

Contents

Part I	Imaging and Characterization	
Photothermal Imaging Using Microwave Detection By J. Pelzl, U. Netzelmann, Th. Orth, and R. Kordecki (With 8 Figures)	2	
Micrometer Photoacoustic Imaging by Photodeformation: Application to Carbon-Carbon Composites By A. Déom, D. Boscher, and D. Balageas (With 2 Figures)	13	
Photothermal Imaging of Local Thermal Resistances By M. Beyfuss, J. Baumann, and R. Tilgner (With 3 Figures)	17	
Detection of Vertical Cracks in Ceramic Materials by the Mirage Effect By J. Rantala, J. Hartikainen, R. Lehtiniemi, R. Vuohelainen, M. Oksanen, J. Jaarinen, and M. Luukkala (With 2 Figures)	21	
A Novel "Flying-Spot" Infrared Camera for Imaging Very Fast Thermal-Wave Phenomena By Y.Q. Wang, P.K. Kuo, L.D. Favro, and R.L. Thomas (With 2 Figures)	24	
Characterization of Semiconductor Thin Films Using High-Frequency Photothermal-Optical-Beam-Deflection Imaging By Z.M. Liu, G.C. Wetsel, Jr., and T.M. Moore (With 2 Figures)	27	
Real-Time Thermal-Wave Imaging of Plasma-Sprayed Coatings and Adhesive Bonds Using a Box-Car Video Technique By T. Ahmed, H.J. Jin, P. Chen, P.K. Kuo, L.D. Favro, and R.L. Thomas (With 3 Figures)	30	
Non-destructive Evaluation of the Distribution of Stress by Means of the Photoacoustic Microscope By M. Kasai and T. Sawada (With 4 Figures)	33	
Characterization of Metal Defects in Insulating Materials By X.M. Teng and L.J. Inglehart (With 2 Figures)	37	
Thermal Wave Characterization of Ceramics By L.J. Inglehart (With 3 Figures)	40	

Time-Domain Opto-thermal Spectro-radiometry By R.E. Imhof, C.J. Whitters, and D.J.S. Birch (With 4 Figures)	46
Time-Resolved Infrared Radiometry for Characterization of Structured Materials By J.W. MacLachlan Spicer, W.D. Kerns, L.C. Aamodt, and J.C. Murphy (With 3 Figures)	55
The Effect of Transverse Heatflow and the Use of Characteristic Times in Studying Multilayered-Coatings in the Time Domain By L.C. Aamodt, J.W. MacLachlan Spicer, and J.C. Murphy (With 3 Figures)	59
Photoacoustic Quantitative Depth Profiling of an Ion-Pair Adsorbed Polyvinylchloride Film Using an Approximation of the Inverse Laplace Transform By A. Harata and T. Sawada (With 4 Figures)	64
Depth Profiling of Opaque Multilayer Materials by Correlation Photoacoustics By S.Y. Zhang, Q. Shen, B. Yan, Z.Q. Wang, and Y.C. Shen (With 4 Figures)	67
Modelling of Sample Translucency, Substrate Absorption and Interface Defects for Thermal Wave Infrared Inspection of Thermal Barrier Coatings By J.D. Morris, D.P. Almond, P.M. Patel, and H. Reiter (With 2 Figures)	71
Transient Thermal Wave Techniques for the Characterisation of Surface Coatings By S.K. Lau, D.P. Almond, and P.M. Patel (With 5 Figures)	74
Numerical Analysis of the Transient Thermal Response of Subsurface Defects By S.K. Lau, D.P. Almond, and P.M. Patel (With 3 Figures)	78
Measurement of the Thermal Diffusivity and Effusivity of Porous Bulk Materials By B.K. Bein, U. Bertsch, W. Rubelowski, M.M.F. d'Aguiar Neto, and J. Pelzl (With 4 Figures)	82
Photoacoustic Measurements of Thermophysical Properties Between Room Temperature and 1000K – Experimental Technique and First Results for Graphites By B.K. Bein, H.W. Schmidt, J. Gibkes, J. Pelzl, and P.S. Bechthold (With 3 Figures)	86

NDE Applications of High-Resolution Photoinductive Imaging By J.C. Moulder, D.N. Rose, D.C. Bryk, and J.S. Siwicki (With 3 Figures)	91
Nondestructive Evaluation of a Semi-infinite Buried Slab by Photothermal Deflection By A. Sánchez-Lavega, A. Salazar, and J. Fernández (With 4 Figures)	95
Impulse Response Measurements Using Both Photoacoustic and Photothermal Deflection Methods By P.G. Cummins, S.A. Johnson, R.M. Miller, A. Allan, and A. Watkins (With 3 Figures)	99

Part III Thin Films

Mapping of Charge Profiles of Thin Electret Films by Sub-nanosecond Thermal Pulses By H. Coufal and R.K. Grygier (With 2 Figures)	104
Reduction of the Photoacoustic Signal by the Evaporation Resistance of Thin Films on Liquids and Solids By R. Osiander, B. Helm, and P. Korpiun (With 2 Figures)	107
Photopyroelectric Spectroscopy (PPES) of a-Si:H Thin Films on Quartz By A. Mandelis, R.E. Wagner, K. Ghandi, R. Baltman, and Phat Dao (With 3 Figures)	110
Photothermal Deflection Method for Monitoring Photoelectronic and Nonradiative Energy Conversion in Semiconductor Photoelectrochemical (PEC) Cells By R.E. Wagner and A. Mandelis (With 1 Figure)	113
Photothermal Spectroscopy of Rhodamine 6G Dye in Organic and Inorganic Amorphous Films By E. Strauss, H. Prekel, D. Otteken, and R. Reisfeld (With 1 Figure)	117
Photoacoustic-Attenuated Total Reflection Study of Surface Roughness in Thin Metal Films By Sohair Negm and H. Talaat (With 3 Figures)	120
Thermal Wave Measurement of Diamond Films By P.K. Kuo, Lanhua Wei, R.L. Thomas, and R.W. Pryor (With 1 Figure)	124
Thermal Diffusivity of Thin Diamond Films By W.P. Winfree, B.S. Crews, and S. Albin	127
Thermal Diffusivity of CVD Diamond Films Using Thermal Wave Techniques By H.P.R. Frederikse, A. Feldman, and X.T. Ying (With 1 Figure) . .	130

Measurements of the Absorption Distribution of Optical Thin Films by Scanning Photothermal Microscopy By Huang Xue-bo and Chen Wen-bin (With 6 Figures)	133
--	-----

Part IV Semiconductors

High Resolution Thermal Wave Measurements and Imaging of Defects and Damage in Electronic Materials By J. Opsal (With 5 Figures)	140
Subsurface Defect Inspection in IC Devices with Thermal Wave Imaging By W.L. Smith, C.G. Welles, and A. Rosencwaig (With 2 Figures)	146
Temperature Effect on Photothermal Reflectance Signal: Application to Ion Implanted and Amorphous Silicon By C. Christofides, I.A. Vitkin, and A. Mandelis (With 1 Figure)	149
Study of the Induced Damage and of the Annealing Kinetics of Defects in Ion Implanted Silicon Using the Photothermal Reflectance Technique By I.A. Vitkin, C. Christofides, and A. Mandelis (With 1 Figure)	153
Subgap Amorphous Silicon Photothermal Deflection Spectroscopy: Spatial Absorption Localization Studies By D. Fournier, J.P. Roger, A.C. Boccara, M.L. Theye, L. Chahed, W.A. Turner, and W. Paul (With 4 Figures)	156
Subgap Absorption Spectra of Ion Implanted Si and GaAs Layers By L. Luciani, Massimo Marinelli, U. Zammit, R. Pizzoferrato, F. Scudieri, and S. Martellucci (With 4 Figures)	160
Beam Deflection Investigation of the Dynamics of Carriers Photoexcited from Deep Centers in CdS:Cu ⁺ By E. Strauss, Th. Sommer, and R.K. Germer (With 1 Figure)	163
Axisymmetrical Modeling of a Photothermal Collinear Beam Deflection in a Semiconductor with the Use of a Fast Hankel Transform By M. Choquet and L. Bertrand (With 2 Figures)	166
Frequency Dependence of Amplitude and Phase of Photothermal-Optical-Beam-Deflection Signal By G.C. Wetsel, Jr. and Z.M. Liu (With 1 Figure)	170
Determination of Optical and Thermal Properties of the GaAsSb/GaAs Heterostructure by Photothermal Deflection Spectroscopy By N. Yacoubi and H. Mani (With 6 Figures)	173

Anomalous Properties of Amorphous Semiconductor Superlattices Characterized by Photoacoustic and Photothermal Spectra By S.Y. Zhang, B.F. Zhang, Z.C. Wang, E.A. Gardner, and J.P. Zhou (With 2 Figures)	177
Piezoelectric Photoacoustic Effect of Semiconductors in DC Electric Fields By Yue-sheng Lu and Shu-yi Zhang (With 1 Figure)	180
Photoacoustic Study of the Glass Transition and Crystallization in Bulk Ge_xTe_{1-x} and Si_xTe_{1-x} Glasses By K.N. Madhusoodanan, J. Philip, S. Asokan, G. Parthasarathy, and E.S.R. Gopal (With 4 Figures)	183

Part V High-Temperature Superconductors

Spectroscopy of High T_c Oxides and Plasma Frequency Determination By N. Bontemps, D. Fournier, A.C. Bocvara, and P. Monod (With 3 Figures)	188
Imaging of Defects in Metallo-organic Thin Films by Photothermal Deflection By J.A. Sell, M.S. Meyer, and J.V. Mantese (With 4 Figures)	191
Laser Beam Deflection as a Probe of Laser Ablation of Materials By J.A. Sell, D.M. Heffelfinger, P. Ventzek, and R.M. Gilgenbach (With 3 Figures)	194
Specific Heat Jump in High T_c Superconductors Measured by a Compensation Technique By M. Müller, R. Osiander, A. Gold, and P. Korpiun (With 4 Figures)	198
Photothermal Measurements of High- T_c Superconductors By J.T. Fanton, A. Kapitulnik, D.B. Mitzi, B.T. Khuri-Yakub, and G.S. Kino (With 2 Figures)	202
Investigation of Surface Diffusivity of High T_c Superconductivity Films by the "Mirage Effect" By Xiaorong Zhang, Changning Gan, Ziran Xu, Shiyuan Zhang, and Hongchai Zhang (With 2 Figures)	205
Simultaneous Monitoring of Specific Heat, Thermal Conductivity, and Thermal Diffusivity Anomalies in $YBa_2Cu_3O_{7-x}$ Superconductors Using the Photopyroelectric Effect By F. Murtas, M.G. Mecozzi, Massimo Marinelli, U. Zammit, R. Pizzoferrato, F. Scudieri, S. Martellucci, and Marco Marinelli (With 4 Figures)	208

Photopyroelectric Impulse Response Investigation of Single Crystal $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$	211
By S.B. Peralta, I.A. Vitkin, K. Ghandi, A. Mandelis, W. Sadowski, and E. Walker (With 2 Figures)	211
High Resolution Photoacoustic Spectroscopy of Ho_2O_3 and Nd_2O_3 Powders with a Piezoelectric Detector	214
By K. Narayanan and S.N. Thakur (With 3 Figures)	214
Separation of Surface Optical Absorption of BaYCuO Thin Film from Absorption of Substrate by Using the Phase of the Photoacoustic Signal	218
By Guiwen Zhao and Jiaqi Wu (With 3 Figures)	218

Part VI Nonoptical Excitation Sources

X-Ray Photoacoustics for Characterization and Non-destructive Evaluation	222
By T. Masujima (With 16 Figures)	222
Photoacoustic X-Ray Absorption Near Edge Structure in CuInSe_2	235
By T. Toyoda, T. Masujima, H. Shiwaku, H. Nakanishi, S. Endo, T. Irie, A. Iida, H. Kawata, and M. Ando (With 4 Figures)	235
Energy Transfer from Low Energy Noble Gas Ions to Gold Surfaces Using a Pyroelectric Calorimeter	238
By H. Coufal and H.F. Winters (With 2 Figures)	238
Energy Deposition at Solid Surfaces Studied by cw-Photothermal Displacement Spectroscopy	241
By M. Reichling, A. de la Calle, and E. Matthias (With 4 Figures) . .	241
Evaluation of the Temperature Dependence of Electron Acoustic Signals in Silicon by Use of a Capacitive Transducer	245
By M. Domnik and L.J. Balk (With 3 Figures)	245
Optical Beam Deflection in Semiconductors with Electron Beam Excitation	249
By J.C. Murphy, J.W. MacLachlan Spicer, R.B. Givens, L.C. Aamodt, and G. Chang (With 2 Figures)	249
Study of Magnetostatic Modes in Yttrium Iron Garnet by Photothermal Laser Beam Deflection	254
By O. von Geisau, U. Netzelmann, S.M. Rezende, and J. Pelzl (With 1 Figure)	254
Detection of Nonthermal Microwave-Induced Photoacoustic Signals in Water	257
By Soo Chin Liew and T. Bowen (With 2 Figures)	257

Part VII Thermoelasticity

Laser-Generated Ultrasound: Toward Realistic Modeling By F.A. McDonald (With 3 Figures)	262
Transmission and Reflection Thermoacoustic Imaging of Metallic Samples By B. Cretin (With 2 Figures)	269
Thermoelastic Properties of a Two-Material Junction By N. Tankovsky, U. Netzelmann, and J. Pelzl (With 3 Figures)	272
Photoacoustic Evaluation of Aerogel-Glass Interfaces By M. Oksanen, J. Stor-Pellinen, J. Rantala, J. Hartikainen, R. Lehtiniemi, R. Vuohelainen, and M. Luukkala (With 3 Figures)	275
A Beam Deflection Technique for Photo-acoustic Lamb Wave Measurements By L. Noui and R.J. Dewhurst (With 2 Figures)	278
Laser Induced Sheet Waves for Investigating Anisotropy in Polymer Film By L. Noui, Q. Shan, and R.J. Dewhurst (With 3 Figures)	282

Part VIII Thermal Properties and Phase Transitions

Photoacoustic Monitoring of Polymerization Processes By M.W. Sigrist (With 2 Figures)	288
Simultaneous Monitoring of Heat Capacity Thermal Conductivity and Diffusivity over the Smectic A-Nematic Transition in Alkylcyanobiphenyl Liquid Crystals By U. Zammit, Massimo Marinelli, R. Pizzoferrato, F. Scudieri, and S. Martellucci (With 1 Figure)	291
Photoacoustic Measurement of the Glass Transition of Polymeric Materials By D. Lévesque, L. Bertrand, and L. Piché (With 2 Figures)	294
Photoacoustic Investigation of the Anisotropic Thermal Behavior of Liquid Crystals By C. Glorieux, E. Schoubs, and J. Thoen (With 1 Figure)	297
Photopyroelectric Detection of Phase Transitions in Thermally Thick Solids By D. Dadârlat, M. Chirtoc, and D. Bicanic (With 2 Figures)	300
Phase Transition of GMO and TGS Crystals Studied by a Photothermal Beam-Deflection Technique By H.J. Seo, S.I. Yun, Min Su Jang, and T.Y. Kim (With 2 Figures) . .	303

Anisotropic Thermal Diffusivity Measurements in a Discotic Liquid Crystal Using Photothermal Probe Beam Deflection By M. Gharbia, A. Hadj-Sahraoui, G. Louis, A. Gharbi, and P. Peretti (With 2 Figures)	306
The Photoacoustic Signal of Fractal Structures By R. Osiander, R. Haberkern, P. Korpiun, and W. Schirmacher (With 2 Figures)	309
Effect of Sorption and Mass Diffusion in Porous Materials on the Photoacoustic Signal By P. Korpiun, W. Herrmann, and R. Osiander (With 1 Figure)	313
Photothermal Measurements of Optical Absorption Losses in Laser Components By J.P. Roger, F. Charbonnier, D. Fournier, and A.C. Boccara (With 2 Figures)	316
High-Sensitivity Photothermal Absorption Measurements on Curved Optical Thin Film Optics By H.-G. Walther and E. Welsch (With 3 Figures)	319
Opto-Thermal Investigation of Dichroic Materials By P.H. Willson, R.E. Imhof, D.J.S. Birch, and J.F. Webb (With 5 Figures)	322
Photoacoustic and EPR Investigation of Iron Oxide Doping of Soda-Lime Glasses By A.M. Mansanares, F.C.G. Gandra, E.C. da Silva, H. Vargas, and L.C.M. Miranda (With 2 Figures)	326
Pulsed Laser Photothermal Radiometry and Photothermal Beam Deflection Spectroscopy: Determination of Thermal Diffusivities of Liquids By D.P. Cobranchi, N.F. Leite, S.J. Isak, S.J. Komorowski, A. Gerhard, and E.M. Eyring (With 2 Figures)	328
Photothermal Deflection Method for Thermal Diffusivity Measurements: A Thermo-optical Classification of Solids By A. Salazar, A. Sánchez-Lavega, and J. Fernandez (With 2 Figures)	331

Part IX Weakly Absorbing Systems

Photoacoustic Resonance Spectroscopy: A Tool for High Precision Experiments By P. Hess (With 6 Figures)	336
Frequency Domain Analysis of Acoustic Resonances Excited with Single Laser Pulses By M. Fiedler and P. Hess (With 3 Figures)	344

Photopyroelectric Solid State Sensor for Hydrogen Gas Trace Detection By A. Mandelis and C. Christofides (With 2 Figures)	347
Photoacoustic and Mirage Effect on Liquids By P. Korpilun, F. Lepoutre, H. Schmitt, and R. Osiander (With 3 Figures)	351
Optoacoustic Raman Gain Spectroscopy with Pulsed Lasers By G.M. Bilmes, M. Rohr, and S.E. Braslavsky (With 3 Figures) . . .	354
Spectrally Resolved Laser Photoacoustic Monitoring of NH ₃ in Power Plant Emission By A. Olafsson, M. Hammerich, and J. Henningsen (With 2 Figures) . .	357
Two-Photon Absorption of Formaldehyde Using Pulsed Gas Phase Photoacoustic Spectroscopy By A.V. Ravi Kumar, G. Padmaja, V.P.N. Nampoori, and C.P.G. Vallabhan (With 3 Figures)	360
The Effect of Background Absorption on the Photoacoustic Measurement of Ammonia in the Atmosphere By R.A. Rooth, A.J.L. Verhage, and L.W. Wouters (With 3 Figures) . .	363
Stack Gas Monitoring by Pulsed Laser Optoacoustic Spectroscopy By I. Carrer, M. Monguzzi, E. Zanzottera, L. Civitano, and E. Sani (With 1 Figure)	366
Photoacoustic Measurement of Plant Gas Exchange By O. Oehler and H. Blum (With 2 Figures)	369
Laser Photoacoustic Measurements in Plane Gas Jets By V.P. Zharov and Ya.O. Symanovskii (With 3 Figures)	372
A Photothermal Study of the Photolysis of Bromine at 532nm By K. Koseki, H. Matsui, and M. Koshi (With 3 Figures)	376

Part X Photochemistry

Picosecond Transient Thermal Phase Grating Spectroscopy: From Proteins to Surfaces By R.J.D. Miller, L. Genberg, L. Richard, and S.M. Gracewski (With 5 Figures)	380
Photothermal Energy Balance Analysis of Photovoltaic Cells By D. Cahen, B. Büchner, H. Flaisher, and M. Wolf (With 6 Figures) . .	389
Calorimetric Characterization of Semiconductor Lasers By B. Büchner, M. Wolf, and D. Cahen (With 3 Figures)	397

Measurement of the Quantum Yield of Triplet Formation of Transient Species by Using the Time-Resolved Thermal Lens Method By M. Terazima and T. Azumi (With 2 Figures)	400
Characteristic Times of Non-radiative Processes as Studied by Correlation Photoacoustics By Y. Sugitani and M. Habiro (With 1 Figure)	403
Optical Saturation in the Photothermal Spectroscopy of Fluorescent Materials By S.B. Peralta and A. Mandelis (With 2 Figures)	406
Production of Anisotropic Photoacoustic Pressure Waves by Photodissociation of Molecular Chlorine By S.M. Park, M.I. Khan, and G.J. Diebold (With 3 Figures)	409
Laser Induced Photoacoustic Spectroscopy of Actinides in Alkaline Solutions in an Electrochemically Controlled Anaerobic Environment By J.E. Cross, D. Crossley, M. Liezers, J.W. McMillan, P.M. Pollard, and S. Turner (With 2 Figures)	413
Photoacoustic Study of Adatoms in Surface Enhanced Second Harmonic Generation By E.C. Jung, J.W. Hwang, Y.D. Kim, and C.S. Jung (With 1 Figure)	416

Part XI Biology and Medicine

Laser-Tissue Interactions in the Nanosecond, Picosecond and Femtosecond Time Domains By C.A. Puliafito, R. Birngruber, T.F. Deutsch, J.G. Fujimoto, D. Stern, and B. Zysset (With 7 Figures)	420
Investigation of Human Tissues with Scanning Electron Acoustic Microscopy By L.J. Balk, M. Domnik, K. Niklas, and P. Mestres (With 5 Figures)	428
The Application of Photoacoustic Detection in the Primary Diagnosis of Cancer By Sun Hong-Wei, Huang Men-Cai, Wang Qing-Hua, and Wu Wan-Chun (With 4 Figures)	431
Photoacoustic Signals from Leaves and Time Domain Measurements of Photosynthetic Gas Exchange (Oxygen Evolution and Uptake) By O. Canaani, S. Malkin, E. Shalgi, J. Kolbowski, P. van Dam, and D. Mauzerall (With 4 Figures)	435
Photoacoustic Signals of Leaves as Influenced by the Structure of the Leaf Tissue By C. Buschmann (With 1 Figure)	439

Identification of Chlorophylls and Carotenoids by Photoacoustic Spectroscopy By Zhao Guiwen, Cui Hua, Luo Siquan, and Su Qingde (With 4 Figures)	442
Photothermal Colorimetry of Phosphorus and Ammonium in Aqueous Phase for Use in the Agricultural Practice By D. Bicanic, E. Strauss, J.P. Favier, A. Miklós, P. Torfs, and M. Lubbers (With 1 Figure)	445
Enhanced Photobleaching of Hematoporphyrin IX in Intralipid: A Photoacoustic Study By A. Lachaîne, R. Pottier, and J.C. Kennedy (With 2 Figures)	448
Impact of Air Pollutants and Acid Rain on Corn and Sugar Maple Seedlings Assessed by Photoacoustic Spectroscopy By C.N. N'soukpoé-Kossi, H. Proteau, R. Bélanger, S. Keilani, D. Charlebois, and R.M. Leblanc (With 3 Figures)	451
Scanning Microscopy of Adsorbed Water in Annual Rings of Wood By B. Helm, R. Osiander, and P. Korpiun (With 2 Figures)	454
Intracavity Photoacoustic Trace Detection of C_2H_4 at ppt Levels By F. Harren, F. Bijnen, C. Heffels, J. Reuss, L.A.C.J. Voesenek, and C.W.P.M. Blom (With 1 Figure)	457
Sensitive Laser Photoacoustic Stark Detection of Ammonia in the Air and in Open Top Fumigation Chambers By H. Sauren, D.D. Bicanic, H. Jalink, A. Miklós, J. Quist, and J. Mooi (With 1 Figure)	460
Optocalorimetric Methods for Registration of Phase Transitions in a Laser Irradiated Biomedical Medium By V.P. Zharov, A.A. Kozlov, Yu.O. Litvinov, B.V. Zubov, and A.A. Savelyev (With 3 Figures)	463

Part XII Techniques and Instrumentation

Photothermal Investigations: Why, When and How? By A.C. Boccara and D. Fournier	468
A Single Beam Interferometry of a Thermal Bump By P.K. Kuo, L.D. Favro, M. Munidas, and R.L. Thomas (With 6 Figures)	472
Amplitude and Phase Modulation (AM-PM) Wideband Photothermal Spectrometry By J.F. Power (With 2 Figures)	479
Photoacoustic Waveforms from Laser Heated Particulate Matter By G.J. Diebold, P. Karcher, and S.M. Park (With 4 Figures)	486

Real-Time Asynchronous/Synchronous Lock-In Thermal-Wave Imaging with an IR Video Camera By L.D. Favro, T. Ahmed, H.J. Jin, P. Chen, P.K. Kuo, and R.L. Thomas (With 3 Figures)	490
The Photothermal Deflection Dynamics of a Laser Beam: Application to Energy Relaxation Measurements By M.-C. Gagné, and S.L. Chin (With 2 Figures)	493
Fast Photothermal Measurement System for Nondestructive Evaluation By J. Hartikainen and M. Luukkala (With 3 Figures)	496
On Gas Viscosity and Residual Volume Effects in a Photoacoustic Cell By D. Lévesque and L. Bertrand (With 2 Figures)	500
Fourier Transform Infrared Photopyroelectric Spectroscopy of Solids: A New Technique By A. Mandelis, F. Boroumand, H. Solka, J. Highfield, and H. van den Bergh (With 1 Figure)	504
Photopyroelectric Computerized Scanner for Contactless, Spatially Resolved Detection of Thermal Waves By M. Mieszkowski and A. Mandelis (With 2 Figures)	507
Photothermal Wave Diffraction and Interference in Condensed Media By A. Mandelis and K.F. Leung (With 3 Figures)	511
Standing Wave Excitation as a Means of Suppressing Volume Signals in Photothermal Detection By B. Mongeau, M. Saint-Denis, and L. Bertrand (With 2 Figures) . .	514
Optothermal Laser Spectrometer By S.T. Kornilov, I.V. Ostrejkovskij, and E.D. Protsenko (With 2 Figures)	517
Photothermal Spectroscopy and Calorimetry by Ultrasonics By O. Oehler, S. Friedrich, and A. Schäppi (With 3 Figures)	519
The Resonant Photoacoustic Heat Pipe Cell for Spectral Investigation of Low Volatility Liquids and Solids By H. Jalink and D. Bicanic (With 2 Figures)	522
Fibre Optic Laser Generation of Thermal Waves and Their Infrared Detection By P.M. Patel, D.P. Almond, and H. Reiter (With 3 Figures)	526
Measurement of the Photothermal Signal Phase Using Step-Scan Interferometry By R.A. Palmer, C.J. Manning, J.M. Widder, R.M. Dittmar, P.J. Thomas, and J.L. Chao (With 5 Figures)	529

A Rapid-Scan and High-Fidelity Dual-Mode Photoacoustic Microscope and Its Application to Paper Chromatography	533
By T. Hoshimiya (With 3 Figures)	533
Operational Diagram for Photopyroelectric Experiments with Periodic Excitation	
By M. Chirtoc, G. Mihailescu, and D. Bicanic (With 1 Figure)	537
Measurement of the Absolute Temperature Rise of Surfaces During Pulsed Laser Heating	
By J. Fischer, Q. Kong, T. Stehlin, and F. Träger (With 2 Figures)	539
Index of Contributors	543