yu. I. Mazur**, S.I. Kriven**, S.R. Lavorik** and G.G. Tarasov**, *Section of Physics, Humboldt University, Berlin, Germany; **Institute of Semiconductors, Ukr. Acad. Sci., Kiev, Ukraine.

Tu4.7 MID-INFRARED ABSORPTION SPECTRA OF IRON GROUP IMPURITIES IN II-IV SEMICONDUCTORS - M.Castillo, Universidad Nacional Experimental del Táchira, Apto 436, San Cristóbal, Venezuela.

SESSION Tu 5

Tuesday PM — **PLASMA DIAGNOSTICS** — September 7

Tu5.1 DEVELOPMENT OF REFLECTOMETRY FOR PLASMA DENSITY MEASUREMENTS AT JET - A.E.Costley, JET Joint Undertaking, Abingdon, Oxon OX14 3EA, UK.

Tu5.2 AN ADVANCED RADAR TECHNIQUE FOR ELECTRON DENSITY MEASUREMENTS ON LARGE TOKAMAKS - P.Millot and H. Léveque, Centre d'Etudes et de Recherches de Toulouse (ONERA/CERT), Département d'Etudes et de Recherches en MicroOndes, 2, avenue Edouard Belin, 31400 Toulouse Cedex, France.

Tu5.3 A FOUR-CHANNEL POLARIZING INTERFEROMETER FOR ECE MEASUREMENTS ON FTU TOKAMAK - P.Buratti and M.Zerbini, Associazione EURATOM-ENEA Sulla Fusione, CRE Frascati, CP 65, i-00044 Frascati (Roma), Italy.

Tu5.4 THE RECEIVER SYSTEM OF THE FAST ION AND ALPHA PARTICLE DIAGNOSTIC AT JET - J.Fessey, J.A.Hoekzema and T.P.Hughes, JET Joint Undertaking, Abingdon, Oxon OX14 3EA, UK.

Tu5.5 A PLASMA IMAGING CAMERA WITH A FILLED, 2-DIMENSIONAL FOCAL PLANE ARRAY. - E.L.Moore, G.R.Huguenin, C.T.Hsieh, A.S.Vickery, K.R.Wood and J.E.Kapitzky, Millitech Corporation, P.O. Box 109, South Deerfield Research Park, South Deerfield, Mass. 01373, USA.

Tu5.6 SUPPRESSION OF COHERENCE EFFECTS IN THE MEASUREMENT OF MMWAVE ABSORPTION IN THE JET PLASMA - R.J.Smith, D.V.Bartlett, A.R.Harvey*, J.C.G.Lesurf* and M.Salisbury**, JET Joint Undertaking, Abingdon, Oxon OX14 3EA, UK; *University of St. Andrews, Dept. of Physics and Astronomy, St. Andrews, Scotland; **Imperial College of Science, Technology and Medicine, London, SW7 2BZ, UK.

Tu5.7 A BROADBAND QUASI-OPTICAL COLLECTION SYSTEM FOR THE JET HETERODYNE RADIOMETER.- L.Porte, D.V.Bartlett, A.Rookes* and R.J.Wylde**, JET Joint Undertaking, Abingdon, Oxon OX14 3EA, UK; * Imperial College of Science Technology and Medicine, London, UK; **Thomas Keating Ltd., Billingshurst, West Sussex, UK and Physics Dept., Queen Mary and Westfield College, London E1 4NS, UK.

Tu5.8 SUBMILLIMETER LASER INTERFEROMETER-POLARIMETER FOR PLASMA DIAGNOSTICS - Yu.E.Kamenev, V.K.Kiselev, E.M.Kuleshov, B.N.Knyaz'kov, V.K.Kononenko, P.K.Nesterov and M.S.Yanovsky, Inst. Radiophysics and Electronics, 12 Ac Proscura st., Kharkov, 310085, Ukraine.

Tu5.9 FIRST ELECTRON TEMPERATURE EDGE MEASUREMENTS ON THE ASDEX UPGRADE TOKOMAK USING A HETERODYNE RADIOMETER - N.A.Salmon, Max-Planck-Institut für Plasmaphysik, EURATOM Association, D-8046 Garching, Fed. Rep. Germany.

Tuesday PM **DETECTORS AND SOURCES - IV** September 7

Tu6.1 HOT-ELECTRON SUPERCONDUCTING MIXERS - E.M.Gershenzon and G.N.Gol'tsman. Moscow State Pedagogical University, 1 M.Pirogovskaja str., Moscow 119435, Russia.

Tu6.2 A COMBINED 3MM AND 1.3MM BANDS SIS RECEIVER FOR THE IRAM INTERFEROMETER - M.Carter, J.Blondel, A.Karpov, F. Mattiocco and B.Lazareff, IRAM, Institut de Radio Astronomy Millimetrique, St.Martin d'Heres, France.

Tu6.3 AND 270 GHZ SIS RECEIVERS DEVELOPMENT FOR ATMOSPHERIC OBSERVATION - S.Ochiai and H.Masuko, Communs. Res. Lab., Tokyo 184, Japan.

Tu6.4 PREPARATION AND MICROWAVE MEASUREMENTS OF STACKED $Nb/(Al/AlO_x/Nb)_n$ SUPERCONDUCTING TUNNEL STRUCTURES - I.P.Nevirkovets and L.P. Strizhko*, Department of Materials Science and Metallurgy, University of Cambridge, Pembroke St, Cambridge CB2 3QZ, UK; *Institute for Radio Astronomy of the Ukrainian Academy of Sciences, Krasnoznamennaja str., 4, 310002 Kharkov, Ukraine.

Tu6.5 PERFORMANCE OF AN SIS RECEIVER OVER 460 GHZ TO 640 GHZ USING SUBMICRON Nb JUNCTIONS WITH INTEGRATED RF TUNING CIRCUITS - P.Febvre*, W.R.McGrath, P.Batelaan, H.G.LeDuc, B. Bumble, M.A.Frerking and J.Hernichel**, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109, USA; *Permanent address: DEMIRM-Observatoire de Meudon, 92195 Meudon Cedex, France; **Permanent address: Universität Köln, 5000 Köln 41, Germany.

Tu6.6 HIGH QUALITY NbN-BASED JUNCTIONS FOR 500 GHZ WAVEGUIDE MIXERS - M.G.Blamire, Z.H.Barber, H. van de Stadt*, J.J. Wezelman* and S. Withington**, Department of Materials Science, University of Cambridge, Pembroke St., Cambridge, CB2 3QZ, UK; *SRON, Laboratory for Space Research Groningen, P.B. Box 800, 9700 AV Groningen, The Netherlands; **Cavendish Laboratory, University of Cambridge, Madingley Road, Cambridge, CB3 OHE, UK.

Tu6.7 QUASI-OPTICAL 0.5 THZ SIS RECEIVER WITH TWIN JUNCTION TUNING CIRCUIT - S.W.Jacobsson†, V.Yu Belitsky††, L.V. Filippenko††, S.A. Kovtonjuk††, V.P. Koshelets†† and E.L.Kollberg†, †Department of Microwave Technology, Chalmers University of Technology, S-412 96, Göteborg, Sweden; ††Institute of Radio Engineering and Electronics, Russian Academy of Sciences, Mokhovaja 11, 103907 Moscow, Russia.

Tu6.8 FREQUENCY MEASUREMENT OF SUB-MILLIMETRE WAVELENGTH LASER LINES USING JOSEPHSON JUNCTIONS - M.C.Wicks and J.R.Birch, Division of Electrical Science, National Physical Laboratory, Middlesex, TW11 OLW, UK.

Tu6.9 MILLIMETRE WAVE MIXING WITH YBCO JOSEPHSON JUNCTIONS ON BICRYSTAL SUBSTRATES - P.G.Quincey and M.C.Wicks, Division of Electrical Science, National Physical Laboratory, Middlesex, TW11 OLW, UK.

Tu6.10	METHODS OF FREQUENCY MEASUREMENTS OF MICROWAVE SIGNALS OF MM- AND SUBMM- WAVE BANDS WITH THE USE OF AS JOSEPHSON EFFECT - S.E.Anischenko, S.Y.Larkin and P.V.Khabayev, State Research Center "Fonon", 37 Pobedy Ave., KPI-3240, Kiev, 252056, Ukraine.
Tu6.11	FOR QUESTION OF SUPERCONDUCTIVE WIDE BAND FREQUENCY METER DESIGNING: MAIN METHODICS AND PROBLEMS - G.A.Marusly, V.G.Gurovich, G.A.Zatona and N.V.Pilinsky, State Research Center of Superconductive Radioelectronics, Ave. 50 Years of October, 2b, 252680 Kiev, Ukraine.
Tu6.12	SIS-MIXER DEVELOPMENT AT SRON - J. Mees[a], G. de Lange[a,b], A. Skalare[a,c], C.E. Honingh[a,d], M.M.T.M. Dierichs[a], H. Kuipers[a,b], R.A. Panhuyzen[a], H. van de Stadt[a], Th. de Graauw[a] and T.M. Klapwijk[b], [a]Space Research Organisation Netherlands (SRON), Postbox 800, 9700 AV Groningen, The Netherlands; [b]Dept. of Applied Physics and Materials Science Center, University of Groningen, Nijenborgh 4, 9747 AG Groningen, The Netherlands; [c]Now at: Jet Propulsion Laboratory, California Institute of Technology, CA 91109, USA; [d]Now at: Universität zu Köln, 1 Physikalisches Institut, Zülpicherstr. 77, 5000 Köln 41, Germany.

SESSION Tu 7

Tuesday PM | **WAVEGUIDE - I** | September 7

Tu7.1 NETWORK ANALYSIS OF THE DISPERSION CHARACTERISTICS FOR THE GROOVE GUIDE WITH ARBITRARY CURVED SHAPES - Xu Shanjia and Zhang Yaojiang, University of Science and Technology of China, Hefei, Anhui, 230027, P.R. China.

Tu7.2 PHASE AND ATTENUATION COEFFICIENTS IN BI-DIELECTRIC ECCENTRIC CIRCULAR TRANSMISSION LINES - Li-Yang Zhang, Pin Wang, Yong-Chang Jiao and Chang-Hong Liang, Dept. of Electromagnetic Engineering, Xidian University, Shaanxi 710071, P.R. China.

Tu7.3 THE CHARACTERISTICS OF THE CLOSED CIRCULAR GROOVE GUIDE - Jun Qian, Yang Hong-Sheng and Lu Zhong-Zuo, Department of Electronic Engineering, National Key Laboratory of Millimeter Waves, Southeast University, Nanjing, 210018, P.R. China.

Tu7.4 THE HIGHER ORDER MODES IN CIRCULAR GROOVE GUIDE - Ma Jianglei, Yang Hong-Sheng and Lu Zhong-Zuo, National Key Lab. of Millimeter Waves, Southeast University, Nanjing, 210018, P.R. China.

Tu7.5 A TRANSITION FROM RECTANGULAR WAVEGUIDE TO CIRCULAR GROOVE GUIDE - Yang Hong-Sheng, Shen Zheng-Kun and Xu Zheng-Rong, National Key Lab. of Millimeter Waves, Southeast University, Nanjing, 210018, P.R. China.

Tu7.6 AN ANALYSIS OF A KIND OF DIELECTRIC WAVEGUIDE - Hong Wu and Jun Qian. Southeast University, Nanjing, 210018, P.R. China.

Tu7.7 TRANSITIONS FOR THE QUASI-OPTICAL WAVEGUIDES - V.K.Kiselyev and T.M.Kushta. Inst. Radiophysics and Electronics, Kharkov, Ukraine.

Tu7.8 FREQUENCY DEPENDENT CHARACTERISTICS OF THICK MICROSTRIP LINES IN LOSSY MULTILAYERED DIELECTRIC MEDIA - J.R.Souza, Center for Telecommunications Studies - CETUC, Pontifical Catholic University of Rio de Janeiro - PUC/Rio, Rua Marquês de São Vicente, 225, 22453 Rio de Janeiro - RJ, Brazil.

Tu7.9 REJECTION FILTER - S.A. Pogarsky and I.I. Saprykin, Microwave Physics Department, State University, Sq. Svobody, 4, 310077, Kharkov, Ukraine.

SESSION Tu 8

Tuesday PM | **SPECTROSCOPY - IV** | September 7

Tu8.1 OPTICAL CHARACTERISATION OF THIN FILMS USING SURFACE POLARITONS AND SURFACE ELECTROMAGNETIC WAVE MEASUREMENTS (*Invited Keynote*) - E.V.Alieva, L.A.Kuzik, V.A.Yakovlev and G.N.Zhizhin, Institute of Spectroscopy, Academy of Sciences of Russia, Troitzk, Moscow reg. 142092, Russia.

Tu8.2 INFRARED SURFACE WAVE HETERODYNING ON METALS AND SEMICONDUCTORS - V. Vaicikauskas, R.Petruskevicius, R.Antanavicius and R.Januskevicius, Institute of Physics, A. Gostauto 12, 2000 Vilnius, Lithuania.

Tu8.3 SURFACE ELECTROMAGNETIC WAVE PROPAGATION ON $NaClO_3$ AND KTP CRYSTALS - E.V.Alieva, L.A.Kuzik and VA.Yakovlev, Institute of Spectroscopy, Academy of Science of Russia, Troitzk, Moscow reg. 142092, Russia.

Tu8.4 INTERFEROMETRIC MEASUREMENTS OF PHASE SHIFT IN THE IR REFLECTION-ABSORPTION SPECTROSCOPY - L.A.Kuzik, A.B.Sushkov, V.A.Yakovlev and G.N.Zhizhin, Institute of Spectroscopy, Academy of Sciences of Russia, Troitzk, Moscow reg. 142092, Russia.

Tu8.5 SPECTROSCOPY OF CONFINED LO PHONONS IN SUPERLATTICES: A PROBE FOR STUDY OF INTERFACIAL DISORDER - M.I.Vasilevskiy, Faculty of Applied Physics and Microelectronics, Nizhni Novgorod State University, 37 Sverdlova str., Nizhni Novgorod 603000, Russia.

Tu8.6 FAR INFRARED SPECTROSCOPY OF PHONONS IN GaInAs/InP SUPERLATTICES - T.S.Sethi[1], J.P. Bryant[2], A.A. Hamilton[2], T. Dumelow[2], W.F. Sherman[1] and T.J. Parker[2]; [1]Department of Physics, King's College London, Strand, London WC2R 2LS, UK; [2]Department of Physics, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, UK.

Tu8.7 QUANTUM SIZE OSCILLATIONS IN OPTICAL AND ELECTRICAL PROPERTIES OF SUPERTHIN Nb AND Cu FILMS - L.A.Kuzik, Y.E.Petrov, V.A.Yakovlev, Institute of Spectroscopy, Academy of Sciences of Russia, Troitzk, Moscow reg 142092, Russia; F.A. Pudonin, P.N. Lebedev Physical Institute, Academy of Sciences of Russia, Moscow, Russia.

Tu8.8 NON-LINEAR DOPPLER SHIFT OF THE PLASMON RESONANCE IN A GRATING-COUPLED DRIFTING 2DEG - R.E.Tyson, R.J.Stuart, H.P.Hughes, J.E.F. Frost, D.A.Ritchie, G.A.C. Jones and C. Shearwood, University of Cambridge, Cavendish Laboratory, Madingley Road, Cambridge CB3 OHE, UK.

Tu8.9 OPTICAL TRANSITIONS IN QUANTUM WIRES WITH AN AXIAL MAGNETIC FIELD - M. Masale, N.C. Constantinou and D.R. Tilley, Dept of Physics, Univ. of Essex, Colchester CO4 3SQ, UK.

Tu8.10 FAR INFRARED AND RAMAN STUDY OF THE EFFECT OF GROWTH ON THE INTERFACES OF ASYMMETRIC GaAs/AlAs SUPERLATTICES - A.Z.Mamun[1], J.P.Bryant[1], T.Dumelow[1], T.J.Parker[1], R.J.York[1], S.R.P.Smith[1], C.T.Foxon[2], J.W.Orton[3] and K.J.Moore[4]; [1]Department of Physics, University of Essex, Colchester, CO4 3SQ, UK; [2]Dept. of Physics, University of Nottingham, Nottingham, NG7 2RD, UK; [3]Dept. of Electrical and Electronic Engineering, University of Nottingham, NG7 2RD, UK; [4]Dept. of Physics, Manchester Metropolitan University, Manchester, M1 5GD, UK.

Tu8.11 SIZE EFFECTS IN VIBRATIONAL POLARITON SPECTRA - E.A. Vinogradov, Institute of Spectroscopy, Russian Academy of Sciences, 142092, Troitsk, Moscow, Russia.

SESSION W1

Wednesday AM | **GYROTRON - I** | September 8

W1.1 A QUASI-OPTICAL MODE CONVERTER FOR GYROTRONS OPERATING IN HIGH ORDER MODES - M.Blank, K.E.Kreischer and R.J.Temkin, MIT Plasma Fusion Center, Cambridge, MA 01219, USA; E.Giguet, Thomson Tubes Electroniques, 78141, Velizy Villacoublay, France.

W1.2 COMPACT QUASIOPTICAL TE_{22-6} TO TEM_{00} TEM CONVERTER WITH FEED WAVEGUIDE DEFORMATIONS - J. Pretterebner[12], A. Möbius[13], M. Thumm[34], A. Wien[34]; [1]Innovative Microwave Technology Ltd., Heinrich Baumannstrasse 49, W-7000 Stuttgart 1, Germany; [2]Institut für Plasmaforschung, Universität Stuttgart, Pfaffenwaldring 31, W-7000 Stuttgart 80, Germany; [3]Kernforschungszentrum Karlsruhe, Inst. f. Technische Physik, P.O. Box 3640, W-7500, Karlsruhe, Germany; [4]Institut für Höchstfrequenztechnik und Elektronik, Universität Karlsruhe, W-7500 Karlsruhe, Germany.

W1.3 A TRAVELLING-WAVE RESONATOR FOR EXCITING WHISPERING-GALLERY MODES IN AN OVERMODED CIRCULAR WAVEGUIDE - T.A.Hea, R.A.Peebles and R.J.Vernon, Department of Electrical and Computer Engineering, University of Wisconsin, Madison, WI 53706, USA.

W1.4 MODE COUPLING IN OVERMODED, VARYING-RADIUS COAXIAL GYROTRON CAVITIES - D. Wagner, J. Pretterebner, Universität Stuttgart, Institut für Plasmaforschung, 70569 Stuttgart, Germany; M.Thumm, Kernforschungszentrum Karlsruhe, Institut für Technische Physik and Universität Karlsruhe, Institut für Höchstfrequenztechnik und Elektronik, 76021 Karlsruhe, Germany.

W1.5 MODELLING OF MODE PURITY IN HIGH POWER GYROTRONS - S.Y.Cai, T.M.Antonsen and B.Levush. University of Maryland, College Park, MD 20742, USA.

W1.6 MODE PRIMING AN 85 GHZ QUASIOPTICAL GYROKLYSTRON - R.P.Fischer, A.W.Fliflet, W.M.Manheimer, B.Levush* and T.M.Antonsen, Jr.*, Beam Physics Branch, Plasma Physics Division, U.S. Naval Research Laboratory, Washington, D.C. 20375-5000, USA; *Laboratory for Plasma Research, University of Maryland, College Park, MD 20742, U.S.A.

W1.7 ADVANCED COMPLEX CAVITY FOR MULTI-MEGAWATT GYROTRON - K.Xu and M.Thumm*, Kernforschungszentrum Karlsruhe, Institut für Technische Physik, P.O. Box 3640, D-7500 Karlsruhe 1, Germany; *also Universität Karlsruhe, Institut für Höchstfrequenztechnik und Elektronik, D-7500 Karlsruhe 1, Germany.

W1.8 KW SIXTH-HARMONIC GYROFREQUENCY MULTIPLIER - A.J.Balkcum, D.B.McDermott, F.Hartemann and N.C.Luhmann Jr., Dept. of Electrical Engineering, University of California, Los Angeles, CA 90024, USA.

SESSION W 2

Wednesday AM — **QUASI-OPTICAL COMPONENTS - I** — September 8

W2.1 LOW PASS FILTERS FOR THE FAR INFRARED - C.V. Haynes and P.A.R.Ade, Department of Physics, Queen Mary and Westfield College, Mile End Road, London E1 4NS, UK.

W2.2 REJECTION OF FREQUENCY BANDS OF ELECTROMAGNETIC RADIATION BY QUASI-OPTICAL BRAGG STRUCTURES - A.A.Vertiy, S.P.Gavrilov and I.N.Goltvyanskiy, Institute of Radiophysics and Electronics, Academy of Sciences of Ukraine, 12 acad. Proskura st., Kharkov 310085, Ukraine.

W2.3 PERFORMANCE OF A HIGH T_C SUPERCONDUCTING ULTRA-LOSS MICROWAVE MICROSTRIP FILTER - O.D.Pustylnik, A.A.Dymnikov, I.V.Voinovsky and O.A.Khimenko, SRC "Fonon", 39 Pobedy Av., KPI-3240, Kiev, Ukraine; V.F. Vratskikh, Institute for Thermophysics, Kutateladze 1, Novosibirsk 630090, Russia.

W2.4 FREQUENCY SELECTIVE SURFACES FOR MILLIMETRE AND SUBMILLIMETRE-WAVE QUASI-OPTICAL DEMULTIPLEXING - J.W.Bowen, Department of Physics, Queen Mary and Westfield College, Mile End Road, London E1 4NS, UK; R.Cahill, Systems and Payloads Department, British Aerospace Space Systems Ltd., FPC 320, PO Box 5, Filton, Bristol BS12 7QW, UK, and E.A.Parker, Electronic Engineering Labs, The University of Kent, Canterbury, Kent CT2 7NT, UK.

W2.5 RUGGED FAR INFRARED BANDPASS FILTERS - P.G.Huggard, M.Meyringer, A. Schilz and W.Prettl, Institut für Angewandte Physik, Universität Regensburg, 93040 Regensburg, Germany.

W2.6 QUASI-OPTICAL NARROW-BAND NOTCH FILTERS - G.G.Denisov, S.V. Kuzikov and M.Yu.Shmelyov. Institute of Applied Physics, Russian Academy of Science, 46 Ulyanov Street, 603600 Nizhny Novgorod, Russia.

W2.7 DESIGN OF RIDGED WAVEGUIDE E-PLANE BANDPASS FILTERS IN MILLIMETER WAVE APPLICATIONS - D.Budimir, V.Postoyalko and J.R.Richardson., Microwave and Terahertz Technology Group, Dept. of Electronic and Electrical Engineering, University of Leeds, Leeds LS2 9JT, UK.

W2.8 FILTERS AND WAVEFRONT DIVIDING BEAMSPLITTERS FOR THE NEAR AND MID INFRARED PRODUCED BY MICROMACHINING TECHNIQUES - J.Warren, National Synchrotron Light Source, Brookhaven National Laboratory, Upton, NY 11973, USA; J.B.Heaney, NASA Goddard Space Flight Center, Greenbelt, Maryland 20771, USA, and K.D.Möller, Department of Physics, New Jersey Institute of Technology, Newark, NJ 07102, USA.

SESSION W3

Wednesday AM | **WAVEGUIDE - II** | September 8

W3.1	A NOVEL TYPE OF WAVEGUIDE-TO-COPLANAR WAVEGUIDE ADAPTER - Gong Ke and Wang Ji, Department of Electronic Engineering, Tsinghua University, Beijing 100084, P.R. China.
W3.2	SIMULTANEOUS CONSIDERATION OF CONDUCTOR THICKNESS AND SEMICONDUCTOR SUBSTRATE IN FIN-LINES - H.C.C.Fernandes, E.A.M.de Souza, A.C.R.de Brito and E.D.Barbosa. Federal University of Rio Grande do Norte, P.O.Box, 1583, Natal, Brazil.
W3.3	CHARACTERISTICS OF MICROSTRIP LINES WITH FINITE METALLIZATION THICKNESS AND TURNING-UP EDGE FOR HIGH POWER TRANSMISSION - Ao Sheng Rong and Zhong Liang Sun. State Key Lab. of Millimeter Waves, Southeast University, Nanjing 210018, PRC.
W3.4	SPECTRUM DYNAMICS OF NON-RADIATING MODES OF SEMI-OPEN TRANSMISSION LINES BASED ON PLANAR WAVEGUIDE JOINTS - A.G.Yushchenko and S.F.Shibalkin, Microwave Devices Lab. of Kharkov State University, Freedom Square 4, Kharkov 310077, Ukraine.
W3.5	TRANSVAR DIRECTIONAL COUPLER FOR MILLIMETER-WAVE APPLICATIONS - Yonghui Shu, Epsilon Lambda Electronics Corporation, 427 Stevens Street, Geneva, IL 60134, USA.
W3.6	GHZ MICROSTRIP LINE SP4T PIN DIODE SWITCH - Yonghui Shu, Epsilon Lambda Electronics Corporation, 427 Stevens Street, Geneva, IL 60174, USA.
W3.7	MODAL ANALYSIS OF MICROSTRIP AND FINLINE STEP DISCONTINUITIES FOR MICROWAVE AND MILLIMETER-WAVE INTEGRATED-CIRCUITS APPLICATIONS - C. Nguyen and K.M. Rahman, Department of Electrical Engineering, Texas A&M University, College Station, Texas 77843-3128, U.S.A.
W3.8	RECENT DEVELOPMENT OF MICROSTRIP BAND-PASS FILTERS FOR MICROWAVE AND MILLIMETER-WAVE INTEGRATED CIRCUITS - C. Nguyen, Department of Electrical Engineering, Texas A&M University, College Station, Texas 77843-3128, U.S.A.

SESSION W4

Wednesday AM | **BIOLOGICAL EFFECTS** | September 8

W4.1 MILLIMETRE WAVES AND QUANTUM MEDICINES (*Invited Keynote*) - P.Sit'ko, Scientific Research Center on Physics of the Alive and Microwave Resonance Therapy, Kiev, 252033, Ukraine.

W4.2 INFRARED SPECTRA OF URINE FROM CANCEROUS BLADDERS - M.A.Moharram, A.Higazi* and A.A.Moharram,* Spectroscopy Department, Physics Division, National Research Centre, Cairo, Egypt, *Faculty of Medicine, Cairo University.

W4.3 DRO-AUTODYNE SPECTROMETER FOR INVESTIGATION OF INTERACTION OF MILLIMETER ELECTROMAGNETIC WAVES WITH BIOLOGICAL OBJECTS - G.P.Ermak and Ye.B.Senkevich, Inst. of Radiophysics and Electronics of the Ukrainian Academy of Sciences, 12 Ac. Proskura st., Kharkov, 310085, Ukraine.

W4.4 INFRARED SPECTROSCOPY DETECTION OF MILLIMETRE-WAVE EFFECT UPON BIOMOLECULES - G.S.Litvinov, L.I. Berezhinsky, G.I. Dovbeshko, M.P. Lisitsa and L.I. Matseiko, Scientific Research Center "Vidhuk", Volodymyrska 61-b, Kiev 252033, Ukraine.

W4.5 TREATMENT OF CARDIOVASCULAR DISEASES BY MEANS OF WIDE-BAND COHERENT SIGNAL OF MM RADIO WAVE RANGE - V.D.Yeremka, A.A.Kuznetsov, V.V.Smorodin, A.I.Fisun, A.M.Fursov, L.P.Himenko and P.L.Himenko, Inst. of Radiophysics and Electronics of Ukrainian Academy of Sciences, 12, Acad. Proskura st., Kharkov 310085, Ukraine.

W4.6 REARRANGEMENTS IN POLARISED VIBRATIONAL SPECTRA OF GLYCINE-CONTAINING CRYSTALS UNDER MILLIMETER WAVE ACTION - G.I.Dovbeshko, L.I.Berezhinsky, G.S.Litvinov and V.V.Obukhovsky, Scientific Research Centre on Physics of the Alive and Microwave Resonance Therapy, Kiev, Ukraine.

W4.7 THE COMBINED EFFECT OF HIGH TEMPERATURE AND MICROWAVE FIELDS ON WINTER WHEAT SEEDS - V.G.Shakhbazov, A.A. Shmatko and Al. A.Shmatiko, Kharkov State University, Department of Genetics and Cytology, 4 Nezavisimosti Square, Kharkov, Ukraine.

W4.8 PECULIARITIES OF THE FAR INFRARED SPECTRA OF AMINOACIDS, BIOPOLYMERS AND CELLS - G.S.Litvinov and G.I.Dovbeshko, Scientific Research Center "Vidhuk", Volodymyrska 61-b, Kiev, 252033 Ukraine.

W4.9 THE INFLUENCE OF MICROWAVE FIELDS ON ELECTROKINETIC PROPERTIES OF CELLULAR NUCLEI OF HUMAN BUCCAL EPITHELIUM - V.G.Shakhbazov and Al.A.Shmatiko, Kharkov State University, Department of Genetics and Cytology, 4 Nezavisimosti Square, Kharkov, Ukraine.

SESSION W 5

Wednesday PM | **GYROTRON - II** | September 8

W5.1 OPTIMUM OPERATION OF GYROTWISTRONS - P.E.Latham and G.S.Nusinovich. University of Maryland, College Park, MD, USA.

W5.2 UNIVERSALLY SCALED EQUATIONS FOR GYROTRON AND CARM AMPLIFIERS - B.W.J.McNeil, G.R.M.Robb and A.D.R.Phelps, Dept. of Physics and Applied Physics, University of Strathclyde, Glasgow, G4 ONG, UK.

W5.3 EXPERIMENTS OF 3RD AND 10TH CYCLOTRON HARMONIC PENIOTRON OSCILLATORS - K.Yokoo, T.Ishihara, H. Tadano, K.Sagae, H.Shimawaki, N.Sato and S.Ono, Research Institute of Electrical Communication, Tohoku University, Sendai 980, Japan.

W5.4 RELATIVISTIC PENIOMAGNETRON OF MM AND SUB MM RADIO WAVE RANGE - V.D.Yeremka, V.A.Zhurakhovskiy and L.P.Mospan, Institute of Radiophysics and Electronics of Ukrainian Academy of Sciences, 12, Acad. Proskura st., Kharkov, 310085, Ukraine.

W5.5 TWO-STAGE 35 GHZ GYRO-PENIOTRON AMPLIFIER EXPERIMENT - G.S.Park[§], C.M.Armstrong, A.K.Ganguly, R.H.Kyser[¶] and J.L. Hirshfield[§], Naval Research Laboratory, Code 6840, Washington, DC 20375, USA; [§]Omega-P, Inc., New Haven, CT 06520; [¶]B-K Systems, Inc., Rockville, MD 30850.

W5.6 EXPERIMENTAL STUDY OF A RELATIVISTIC PENIOTRON - S.Musyoki, K.Sakamoto, A.Watanabe and M. Shiho, Japan Atomic Energy Research Institute, Naka Fusion Research Establishment, Naka-machi, Naka-gun, Ibaraki 311-01, Japan; K.Yokoo, N.Sato and S. Ono, Research Institute of Electrical Communication, Tohoku University, Sendai 980, Japan; S.Kawasaki and M.Takahashi, Faculty of Science, Saitama University, 255 Shimookubo, Urawa-shi, Saitama-ken 388, Japan; H.Ishizuka, Fukuoka Institute of Technology, Higashi-ku, Fukuoka, Japan.

W5.7 PENIOMAGNETRON WITH QUASIOPTICAL TWO-MIRRORS RESONATOR - V.D.Yeremka, Institute of Radiophysics and Electronics of Ukrainian Academy of Sciences, 12, Acad. Proskur st., Kharkov, 310085, Ukraine

W5.8 THEORY OF REFLECTION-TYPE GYRO-TWT AND GYRO-BWO - A.P. Chetverikov, Saratov University, Physical Department, Astrahanskaya, 83, Saratov 410071, Russia.

W5.9 COMPARATIVE ANALYSIS OF OSCILLATIONS IN BACKWARD WAVE OSCILLATORS - A.P. Chetverikov, Saratov University, Physical Department, Astrahanskaya, 83, Saratov 410071, Russia.

SESSION W6

Wednesday PM — **QUASI-OPTICAL COMPONENTS - II** — September 8

W6.1 INFRARED POLARIZERS MADE OF ANODIC ALUMINA FILMS - M.Saito, T.Kano, T.Seki and M.Miyagi, Tohoku University, Department of Electrical Communications, Sendai 980, Japan.

W6.2 REFLECTION TYPE ISOLATOR FOR SUBMILLIMETER WAVES - V.K.Kononenko and E.M.Kuleshov, Inst. of Radiophysics and Electronics, Academy of Sciences of Ukraine, 12 Acad. Proscura st., Kharkov, 310085, Ukraine.

W6.3 HIGH PERFORMANCE QUASI-OPTICAL FARADAY ROTATORS - G.M.Smith†, M.Webb* and J.C.G.Lesurf†, †University of St.Andrews, Dept. of Physics and Astronomy, Fife, KY16 9SS, UK, *DSTO, SRL, Salisbury, Australia, formerly at St. Andrews.

W6.4 MODULATION CHARACTERISTICS OF INJECTION HETEROLASERS COMPRISING CHARGE CARRIERS HEATED BY EXTERNAL MW ELECTRIC FIELD IN VIEW OF ELECTRON-ELECTRON AND ELECTRON-HOLE INTERACTIONS AS WELL AS HIGHER FIELD TRANSPORT - T.Yu.Bagaeva, I.I.Filatov, V.B.Gorfinkel, S.A. Gurevich* and T.I.Solodkaya, Saratov Branch of IRE Russian Academy of Science, 410019 Saratov, Russia, *A.F. Ioffe Institute of Russian Academy of Science, St. Petersburg, Russia.

W6.5 ABOUT USE OF THE INDUCED ANTIFERROMAGNETIC ORDERING EFFECT IN SHF DEVICES - V.N.Polupanov, V.K.Kiselev and V.N.Seleznev*, Inst. of Radiophysics and Electronics, Academy of Sciences of Ukraine, 12, Acad. Proscura st., Kharkov 310085, Ukraine, *State University of Simferopol', 4, Yaltinskaya st., Simferopol', 333036, Krimea, Ukraine.

W6.6 TRANSVERSE RESONANCES IN OVERSIZED WAVEGUIDES - D.Wagner, J.Pretterebner, Universität Stuttgart, Institut für Plasmaforschung, 70569 Stuttgart, Germany; M. Thumm, Kernforschungszentrum Karlsruhe, Institut für Technische Physik and Universität Karlsruhe, Institut für Höchstfrequenztechnik und Elektronik, 76021 Karlsruhe, Germany.

SESSION W7

Wednesday PM | **INSTRUMENTATION - I** | September 8

W7.1 WAVEFRONT DIVIDING RING-INTERFEROMETERS FOR THE FAR INFRARED - K.D.Möller, K.Chin and C. Qiu, Department of Physics, New Jersey Institute of Technology, Newark, NJ 07102, USA, P.Bruelemans and P.Janssen, Dept. of Physics, Katholieke Universiteit, Leuven, Belgium.

W7.2 HIGH RESOLUTION FAR INFRARED FOURIER SPECTROMETER USING A BUFFERED ADC - A.K.Wan Abdullah, M.Roslan and W.A.Kamil*, School of Physics, *School of Chemical Sciences, Universiti Sains Malaysia, 11800 Penang, Malaysia.

W7.3 A HIGH RESOLUTION, HIGH SPEED DATA ACQUISITION SYSTEM BASED ON AN IBM-PC 486, FOR CONTROL OF A FOURIER TRANSFORM SPECTROMETER - Z.B.Maricic+, L.P.Ellison+, B.Gowland* and G.A.Gledhill,+ +Dept. of Physics, *Computer Centre, Royal Holloway, University of London, Egham Hill, Egham, Surrey, TW20 OEX, UK.

W7.4 CHARACTERIZATION OF CH-PLASMAS WITH CSR BASED MICROWAVE SPECTROMETERS - F.Wolf, F.Neubert, T.Hessel and V.L.Vaks, Analytik & Meβtechnik GmbH Chemnitz, Stollberger Str. 4a, D-09119 Chemnitz, Germany.

W7.5 A Nb OPEN RESONATOR FOR MILLIMETER WAVE SURFACE RESISTANCE MEASUREMENTS OF SUPERCONDUCTIVE THIN FILMS - B.Komiyama and H.Shimakage, Communications Research Laboratory, Iwaoka Kobe 674, Japan.

W7.6 A NEW METHOD FOR COMPLEX SPECTRAL MEASUREMENTS IN MILLIMETER AND SUBMILLIMETER FREQUENCY RANGE - A.B.Latyshev, D.A.Loukianov and A.V.Semenov, General Physics Institute, Russian Academy of Science, 38 Vavilov St, 117942 Moscow, Russia.

W7.7 HIGH MICROWAVE PULSE POWER MEASUREMENT IN A FREE SPACE - M.Dagys, Z.Kancleris, R.Simniskis, Semiconductor Physics Institute, Gostauto 11, Vilnius 2600, Lithuania, and M.Bäckström, U.Thibblinn and B.Wahlgren, SAAB Military Aircraft, Linkoping S-581 88, Sweden.

W7.8 THE MILLIMETER WAVES POWER TRANSDUCER - K.Repsas, R.Vaskevicius, and V.Orsevskis, Semiconductor Physics Institute, 2600 Vilnius, Gostauto 11, Lithuania.

W7.9 FOURIER TRANSFORM INFRARED SPECTROMETER USING DELTA-SIGMA MODULATION FOR HIGH DYNAMIC-RANGE SPECTROMETRY - K. Minami and S. Kawata, Department of Applied Physics, Osaka University, Suita, Osaka 565, Japan.

SESSION W8

Wednesday PM	**POST-DEADLINE**	September 8

W8.1 NEW FIR LASER ASSIGNMENTS IN THE ν_5, ν_7, and ν_8 EXCITED STATES OF $^{13}CD_3OH$ METHANOL - Li-Hong Xu and R.M. Lees, CEMAID and Physics Department, University of New Brunswick, Fredericton, N.B., Canada E3B 5A3.

W8.2 ASSIGNMENT OF THE FIR AND IR ABSORPTION SPECTRA OF THE METHANOL ISOTOPIC SPECIES - G. Moruzzi[1], F. Strumia[1], R.M. Lees[2], Li-Hong Xu[2], B.P. Winnewisser[3], M. Winnewisser[3] and I. Mukhopadhyay[4]; [1]Dipartimento di Fisica dell'Università di Pisa, Piazza Torricelli 2, I-56126 Pisa; [2]Department of Physics, University of New Brunswick Fredericton, New Brunswick, Canada E3B 5A3; [3]Physikalish-Chemisches Institut der Justus-Liebig - Universität Giessen, Heinrich-Buff-Ring 58, D-W6300 Giessen; [4]Government of India, Department of Atomic Energy, Centre for Advanced Technology, Indore 452013, India.

W8.3 INJECTION SEEDING OF A PULSED FAR INFRARED MOLECULAR GAS LASER - H.P.M. Pellemans, J. Burghoorn*, T.O. Klaassen and W. Th. Wenckebach, Faculty of Applied Physics, Delft University of Technology, The Netherlands; *currently with the Max-Planck-Institut für festkörperforschung, Hochfeld-Magnetlabor, Grenoble, France.

SESSION Th 1

Thursday AM	GYROTRON - III	September 9

Th1.1 COMPARATIVE STUDY OF GYROTRONS BASED ON THERMIONIC AND COLD CATHODES - A.W.Cross, S.N.Spark, K. Ronald, A.D.R.Phelps and W. He, Dept. of Physics and Applied Physics, University of Strathclyde, Glasgow G4 ONG, UK.

Th1.2 RESULTS OF EXPERIMENTS ON PARAMETERS OF ELECTRON GUNS FOR GYROTRONS - B.Piosczyk. Kernforschungszentrum, Karlsruhe, ITP, Postfach 3640, D-7500, Karlruhe 1, Germany.

Th1.3 VACUUM MICROELECTRONIC ARRAY GYROTRON CATHODE EXPERIMENTS - M.Garven, S.N.Spark and A.D.R.Phelps and N. Cade*, Dept. of Physics and Applied Physics, University of Strathclyde, Glasgow G4, ONG, UK; *GEC-Marconi Ltd., Hirst Research Centre, East Lane, Wembley, Middx., HA9 7PP, U.K.

Th1.4 HIGH SPEED DIAGNOSTIC STUDY OF PULSED, COLD CATHODE, GYROTRONS - K.Ronald, S.N.Spark, A.D.R.Phelps and W. He, Dept. of Physics and Applied Physics, University of Strathclyde, Glasgow, G4 ONG, U.K.

Th1.5 NON-ADIABATIC ELECTRON GUNS FOR GYROTRONS - J.J.Barroso, I.P.Spassovsky and C.Stelatti., Instituto Nacional de Pesquisas Espaciais, 12201-970, São José dos Campos, SP - Brazil.

Th1.6 DIOCOTRON INSTABILITY IN THE DRIFT TUBE OF A GYROTRON - R.Schuldt, Nuclear Research Center Karlsruhe, HDI, W 7500, Karlsruhe 1, Germany.

Th1.7 ELECTROSTATIC EFFECTS ON THE QUALITY OF GYROTRON BEAMS - J.L.Vomvoridis, K.Hizanidis, I.Tigelis* and D.I. Frantzeskakis*, Dept of Electrical and Computer Engineering, National Technical University of Athens, Greece; *Department of Physics, University of Athens, Greece.

Th1.8 HZ PRF CARM EXPERIMENT - S.J.Cooke, S.N.Spark, W. He and A.D.R.Phelps, Dept. of Physics and Applied Physics, University of Strathclyde, Glasgow, G4 ONG, UK.

Th1.9 EFFECT OF BEAM GEOMETRIC DEFORMATION ON THE PROPERTIES OF ECRM - Yu Yongjian, University of Electronic Science and Technology, Dept. of Electronic Engineering, Chengdu, P.R. China.

Th1.10 DESIGN AND PERFORMANCE OF 94-GHZ HIGH POWER MULTICAVITY GYROKLYSTRON AMPLIFIER - I.I.Antakov, E.V.Zasypkin and E.V.Sokolov, Institute of Applied Physics, Russian Academy of Sciences, 46 Uljanov st., Nizhni Novgorod, 603600, Russia.

SESSION Th 2

Thursday AM — **QUASI-OPTICAL COMPONENTS - III** — September 9

Th2.1 ANALYSIS OF A DIODE MOUNTING STRUCTURE OF A SUB-HARMONICALLY PUMPED MILLIMETER-WAVE MIXER - S.D.Vogel, Institute of Applied Physics, Microwave Department, University of Bern, CH-3012, Bern, Switzerland.

Th2.2 TERAHERTZ METAL PIPE WAVEGUIDES - A.S.Treen and N.J. Cronin, School of Physics, University of Bath, Claverton Down, Bath, Avon. BA2 7AY, U.K.

Th2.3 NEW DEVELOPMENTS IN MILLIMETER WAVE BEAM CONTROL ARRAYS - T.Liu, X-H. Qin, F.Wang, L.Sjogren, C.W.Domier and N.C.Luhmann Jr., Dept. of Electrical Engineering, University of California at Los Angeles,, Los Angeles, California, U.S.A. 90024-1594.

Th2.4 DESIGN OF A MILLIMETER WAVE QUASI-OPTICAL OSCILLATOR - J. Bae, M. Akaishi, Y.Aburakawa and K. Mizuno, Research Institute of Electrical Communication, Tohoku University, 2-1-1 Katahira, Aoba-ku, Sendai 980, Japan.

Th2.5 LEAKY WAVE CORRUGATED DIELECTRIC ANTENNA FOR MILLIMETER WAVE APPLICATIONS - S.C.Shrivastava and A.K.Tiwari, Maulana Azad College of Technology, Bhopal - 462-007, India.

Th2.6 OPTIMIZATION OF COUPLING BETWEEN HE_{11}-WAVEGUIDE MODE AND GAUSSIAN BEAM - T.Graubner, W.Kasparek and H.Kumric, Institut für Plasmaforschung, Universität Stuttgart, Pfaffenwaldring 31, D-7000 Stuttgart 80, Germany.

Th2.7 SLOTLINE SURFACE-WAVE LEAKAGE AND SLOT ANTENNA PERFORMANCE - C.Letrou and V.Popescu. Institut National des Télécommunications, 91011 Evry, France.

Th2.8 MICROSTRIP RESONATOR USING HIGH-Tc SUPERCONDUCTING THIN FILM ON SAPPHIRE SUBSTRATES - O.D.Pustylnik, A.A.Dymnikov, I.V.Voinovsky and O.A.Khymenko, SRC "Fonon", 39 Pobedy Ave., KPI-3240, Kiev, Ukraine; V.F. Vratskikh, Institute for Thermophysics, Kutateladze 1, Novosibirsk 630090, Russia.

Th2.9 MICROWAVE SYSTEMS BASED ON THE EFFECT OF IMAGE MULTIPLICATION IN OVERSIZED WAVEGUIDES - G.G.Denisov, D.A.Lukovnikov and M.Yu.Shmelyov, Institute of Applied Physics, Russian Academy of Science, 46 Ulyanov Street, 603600 Nizhny Novgorod, Russia.

SESSION Th 3

Thursday AM	**INSTRUMENTATION - II**	September 9

Th3.1 TRANSMISSION-REFLECTION MEASUREMENTS FROM 8 GHZ TO THE THZ (*Invited Keynote*) - P.Goy, M.Gross and F. Beck*, AB Millimètre, 52 rue Lhomond, 75005 Paris, France, *Université de Lille 1, I.E.M.N., 59655 Villeneuve d'Ascq Cedex, France.

Th3.2 AN INTERFEROMETER FOR NEAR MILLIMETER WAVE DIELECTRIC STUDIES ON SOLIDS AT ELEVATED TEMPERATURES - J.R.Birch and E.A.Nicol, NPL, Teddington, Middx., TWll OLW, UK.

Th3.3 WAVEFRONT DIVIDING INTERFEROMETER WITH AND WITHOUT MOVING PARTS - K.D.Möller, Department of Physics, New Jersey Institute of Technology, Newark N.J. 07102, Fairleigh Dickinson University, Teaneck, NJ 07666, USA.

Th3.4 MILLIMETER-WAVE BAND MICROWAVE SIGNAL SPECTRUM MEASUREMENT ON THE BASIS OF THE HILBERT TRANSFORM OF JOSEPHSON JUNCTION FUNCTION RESPONSE - S.Y.Larkin, S.E.Anischenko and V.V. Kamyshin, State Research Center "Fonon", 37, Pobedy Ave., KPI-3240, Kiev 252056, Ukraine.

Th3.5 A NEW METHOD FOR NETWORK ANALYZER CALIBRATION - A.Jöstingmeier*, A.v.Borzyszkowski**, G.Faby*, M.Jenett* and K.Schünemann*, *Technische Universität Hamburg-Harburg, Arbeitsbereich Hochfrequenztechnik, Postfach 90 10 52, D-W-2100 Hamburg 90, Germany, **Universität Hamburg, Institut für Angewandte Mathematik, Edmund-Siemers-Allee 1, D-W-2000 Hamburg 13, Germany.

SESSION Th 4

Thursday AM | **SPECTROSCOPY - V** | September 9

Th4.1 FAR INFRARED SPECTROSCOPY OF PHONONS AND PLASMONS IN SEMICONDUCTOR SUPERLATTICES (*Invited Keynote*) - T.Dumelow, A.A.Hamilton, T.J.Parker, S.R.P.Smith and D.R.Tilley, University of Essex, Colchester CO4 3SQ, UK.

Th4.2 FAR INFRARED OPTICS OF GaAs/AlAs SUPERLATTICES - A.A.Hamilton, T.Dumelow, T.J.Parker and D.R.Tilley, University of Essex, Colchester CO4 3SQ, UK.

Th4.3 INVESTIGATION OF PHONONS AND PLASMONS IN ALLOYS AND SUPERLATTICES COMPOSED OF InAs AND InSb - S.K.Kang[1], T. Knight[2], Y.B. Li[2], A.G. Norman[2], J.R. Birch[3], T.Dumelow[1], T.J.Parker[1], C.C. Phillips[2] and R.A. Stradling[2]; [1]Department of Physics, University of Essex, Colchester CO4 3SQ, UK; [2]Blackett Laboratory, Imperial College, London SW7 2BZ, UK; [3]National Physical Laboratory, Teddington TW11 OLW, UK.

Th4.4 CHARACTERISATION OF HYDROGENATED SILICON NITRIDE FILMS BY LOW TEMPERATURE FTIR SPECTROSCOPY - M.M.Pradhan and M.Arora, National Physical Laboratory, Dr. K.S. Krishnan Road, New Delhi 110012, India.

Th4.5 REFLECTANCE STUDY OF T.M.O. GLASSES - A.Memon, M.N.Khan, S.Al-Dallal, Department of Physics, University of Bahrain, and D.B.Tanner, Department of Physics, University of Florida, Gainsville, FL, USA.

Th4.6 THEORY OF MULTIPHONON ABSORPTION IN CRYSTALS AT IR AND MM RANGES - B.M.Garin, Institute of Radio Engineering and Electronics of the Russian Academy of Sciences, Vvedensky Square 1, Fryazino, Moscow region 141120, Russia.

Th4.7 A FEL STUDY OF RELAXATION BETWEEN BOUND DONOR STATE IN Si:P - K.K. Geerinck, J.E. Dijkstra, J.N. Hovenier, T.O. Klaassen, W.Th. Wenckebach, Faculty of Applied Physics, University of Technology Delft, The Netherlands; A.F.G. van der Meer and P.W. van Amersfoort, FOM Institute for Plasma Physics Rijnhuizen, Nieuwegein, The Netherlands.

Th4.8 FT-FIR MAGNETO-SPECTROSCOPY ON RESONANT BOUND POLARONS IN n-GaAs - A.J. van der Sluijs, K.K. Geerinck, T.O. Klaassen and W.Th. Wenckebach, Faculty of Applied Physics, Delft University of Technology, The Netherlands.

Thursday PM | **GYROTRON - IV** | September 9

Th5.1 HIGH FREQUENCY, MEGAWATT GYROTRON EXPERIMENTS AT MIT - K.E.Kreischer, M.Blank, W.C. Guss, S.K.Lee and R.J.Temkin, MIT Plasma Fusion Centre, Cambridge, MA 01219, USA.

Th5.2 DESIGN CONSIDERATIONS FOR A 1 MW CW GYROTRON WITH AN INTERNAL CONVERTER - K.Felch, T.S.Chu, H.Huey, H.Jory, J.Neilson and R.Schumacher, Varian Associates, Inc., 811 Hansen Way, Palo Alto, CA 94304, USA; J.A. Lorbeck and R.J. Vernon, University of Wisconsin - Madison, Dept. of Electrical and Computer Engineering, 1415 Johnson Drive, Madison, WI 53706, USA.

Th5.3 MW/140 GHZ $TE_{10,4}$ GYROTRON WITH BUILT-IN HIGHLY EFFICIENT QUASIOPTICAL CONVERTER - E.Borie, G.Dammertz, G.Gantenbein, M.Kuntze, A.Möbius, H.-U.Nickel*, B.Piosczyk and M.Thumm*, Kernforschungszentrum Karlsruhe GmbH, ITP, Postfach 3640, 76021 Karlsruhe, Germany; *also Universität Karlsruhe, Institut für Höchstfrequenztechnik und Elektronik.

Th5.4 DESIGN OF A 3 MEGAWATT, 140 GHZ GYROTRON BASED ON A $TE_{21,13}$ COAXIAL CAVITY - M.E.Read, G.S.Nusinovich, O.Dumbrajs, H.Q.Dinh, D. Opie and G. Bird, Physical Sciences Inc., Alexandria, VA, 22314, USA; K.E.Kreischer and M.Blank , MIT, Cambridge, MA 02139, USA.

Th5.5 GHZ HARMONIC GYROKLYSTRON - G.P.Scheitrum, T.Bemis, T.A. Hargreaves and L.Higgins, Litton Systems Electronic Devices Division, San Carlos, CA 94070, USA.

Th5.6 DESIGN OF A 100 MW, 17 GHZ SECOND HARMONIC GYROKLYSTRON EXPERIMENT - P.E.Latham, W.Lawson, J.Calame, V.Specht, M.K.E.Lee. Q.Qian, M.Rimlinger and B.Hogan, University of Maryland, College Park, MD, USA.

Th5.7 HIGH POWER OPERATION OF A K-BAND SECOND HARMONIC GYROKLYSTRON - W.Lawson, H.W.Matthews, M.K.E.Lee, B.Hogan, J.P. Calame and J.Cheng, Electrical Engineering Department and Laboratory for Plasma Research, University of Maryland, College Park, MD 20742, USA.

Th5.8 WIDEBAND GYRO-TWT AMPLIFIER EXPERIMENTS - J.J.Choi*, G.S.Park¶, S.Y.Park¶, C.M.Armstrong, A.K. Ganguly, R.Kyser§ and M.L.Barsanti, Naval Research Laboratory, Code 6840,Washington, DC 20375, USA; *SAIC, McLean, VA 22102; ¶Omega-P, Inc., New Haven, CT 06520; §B-K Systems, Inc., Rockville, MD 20850.

Th5.9 GYRO-TWT AMPLIFIERS AT UCLA - K.C.Leou, Q.S.Wang, C.K.Chong, A.J.Balkcum, S.N.Fochs, E.S. Garland, J. Pretterebner[a], A.T. Lin[b], D.B.McDermott, F.Hartemann and N.C.Luhmann Jr., Dept. of Electrical Engineering, University of California, Los Angeles, CA 90024, USA; [a]IMT GmbH, Heinrich-Baumann-Strasse 49, D-7000 Stuttgart 1, Germany; [b]Department of Physics, University of California, Los Angeles, CA90024, USA.

Th5.10 DEVELOPMENT OF MEDIUM POWER, SUBMILLIMETER WAVE GYROTRONS - T. Idehara, T. Tatsukawa, I. Ogawa, Y. Shimizu, S. Makino and K. Ichikawa, Department of Applied Physics, Faculty of Engineering, Fukui University, Fukui 910, Japan.

Th5.11 HARMONIC CONVERTERS FOR MEGAWATT-LEVEL 140 GHZ - RADIATION, A.K. Ganguly, Code 6841, Naval Research Laboratory, Washington, DC 20375; J.L.Hirshfield, Omega-P, Inc., 2008 Yale Station, New Haven, CT 06520; and Physics Dept., Yale Univ., New Haven CT 06511, USA.

SESSION Th 6

Thursday PM — **QUASI-OPTICAL COMPONENTS - IV** — September 9

Th6.1 IMPEDANCE MATCHING OF MICROSTRIP LINE CIRCUITS BY OPTICALLY TUNABLE STUBS - H.Shimasaki and M.Tsutsumi, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto 606, Japan.

Th6.2 OPTICAL CONTROL OF MILLIMETER WAVES IN THE SILICON WAVEGUIDE - M.Tsutsumi, Kyoto Institute of Technology, Matsugasaki, Kyoto, Japan, and Y.Satomura, Osaka Institute of Technology, Omiya, Osaka, Japan.

Th6.3 QUASI-OPTICAL SWITCHING FOR MM-WAVE CAVITY DUMPING - G.M.Smith, J.C.G.Lesurf, Y.Cui and M.H. Dunn, University of St Andrews, Department of Physics and Astronomy, Fife KY16 9SS, Scotland.

Th6.4 PHASE SHIFT AND LOSS MECHANISM OF OPTICALLY EXCITED E-PLANE ELECTRON-HOLE PLASMA - Ao Sheng Rong and Zhong Liang Sun, State Key Lab. of Millimeter Waves, Department of Radio Engineering, Southeast University, Nanjing 210018, Jiangsu, P.R. China.

Th6.5 MULTIMODE ANALYSIS OF SUBMILLIMETRE-WAVE OPTICAL SYSTEMS - S.Withington, Cavendish Laboratory, Madingley Road, Cambridge, UK, and J.A.Murphy, Maybooth College, Co. Kildare, Ireland.

Th6.6 THE IMPLICATIONS OF PARTIALLY COHERENT SIGNAL BEAMS ON THE PERFORMANCE OF INTERFEROMETRIC SPECTROMETERS IN THE 30-800 GHZ RANGE - J.W.Bowen, Department of Physics, Queen Mary and Westfield College, University of London, London, E1 4NS, UK.

Th6.7 NON-LINEAR TRANSMISSION LINES USING MULTIPLE BARRIER VARACTOR DEVICES - W-M.Zhang, H.Shi, C.W.Domier and N.C.Luhmann Jr., Dept. Electrical Engineering, UCLA, Los Angeles, CA 90024-1594, USA.

Th6.8 MM-WAVE SPATIAL INTERFEROMETRY AS A PASSIVE ALTERNATIVE TO RADAR - J.C.G.Lesurf and M.R.Robertson, Dept. of Physics and Astronomy, University of St.Andrews, Fife, KY16 9SS, Scotland.

Th6.9 A SPECIAL 3-MIRROR QUASI-OPTICAL POWER COMBINING SYSTEM - Xie Wenkai and Liu Shenggang, University of Electronic Science and Technology of China, Chengdu, Sichuan 610054, P.R. China.

Th6.10 OPTIMIZATION CALCULATION OF 3-MIRROR AXISYMMETRIC QUASI-OPTICAL POWER COMBINING - Xie Wenkai, Cheng Zhixun, Liu Senggang, University of Electronic Science and Technology of China, Chengdu, Sichuan 610054, P.R. China.

SESSION Th 7

Thursday PM | **INSTRUMENTATION - III** | September 9

Th7.1 ADVANCES IN MEASUREMENTS WITH AN ALL-ELECTRONIC TERAHERTZ SPECTROSCOPY SYSTEM - D.W.Van Der Weide*, J.S.Bostak, B.A.Auld and D.M.Bloom, Edward L. Ginzton Laboratory, Stanford University, Stanford, CA 94305, USA, *Currently with Max-Planck-Institut für Festkörperforschung, Heisenburgstr. 1, D-7000 Stuttgart 80, Germany.

Th7.2 SOME RECENT APPLICATIONS OF THE FREE ELECTRON LASER (CLIO AND FELIX) IN SEMICONDUCTOR NONLINEAR OPTICS - C.R.Pidgeon, Heriot-Watt University, Riccarton, Currie, Edinburgh, UK.

Th7.3 QUASI-OPTICAL DEVICES FOR SUBMILLIMETER TECHNIQUE - V.B.Anzin, G.A.Komandin, G.V.Kozlov, S.P.Lebedev, A.N. Lipatov and A.A.Volkov, Institute for General Physics, Russian Academy of Sciences, Vavilov str., 38, 117942 Moscow, Russia.

Th7.4 BIAS PULSE MODULATOR FOR A HIGH POWER Kα BAND (26-40 GHZ) IMPATT OSCILLATOR - P.G.Frayne and C.W.T.Nicholls, Royal Holloway College, Egham, TW20 OEX, Surrey, UK.

Th7.5 MICROWAVE SPECTROMETERS FOR THE INVESTIGATION OF FAST PROCESSES IN THE TIME DOMAIN - A.B. Brailovsky, V.V. Khodos, V.L.Vaks, A.N.Panin, S.J.Pripolzin and F.Wolf, Analytik & Meβtechnik GmbH Chemnitz, Stollberger Str. 4a, D-09119 Chemnitz, Germany.

Th7.6 A FREQUENCY-STABILISED MICROWAVE GENERATOR FOR INVESTIGATIONS OF ABSORPTION LINES OF WATER - V.L.Vaks and S.J.Pripolsin, Analytik & Meβtechnik GmbH Chemnitz, Stollberger Str. 4a, D-09119 Chemnitz, Germany.

Th7.7 QUASI-OPTICAL METHOD FOR MOISTURE MEASUREMENTS OF GASES - A.A.Vertiy and S.P.Gavrilov, Inst. Radiophysics and Electronics, Academy of Sciences of Ukraine, 12 Acad. Proskura st., Kharkov 310085, Ukraine.

Th7.8 METHOD AND MEASUREMENT COMPLETE SET FOR NON-DESTRUCTIVE LOCAL PARAMETER MICROWAVE MEASUREMENTS OF MATERIALS - A.A. Zvyagintsev and A.V. Strizhachenko, University, Freedom Sq., 4, 310077, Kharkov, Ukraine.

Th7.9 FREQUENCY STABILIZED MILLIMETER WAVE PULSED IMPATT OSCILLATORS IN AUTO-OSCILLATED AND INJECTION-LOCKED MODES (DESIGNING AND INVESTIGATION) - A.V. Gorbachev, L.V. Kasatkin, V.V. Novozhilov and M.I. Poigina, Research Institute "ORION", Kiev, Ukraine, p.o. 252057.

Th7.10 SOLID-STATE 8-MM WAVE TRANSCEIVER WITH PULSE-TO-PULSE SWITCHING OF OPERATING FREQUENCIES (INVESTIGATION AND DESIGNING) - A.V. Gorbachev, L.V. Kasatkin, V.A. Sackov, I.N. Homenko and I.V. Zverghovsky, Research Institute "ORION", Kiev, Ukraine, p.o. 252057.

SESSION Th 8

Thursday PM | **SPECTROSCOPY - VI** | September 9

Th8.1 SURFACE LAYERS AND FAR INFRARED SPECTRA OF HIGH-T_c SUPERCONDUCTORS (*Invited Keynote*) - X.Gerbaux, A.Hadni and M.Tazawa*, Laboratoire Infrarouge Lointain, L.M.C.P.I., U.R.A. - C.N.R.S. no.809 B.P.239, F-54506 Vandœuvre-les Nancy Cedex, France; *GIRI, Nagoya, 1, Hirate cho, Nagoya 462, Japan.

Th8.2 MEASUREMENTS ON THE FAR INFRARED LASER TRANSMISSION OF $Y_1Ba_2Cu_3O_{7-\delta}$ THIN FILMS - T.P.O'Brien, M.L.McConnell, P.G.Huggard, Gi. Schneider and W.J.Blau, Physics Department, Trinity College, Dublin, Ireland.

Th8.3 FAR INFRARED ELLIPSOMETRIC STUDY OF HTSC GAP IN AB- AND C-ORIENTED EPITAXIAL YBaCuO FILMS - A.B.Sushkov* and E.A. Tishchenko, P.L. Kapitza Institute for Physical Problems, Russian Academy of Science, Kosygina str. 2, 117973 Moscow, Russia; *Institute of Spectroscopy, Russian Academy of Science, 142092 Troitzk, Moscow region, Russia.

Th8.4 SUBMILLIMETER WAVE ESR OF COPPER-OXIDES - H.Ohta and M.Motokawa, Dept. of Physics, Faculty of Science, Kobe University, Rokkodai, Nada, Kobe 657, Japan.

Th8.5 MILLIMETER WAVES SCANNING - NEW METHODS AND POSSIBILITIES INVESTIGATING THE HIGH TEMPERATURE SUPERCONDUCTORS - M.N.Kotov*, V.F. Masterov**, A.V.Prichodko* and O.V.Smertin*, *Microwave Laboratory, Semiconductor Physics Institute, 11 A. Gostauto str., Vilnius 2600, Lithuania; **Experimental Physics Dept., State Technical University, 29 Politechnitcheskaja str., St. Petersburg, Russia.

Th8.6 LOCAL AND NON-DESTRUCTIVE DIAGNOSTICS OF HIGH-T_c SUPERCONDUCTOR LAYERS BY MILLIMETER WAVES - A.Laurinavičius, F.Anisimovas, A. Deksnys, V.Lisauskas and B.Vengalis, Semiconductor Physics Institute, Gostauto 11, 2600 Vilnius, Lithuania.

SESSION F1

Friday AM — **GYROTRON - V** — September 10

F1.1 COLLECTIVE MM-WAVE SCATTERING TO MEASURE FAST ION AND ALPHA-PARTICLE DISTRIBUTIONS IN JET (*Invited Keynote*) - J.A.Hoekzema, A.E.Costley, T.P.Hughes, J.A. Fessey, N.P.Hammond, H.Oosterbeek, P.Roberts, A.L.Stevens, P.E. Stott and W. Suverkropp, JET Joint Undertaking, Abingdon, Oxfordshire, OX14 3EA, UK.

F1.2 STATE OF THE ART OF GYROTRON INVESTIGATION IN RUSSIA (*Invited Keynote*) - V.A.Flyagin, A.L.Goldenberg and V.E.Zapevalov, Institute of Applied Physics, Russian Academy of Sciences, 46 Uljanova st, Nizhni Novgorod, 603600, Russia.

F1.3 THE TRANSMISSION LINES AND ANTENNAS OF THE TORE SUPRA ECRH SYSTEM - F.M.A.Smits, G. Berger-by, G. Bon Mardion, J.-J. Capitain, D. Chatain, J.-J. Cordier, J.P. Crenn, L. Doceul, M. Pain, G.-F. Tonon, A. Dubrovin*, P. Garin* and J.M. Krieg*, Association CEA-Euratom sur la Fusion Contrôlée, CEN-Cadarache, F-13108 St.Paul-lez-Durance CEDEX, France; *Thomson Tubes Electroniques, 2, Rue Latécoère, 78141 Vélizy-Villacoublay, France.

F1.4 MM-WAVE TRANSMISSION IN THE FAST ION AND ALPHA-PARTICLE DIAGNOSTIC AT JET - J.A.Hoekzema and N.P.Hammond, JET Joint Undertaking, Abingdon, Oxfordshire, OX14 3EA, UK.

F1.5 OPTIMIZATION OF AN OVERMODED SMOOTH-WALL CIRCULAR WAVEGUIDE SECTION FOR CARRYING STRONG MM-WAVE POWER IN ECRH EXPERIMENTS - F.Billè*, G. Granucci**, L.Manià*, A. Simonetto** and G.Viciguerra*, *DEEI, Università di Trieste, Via A. Valerio 10, 34127, Trieste, Italy; **Istituto di Fisica del Plasma, Associazione EURATOM-ENEA-CNR, Via Bassini 15, 20133, Milano, Italy.

F1.6 RADIATION PATTERNS AND OPTIMIZATION OF BEAM EXCITATION OF HIGHLY OVERMODED CORRUGATED RECTANGULAR WAVEGUIDES - B.C.Brown, J.A.Lorbeck and R.J.Vernon, Department of Electrical and Computer Engineering, The University of Wisconsin - Madison, Wisconsin 53706, USA.

F1.7 CONDITIONING OPTICS FOR ASTIGMATIC GAUSSIAN BEAMS AT 140 GHZ, 0.5 MW - A.Bruschi, S.Cirant, G.Granucci, A.Simonetto and G.Solari, Istituto di Fisica del Plasma, EURATOM/ENEA/CNR Association, Via Bassini 15, 20133, Milano, Italy.

F1.8 A PROPOSAL FOR A CALORIMETRIC LOAD AT 140 GHZ FOR HIGH POWER HE11 TRANSMISSION LINES - L.Argenti, A.Bruschi, S.Cirant and G.Solari, Istituto di Fisica del Plasma, EUROTOM/ENEA/CNR Association, Via Bassini 15, 20133, Milano, Italy.

F1.9 DIFFRACTION RADIATION OSCILLATORS FOR HIGH-TEMPERATURE PLASMA DIAGNOSTICS AND SPECTROSCOPY - V.P.Shestopalov, B.K.Skrynnik, I.D.Revin and G.P.Ermak, Institute of Radiophysics and Electronics of the Ukrainian Academy of Sciences, 12 Acad. Proskura st., Kharkov, 310085, Ukraine.

SESSION F2

Friday AM **ASTRONOMICAL AND ATMOSPHERIC SYSTEMS** September 10

F2.1 TELESCOPE DESIGN STUDY FOR THE NASA STRATOSPHERIC OBSERVATORY FOR INFRARED ASTRONOMY (SOFIA) - G.W.Sutton, H.M. Martin*, Hans Kärcher** and Kent Pflibsen, Kaman Aerospace Corporation, Optical Development Center, Tucson, AZ 85706, *Steward Observatory Mirror Laboratory, University of Arizona, Tucson, Arizona, **MAN GHH, Gustavsburg, Germany.

F2.2 A 380 GHZ SIS HETERODYNE SPECTROMETER FOR "PRONAOS" (BALLOON BORNE EXPERIMENT FOR SUBMILLIMETER RADIOASTRONOMY) - G.Beaudin,* A.Deschamps,* P. Encrenaz**, P.Febvre*, P. Feautrier**, C. Gac*, M.Gheudin,* B.Léridon,* R.Maoli,* D. Michet*, J.C. Pernot**, C.Robert*, C. Rosolen*, G.Ruffié,* and P. Vola*, *Observatoire de Paris-Meudon, 5 place Jules Janssen, 92195 Meudon, France, **Ecole Normale Supérieure, Laboratoire de Radioastronomie, 24 rue Lhomond, 75005 Paris, France.

F2.3 A COST EFFECTIVE TOTAL POWER RADIOMETER PACKAGE FOR ATMOSPHERIC RESEARCH - B.N.Lyons, W.M.Kelly, D.R.Vizard and U.S.Lidholm, Farran Technology Ltd., Ballincollig, Co.Cork, Ireland.

F2.4 IR DETECTORS FOR SPACEBORNE APPLICATIONS - Y.V.Munro and D.Hickman, Matra Marconi Space UK LTD, Anchorage Road, Portsmouth, UK.

F2.5 QUASI-OPTICAL TRIPLEXING FEED FOR SPACECRAFT RADIOMETER - R.J.Martin and W.J.Hall, BAe Space Systems, Bristol, UK.

F2.6 THE ISO LONG-WAVELENGTH SPECTROMETER - P.E.Clegg, Department of Physics, Queen Mary and Westfield College, London E1 4NS, UK.

F2.7 REFLECTOR AND MIRROR SYSTEMS FOR SUBMILLIMETER AND INFRARED TELESCOPES - AN OVERVIEW OF TECHNOLOGY AND COSTS - Hans J.Kärcher, MAN GHH, Gustavsburg, Germany.

F2.8 A HORIZONTAL ATMOSPHERIC TEMPERATURE SOUNDER BASED ON THE 60 GHZ OXYGEN ABSORPTIONS - R.W.McMillan. Georgia Institute of Technology, Georgia Tech Research Institute, Atlanta, Georgia 30332, USA.

F2.9 A SUBMILLIMETER-WAVE SENSOR FOR TRACE GAS STUDIES IN THE MIDDLE ATMOSPHERE - H. Nett, S. Crewell and K. Künzi, University of Bremen, FB 1, Institute of Remote Sensing, P.O. Box 330440, 2800 Bremen 33, FRG.

F2.10 GROUND-BASED MILLIMETER-WAVE MONITORING OF STRATOSPHERIC OZONE AT ALTITUDES ABOVE 20 KM - A.A. Krasil'nikov, Yu. Yu. Kulikov, and L.I. Fedoseev, Institute of Applied Physics of the Russian Academy of Sciences, 46 Ul'janov Str., Nizhny Novgorod, 603600, Russia.

SESSION F3

Friday AM | **SPECTROSCOPY - VII** | September 10

F3.1 FAR INFRARED SPIN RESONANCE IN II-VI D.M.S. (*Invited Keynote*) - J.L.Martin*, M.Goiran*, Z. Golacki**, J.Léotin* and S.Askenazy*, *Service des Champs Magnetiques Intenses, INSA, Complexe scientifique de Rangueil, 31077 Toulouse-Cedex, France; **Institute of Physics, Polish Academy of Sciences, 32/46 Al. Lotnikow, 02668 Warsaw, Poland.

F3.2 SUBMILLIMETER SPECTROSCOPY OF THE ELECTRON EXCITATIONS IN RARE-EARTH ORTHOFERRITES (*Invited Keynote*) - G.V.Kozlov, S.P.Lebedev, A.A.Mukhin, A.S.Prokhorov and A.A. Egoyan, General Physics Institute, Russian Academy of Sciences, 38 Vavilov St., Moscow 117942, Russia.

F3.3 PROGRESS IN GERMAN HIGH FIELD MAGNETO SPECTROSCOPY USING IR, FIR, AND MM WAVES: A QUANTUM TRANSITION FROM THE HOCHMAGNETFELDANLAGE IN BRAUNSCHWEIG TO THE HUMBOLDT HIGH MAGNETIC FIELD CENTER IN BERLIN (*Invited Keynote*) - M. von Ortenberg and coworkers, HUMBOLDT Universität zu Berlin and Technische Universität Braunschweig, Germany.

F3.4 ORIGIN OF SATELLITE STRUCTURES OF HIGH FIELD EPR IN $Cd_{1-x}Mn_xTe$ - G.Eilers*, M. von Ortenberg and R. Galazka**, Institut für Halbleiterphysik und Optik, Technische Universität Braunschweig, 3300 Braunschweig, Germany; **Polish Academy of Science, Institute of Physics, Warsaw, Poland.

F3.5 INFRARED REFLECTIVITY OF SEMICONDUCTOR MAGNETOPLASMAS - F. Elmzughi and D.R. Tilley, University of Essex, Colchester CO4 3SQ, UK.

F3.6 INFRARED REFLECTIVITY CALCULATIONS FOR RARE-EARTH METALS - K. Abraha and D.R. Tilley, University of Essex, Colchester CO4 3SQ, UK.

F3.7 HIGH RESOLUTION FTS STUDY OF MAGNETIC COMPOUNDS - M.N.Popova, Institute of Spectroscopy, Russian Academy of Sciences, 142092 Troitzk, Moscow region, Russia.

F3.8 FAR INFRARED STUDIES OF MAGNETIC SYSTEMS - T.Dumelow, D.E.Brown and T.J.Parker, Department of Physics, University of Essex, Colchester CO4 3SQ, UK.

F3.9 FIR-STUDY OF $TbPO_4$ - P.Janssen and P.Bruelemans, Katholieke Universiteit Leuven, Belgium.

F3.10	TIME-RESOLVED FAR INFRARED MAGNETOSPECTROSCOPY OF ULTRA-HIGH MOBILITY n-GaAs LAYERS AND GaAs/AlGaAs MULTI QUANTUM WELLS - R.E.M. de Bekker[+], J.M. Chamberlain*, M.B. Stanaway*, P. Wyder[+], C.R. Stanley** and M. Henini*, [+]MPI/HML, Boite Postale 166X, F-38042 Grenoble Cedex, France; *Physics Department, Nottingham University, Nottingham, NG7 2RD, England; **Department of Electronic & Electrical Engineering, Glasgow University, Glasgow G12 8QQ, Scotland.
F3.11	INFRA-RED CYCLOTRON RESONANCE OF 'CROSSED' BAND GAP SUPERLATTICES AT MAGNETIC FIELDS OF UP TO 150T - D.J. Barnes*#, R.J. Nicholas[+], R.J. Warburton,[+] N.J. Mason,[+] P.J. Walker [+] and N. Miura*, *Institute of Solid State Physics, Roppongi 7-22-1, Tokyo 106, Japan; [+]Physics Dept., Clarendon Laboratory, Parks Road, Oxford OX1 3PU, U.K; #Present address: Physics Dept., Geschwister-Scholl-Platz 1, University of Munich, 8000 Munich 22, Germany.

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