GENERAL PHYSICS

I.	Molecule Microscopy	
	Scanning Pinhole Molecule Microscope (SPMM)	2
	Scanning Desorption Molecule Microscope (SDMM)	2
	Desorption Experiments Related to SDMM	2
II.	Electron Optics	5
	Modular Electron Optical Illumination System	9
	Multioptical Bench	Ę
	Spherical Aberration Corrector Module (SACM)	(
	Auger Emission Microscope	6
III.	Physical Electronics and Surface Physics	7
IV.	Atomic Resonance and Scattering	ç
	Studies of Superradiance and Coherence	ç
	Van der Waals Molecules	ç
	Alkali Atom Interactions	10
v.	Quantum Electronics	13
	Laser Applications	13
	Long-Term Laser Frequency Stabilization Using a Molecular Beam	13
	High-Resolution Spectroscopy Using Molecular Beams	14
	Single-Frequency Continuous-Wave Dye Laser	14
	Holographic Applications	15
	Laser Doppler Velocimeter	16
	Gaseous Lasers	17
	Ultraviolet Lasers	17
	CO ₂ Laser	18
	CO Laser Systems	18
	Nonlinear Phenomena	20
	Laser Locking over a "Wide" Frequency Range	20
	Short Laser Pulses	21
	Model of CO ₂ Laser Plasmas	21
VI.	Gravitation Research	23
	Measurement of the Isotropy of Cosmic Background Radiation in the Far Infrared	23
	Heterodyne Detection in the Far Infrared	27
	Electromagnetically Coupled Broadband Gravitational Antenna	31

VII.	Microwave and Millimeter Wave Techniques	3.5
	Low-Temperature Millimeter Wave Receivers	35
	Microwave Measurements and Instrumentation	3.5
	Very Long Baseline Interferometry	36
VIII.	Radio Astronomy	37
	Atmospheric Measurements with Passive Microwave Techniques	37
	Microwave Spectroscopy of the Interstellar Medium	37
	Sensing of Subsurface Body Tissue Temperatures with Microwave Radiometry	39
	Long-Baseline Optical Interferometer	42
	Environmental Sensing with Nimbus Satellite Passive Microwave Spectrometers	42
	Experiments for Microwave Temperature Sounding of the Mesosphere and Upper Stratosphere	43
	Radio Structure of Galaxies	44
IX.	Electrodynamics of Media	45
	Subsurface Probing and Communication with a Dipole Antenna	45
	Optics of Bianisotropic Media and Optical Systems	45
	Microwave Remote Sensing of the Earth	46
х.	Transport Phenomena in Solids	47
XI.	Physical Acoustics	49
	PLASMA DYNAMICS	
XII.	Plasma Dynamics	53
	Confinement Systems	54
	Physics of High-Temperature Plasmas	54
	Laser-Plasma Interactions	5.5
	Optical Mixing in a Target Plasma	56
	Production of Plasmons by Stimulated Raman Scattering	57
	Interactions with Solid Targets	57
	Symbolic Computation (MACSYMA) in Plasma Physics	59
	Intense Relativistic Beam-Plasma Interactions	61
	Fusion Technology Studies	63

	Experimental Studies - Waves, Turbulence, and Radiation	64
	Plasma Diagnostics	64
	Scattering of 10.6 µm Radiation	64
	Linear Quadrupole Experiment (SLIM)	64
	Wave Conversion near Lower Hybrid Resonance	65
	Parametric Instabilities in Beam-Plasma Interaction	65
	Nonlinear Saturation Experiments	65
	Trapped-Particle Experiment	65
	Stabilized Mirror Experiment	66
	Wave-Particle Interaction	66
	General Theory	67
	Collisional and Turbulent Transport in Toroidally Confined Plasmas	67
	Nonlinear and Turbulence Theory	67
	COMMUNICATION SCIENCES AND ENGINEERING	
XIII.	Processing and Transmission of Information	71
	Complexity of Networks and Algorithms	71
	Information Theory of Data-Processing Systems	72
	Optical Channels	73
XIV.	Detection and Estimation Theory	75
	Tracking of Narrow-band Space/Time Random Processes	
	with Adaptive Arrays	75
	Detection and Estimation Theory Methods	75
	Seismic Data Processing for the IDOE East Atlantic Continental Margin Program	76
V77	Di il I Simual Duana anima	
XV.	Digital Notwork Theory and Filter Structures	79
	Digital Network Theory and Filter Structures	79
	Multidimensional Signal Processing	80
	Applications of Digital Signal Processing to Speech	81
	Digital Signal Processing Computer (The Black Box)	82

XVI.	Speech Communication	83
	Timing Studies	83
	Perception of Speech and Speechlike Sounds	85
	Speech Production	87
	Speech Synthesis	88
	Speech Development and Pathologies	88
	Studies of Interspeaker and Intraspeaker Variability	89
XVII.	Linguistics	91
XVIII.	Cognitive Information Processing	93
	Text-to-Speech Conversion	93
	Character Recognition	94
	Precise Transmission and Duplication of Radiographs	95
	Study of Diagnostic Performance of Radiologists Reading Chest X-ray Films	96
	Digital Wirephoto System	96
	Classification of White Blood Cells	98
	Measurement of Cell Adhesiveness	99
XIX.	Communications Biophysics	101
	Signal Transmission in the Auditory System	101
	Auditory Psychophysics	106
	Intensity Perception and Loudness	106
	Binaural Interaction	107
	Hearing Aids	108
	Localization and Signal Separation	108
	Aural Combination Tones: Pure and Applied	110
	Transduction Mechanisms in Lateral Line Organs	111
	Hair-Cell Receptor Potentials	111
	Cupula Structure and Dynamics	112
	Afferent Response	113
	Models of Cochlear Mechanisms	115
	Biomedical Engineering	116
	Instrumentation	116
	Computer Applications	117
	Telemedicine Systems	117
	Neural Mechanisms of Eyelid Behavior	119
	Musical Acoustics Research	121

XX.	Neurophysiology	123
	Membrane Processes	123
	Visual Receptor Model	124
	Study of Frog Rods	125
	New Staining Methods	125
	Stentor Coeruleus	126
	Optic-Nerve Regeneration	126
	Activity in Substantia Gelatinosa	127
	Color Blindness of Retrobulbar Origin	127
	Mechanisms for Color Vision	127
	Pattern Display in Flounder	127
	Description and Characterization of Threshold Changes in Frog Peripheral Nerve Axons	128
	Development of a Model Frog Nerve Axon Showing Threshold Oscillations	129
	Distribution of Nerve Impulses among the Branches of Axonal Trees	130
	Conduction of Impulses in Frog Peripheral Nerves	130
	Sources of Impulse-Dependent Threshold Changes in Axon Membrane	131
	The Role of Sodium, Potassium, and Calcium Ions in Activity-Dependent Threshold Shifts	131
	Nerve Spike Conduction Block in Crayfish Motoneuron Axon Branches	132
	Development of an External Reed Larynx for Rehabilitation of Laryngectomized Patients	132
	Design and Construction of a Portable Adjustable Hearing Aid	133
D. 1. 1	inaking and Dangara	
Publi	ications and Reports	135
Pers	onnel	140
Autho	or Index	147
Rese	arch Support Index	148

