

EML RESEARCH REPORT NO. 3

BIBLIOGRAPHY
on
OPTICAL INFORMATION AND DATA
PROCESSING

Compiled by
J. P. Moffatt, A. T. Shankle,
and F. J. Tischer

This research was supported by
The National Aeronautics and Space Administration
and partially funded under NGR-34-002-038

NORTH CAROLINA STATE UNIVERSITY
Raleigh, North Carolina

November 1966

CONTENTS

	<u>Page</u>
I. Introduction	1
II. List of Principal Periodicals with Abbreviations	3
III. Books	5
IV. List of Subtopics	6
V. Bibliography	7
VI. Authors' Affiliations	65
VII. List of Manufacturers	71

I. INTRODUCTION

Review of the literature on optical information and data processing shows that the volume of publications actually is larger than expected. The reason for this is the fact that the working field is not very new and that its concepts and methods were known for about twenty years, particularly in the specialized areas of photography and microscopy. A drastic increase of importance and volume, however, can be observed at the time of discovery of the generation of highly coherent light beams by lasers. The following rediscovery of holography additionally contributed to a considerable amount of new literature.

The large volume of publications makes literature search in this subject area difficult. This is accentuated by the fact that the titles may not adequately describe the content. This situation prompted the authors to prepare the present bibliography which, hopefully, will assist those working in this subject area to locate quickly literature pertinent to a specialized subsubject. The subdivision of the whole subject area into a sufficiently large number of subtopics with the articles listed under these is supposed to accomplish this in part. Simultaneously the length of abstracts was reduced to a bare minimum for adequately describing the content. Abstracts were omitted when the titles provided sufficient information on the content.

The bibliography is by no means complete. It contains publications of the open literature only since technical reports

by agencies and companies are often difficult to obtain. On the other hand, it is felt that this bibliography contains the essential articles representative for the various subtopics. The listed publications and their bibliographies in turn may lead to additional titles of interest.

A very few books on the subject and valuable information for study are listed on page 5. The list probably should contain more titles on optics, electromagnetics, and communication theory but it was kept to a minimum assuming familiarity with these subject areas from regular college course work.

The list of publications beginning on page 7 is organized in the following manner:

(1) The total field was subdivided into 22 subtopics indicated as headings of the groups and on each page in the upper right-hand corner.

(2) The articles in each group appear in subgroups listed by the year of publication in inverse chronology with the current year at the beginning.

(3) Within the yearly groupings, the articles are listed alphabetically by authors.

Additional information considered useful was also included. It consists of a list of periodicals with abbreviations on page 3, a list of the affiliations of the authors which shows where work is going on, and a list of principal manufacturers of optical components and equipment.

II. LIST OF PRINCIPAL PERIODICALS
WITH ABBREVIATIONS

(Abbreviations taken from the "World List of Scientific Periodicals")

<u>Publications</u>	<u>Abbreviations</u>
Applied Optics	Appl. Optics
IBM Journal of Research and Development	IBM J. Res. Dev.
IEEE Spectrum	IEEE Spectrum
IEEE Transactions on Information Theory (Formerly I.R.E. Trans. Inf. Theory)	IEEE Trans. Inf. Theory
IEEE Transactions on Microwave Theory and Techniques (Formerly I.R.E. Trans. microw. Theory. Tech.)	IEEE Trans. Microwave Theory & Tech.
IEEE International Convention Record (Formerly I.R.E. int. Conv. Rec., I.R.E. natn. Conv. Rec., or I.R.E. Conv. Rec.)	IEEE int. Conv. Rec.
Japanese Journal of Applied Physics	Jap. J. appl. Phys.
Journal of Applied Physics	J. appl. Phys.
Journal of the Optical Society of America	J. opt. Soc. Am.
Journal of the Society of Motion Picture and Television Engineers	J. Soc. Motion Pict. Telev. Engrs.
Nature (London)	Nature, Lond.
Photographic Science and Engineering	Photogr. Sci. Engng.
Proceedings of the IEEE (Formerly Proc. I.R.E.)	Proc. IEEE

Publications

Proceedings of the Institution
of Electrical Engineers

Proceedings of the Royal Society

Abbreviations

Proc. Instn. Elec. Engrs.

Proc. R. Soc.

III. BOOKS

- M. Born &
E. Wolf "Principles of Optics." Pergamon Press,
London, 1964
- E. B. Brown "Modern Optics." Reinhold Publ. Co.
New York, 1965
- "Applied Optics and Optical
Engineering," edited by
R. Kingslake. Vol. I-V Academic Press,
New York, 1965
- M. Kline &
I. W. Kay "Electromagnetic Theory and
Geometrical Optics." Interscience Publ.,
John Wiley & S., Inc.
1965
- "Progress in Optics," edited
by E. Wolf. Vol. I, 1961;
Vol. II, 1963; Vol. III, 1964. John Wiley & Sons, Inc.
- P. M. Duffieux "L'integrale Fourier et ses
applications à l'optique." Facultec des Sciences,
Besancon, 1946
- L. Mertz "Transformations in Optics." John Wiley & Sons, Inc.
1965
- G. W. Stroke "An Introduction to Coherent
Optics and Holography" Academic Press,
New York, 1966
- Symposium on "Optical and
Electro-Optical Information
Processing." (Mass.
Inst. of Techn., Cambridge,
Nov. 1964) Mass. Inst. of
Techn. Press
Cambridge, 1965
- Symposium on "Optical
Processing of Information."
(Office of Naval Research,
Wash., D.C., Oct. 1962) Spartan Books, Inc.
Baltimore, 1963
- Symposium on "Communication
and Information Theory
Aspects of Modern Optics,"
edited by E. L. O'Neill.
(General Electric Electr.
Lab, Syracuse, June 1960) General Electric Co.
Electronics Lab
Syracuse, New York

IV. BIBLIOGRAPHY

Subtopics

Applications

Coherence

Correlation Analysis

Correlation Processing (Filtering)

Detection

Diffraction

Electromagnetics

Filtering, (Spatial Frequencies)

Fourier Transform

Fresnel Transform

Holography

Interferometry

Laser

Matched Filtering

Miscellaneous

Modulation

Optical Information and Data Processing

Pattern Recognition

Photography

Sources

Systems

Television

Applications

1966

D. C. Beste
E. N. Leith

"An Optical Technique for Simul-
taneous Beam Forming & Cross
Correlation"
(Use of an optical
correlator for antenna
array simulation).

IEEE Trans.
Aerospace
2, 376 - 384
July 66

1965

Powell
Stetson

"Interferometric Vibration
Analysis by Wavefront
Reconstruction"

J. Opt. Soc. Am.
55, 1593
Dec. 65

1956

G. Toraldo
de Francia

"Directivity, Super Gain, and
Information"
(Comparison of some aspects
of antenna theory and the
optical theory of resolving
power. Information content
is discussed in relation to
directivity).

IRE Trans.
Antennas and
Prop.
4, 473 - 478
July 56

Coherence

1966

- R. Barakat "Theorem in Coherence Theory"
(Coherence requires monochromaticity). J. Opt. Soc. Am.
56, 739 - 740
June 66
- R. E. Kinzly "Images of Coherently Illuminated Edged Objects Formed by Scanning Optical Systems"
(Elimination of "ringing" in coherent images). J. Opt. Soc. Am.
56, 9 - 11
Jan 66
- C. W. McCutchen "Generalized Source & the Van Cittert-Zernike Theorem: A Study of the Spatial Coherence Required for Interferometry" J. Opt. Soc. Am.
56, 727 - 733
June 66
- R. H. Shore, et al "Diffraction by Apertures Illuminated with Partially Coherent Light"
(Relation of mutual coherence function to diffraction pattern is developed). J. Opt. Soc. Am.
56, 733 - 738
June 66

1965

- R. E. Kinzly "Investigations of the Influence of the Degree of Coherence Upon Images of Edge Objects" J. Opt. Soc. Am.
55, 1002 - 1007
Aug 65
- R. E. Williams "Partially Coherent Processing by Optical Means"
(Treatment of signals whose duration exceeds coherence time of source). IEEE Trans. Inf. Theory
11, 499 - 507
Oct 65

1964

- G. O. Reynolds
T. J. Skinner "Mutual Coherence Function Applied to Imaging through a Random Medium"
(Effect of medium is shown to be that of a low pass filter). J. Opt. Soc. Am.
54, 1302 - 1309
Nov 64

1963

H. Gamo	"Matrix Treatment of Partial Coherence"	Prog. in Opt.III 187 - 332 1963
---------	---	---------------------------------------

1962

W. H. Steel	"Transfer Function in Partially Coherent Light"	Symp on: Comm. & Inf. Theory Asp. of Mod. Opt. 91 - 114 1962
-------------	---	---

1959

G. B. Parrent	"Studies in the Theory of Partial Coherence" (Derivation of coherence properties of various sources).	Opt. Acta. 6, 285 - 296 July 59
W. H. Steel	"Scalar diffraction in terms of Coherence" (The diffraction relations for a partially coherent source).	Proc. Roy. Soc. London A, <u>249</u> , 574-588 Feb. 59

1955

E. Wolf	"A Macroscopic Theory of Interference & Diffraction of Light from Finite Sources. I. Fields with a narrow spectral range" (Discussion of coherence factor in optics).	Proc. Roy. Soc. London A, <u>225</u> , 96-111 Aug 55
---------	--	---

1951

H. H. Hopkins

"The Concept of Partial Coherence
in Optics"
(Definition of a "phase
coherence" factor).

Proc. Roy.
Soc.
London
A, 208, 263-277
Aug 51

1966

- C. S. Weaver
J. W. Goodman "A Technique for Optically
convolving two functions"
(Letter) Appl. Optics
5, 1248 - 1249
July 66
- J. T. Ator "Image velocity sensing by
optical correlation"
(Measuring the velocity of
a moving image by parallel-
slit spatial filter treated as
continuous optical correlation
processing). Appl. Optics
5, 1325 - 1331
Aug 66

1957

- H. Kubola
H. Okzu "Method of Measurement of Re-
sponse Function by Means of
Random Chart" J. Opt. Soc. Am.
47, 666 - 667
July 57
(Measurement of spatial
frequency response of an
optical system by means of
white noise).

1955

- H. H. Hopkins "Transparent Fibers for the
transmission of optical images"
(Summary of earlier experi-
ments. Treatment of the
mechanism of transmission of
light through the bundles). Opt. Acta
1, 164 - 170
Feb 55
- H. H. Hopkins "The frequency response of a
defocused optical system"
(Calculations of character-
istics of a defocused optical
system of rectangular and
circular aperture). Proc. R. Soc.
A231, 91 - 163
July 55

Detection

1965

- D. E. Bode, et al "Lead-Selenide detectors for intermediate temperature operation"
(Recent advances in the detector technology for the 3μ to 5μ region. PbSe films with high performance at 195°K (dry ice)). Appl. Optics
4, 327 - 331
Mar 65
- W. D. Gunter, et al "Enhancement of Photomultiplier Sensitivity by Total Internal Reflection" Appl. Opt.
4, 512 - 513
Apr 65
- C. W. Helstrom "The Detection & Resolution of Optical Signals"
(SNR of Detectors is determined). IEEE Trans.
Inf. Theory
10, 275 - 287
Oct 64
11, 125
Nov 65
- R. A. Smith "Detectors for ultraviolet, visible, and infrared radiation" Appl. Optics
4, 631 - 638
May 65

1963

- R. C. Jones "Information capacity of Radiation Detectors and of Light" Appl. Optics
2, 351 - 358
Apr 63

Diffraction

1966

- D. Malacara "Diffraction of a Plane Wavefront in an Afocal System" J. Opt. Soc. Am.
 (Distortions in the wavefront are developed). 56, 14 - 15
 Jan 66
- F. Kottler "Immagery of One-Dimensional Patterns" J. Opt. Soc. Am.
 F. M. Perrin (Calculation of diffraction patterns of sinusoidal objects). 56, 377 - 388
 Mar 66

1964

- R. Barakat "Application of the Sampling Theorem to Optical Diffraction Theory" J. Opt. Soc. Am.
 (Calculation of optical transfer function from sampled values of point spread function). 54, 920 - 930
 July 64
- R. Barakat "Diffraction Effects of Coma" J. Opt. Soc. Am.
 Houston (Square and circular apertures treated). 54, 1084 - 1088
 Sept 64
- H. P. Greinel "General Solution of the Diffraction Integral for a Rectangular Aperture in the Presence of Aberrations" J. Opt. Soc. Am.
 (Aberrations are considered in the Bessel-Legendre expansion of the fields). 54, 32 - 37
 Jan 64
- A. I. Mahan, "Far-Field Diffraction Patterns of Single Multiple Apertures Bounded by Arcs & Radii of Concentric Circles" J. Opt. Soc. Am.
 et al (Computations verified by measurement). 54, 721 - 732
 June 64

Diffraction

1961

- R. Barakat "The Intensity Distribution and Total Illumination of Aberration-Free Diffraction Images" Prog. in Opt. I
67 - 108
1961
(Presentation of Kirchhoff Diffraction theory).

1957

- M. De "An Interference Photometer for the Measurement of Amplitude Distributions in Diffraction Patterns" Opt. Acta.
4, 45 - 53
June 57
(Mach-Zender interferometer used to measure phase distributions in diffraction plane).

1956

- R. Burtin "Deux problemes de diffraction a grande ouverture en optique" Opt. Acta.
3, 104 - 109
Sept 56
(Diffraction theory employed to describe wide aperture images).

1954

- E. Wolf "Comparison of the Kirchhoff and the Rayleigh - Sommerfeld theories of Diffraction at an Aperture" J. Opt. Soc. Am.
54, 587 - 594
May 54
(Agreement is demonstrated for apertures large compared with illuminating wavelength).
- E. W. Marchand

1953

H. H. Hopkins

"On the Diffraction Theory of
Optical Images"

(Image formation formulated mathematically by considering coherence function in object plane, diffraction distribution, object structure).

Proc. R. Soc.
London
A, 217, 408-432
May 53

Filtering (Spatial Frequency)

1965

- J. D. Armitage,
et al "Absolute Contrast Enhancement"
(The conditions necessary
to justify application of
modulation transfer theory
to photographic masking are
specified). Appl. Optics
4, 445 - 451
Apr 65
- C. J. Drane
J. F. McIlvenna "Application of spatial frequency
concepts to the radar ground
mapping problem"
(Air Force Cambridge Research
Laboratories, Office of
Aerospace Research, L. G. Hanscom
Field, Bedford, Mass.). Appl. Optics
4, 1339 - 1345
Oct 65
- A. Kozma
D. L. Kelly "Spatial Filtering for Detection
of signals submerged in noise"
(Matched filtering is
described as a spatial
filtering operation). Appl. Optics
4, 387 - 392
Apr 65
- I. O. Tannhauser "Investigation of the influence
of apodization on the sine wave
response of photographic lenses" Appl. Optics
4, 731 - 736
June 65

1964

- D. B. Anderson "Application of semi-conductor
technology to coherent optical
transducers and spatial
filters" Symp. Opt. &
Electro-Opt.
Inf. Process.
221 - 234
Nov 64
- W. D. Montgomery "The Extension to Probability
Distributions for Detection
Spatial Filters"
(Filter design from proba-
bility distributions of
signals). IEEE Trans.
Inf. Theory
10, 2 - 5
Jan 64

Filtering (Spatial Frequency)

1964 - con't

- A. Vander Lugt "Signal Detection by Complex Spatial Filtering"
(Presentation of a means of implementing a complex spatial fiber, i. e. one that possesses controlled phase as well as amplitude characteristics).
IEEE Trans. Inf. Theory 10, 139-145
Apr 64
- A. Vander Lugt et al "Character Reading by Optical Spatial Filtering"
Symp. on: Optical & Electro-Opt. Inf. Process. Tech.
1964

1963

- P. J. van Heerden "A new optical method of storing and retrieving information"
(Develops the theory of the filter in the focal plane whose transmission at each point is proportional to the intensity of the light from the object).
Appl. Optics 2, 387 - 392
Apr 63
- J. Tsujiuchi "Correction of Optical Images by Compensation of Aberrations and by Spatial Frequency Filtering"
(Correction of aberrations by: compensating spatial filter, double diffraction).
Prog. in Opt. II 131 - 180
1963
- P. Jacquinot "Apodisation"
(Process of "band limiting" diffraction patterns is discussed).
Prog. in Opt. III 29 - 186
1963

1962

- A. Marechal "Filtering of Optical Images"
(Presentation of some techniques for refining a defocused image).
Symp. on: Comm. & Inf. Theory Asp. of Mod. Opt. 41 - 50
1962

Filtering (Spatial Frequency)

1961

- D. H. Kelly "Image-processing experiments" J. Opt. Soc. Am.
 (Technique is proposed for 51, 1095-1101
 generalized spatial filtering Oct 61
 with large, incoherent sources
 using the photographic
 Herschel effect).
- J. Tsujiuchi "Restitution des images abber- Opt. Acta.
 rantes par le filtrage des 8, 161 - 168
 frequences spatiales III. Apr 61
 Restitution de l'image prise
 avec un filtre a deux foyers"

1960

- J. Tsujiuchi "Restitution des images abber- Opt. Acta.
 rantes par le filtrage des 7, 385 - 398
 frequences spatiales II. Oct 60
 Restitution de l'image dont le
 spectre comprend une partie
 negative"
- J. Tsujiuchi "Restitution des images abber- Opt. Acta.
 rantes par le filtrage des 7, 243 - 261
 frequences spatiales" July 60

1956

- E. L. O'Neill "Spatial Filtering in Optics" IRE Trans.
 (Comparison of incoherent & Inf. Theory
 coherent image formation. 2, 56 - 65
 Analogy of coherent imaging June 56
 with correlation ideas).

1954

- T. P. Cheatham, Jr. "Optical Filters - their IRE Conv. Rec.
 A. Kohlenberg Equivalence to and differences Part 4, 6 - 12
 from Electrical Networks" 1954

Filtering (Spatial Frequency)

1953

A. Marechal
P. Croce

"Un Filtre de Frequences
Spatiales pour l'Amelioration
du Contrast des Images
Optiques"

Comptes Rendus
de Academie
des Sci.
237, 607 - 609
Sept 53

Fourier Transform

1966

- H. Osterberg "Reconstruction of Objects from their Diffraction Patterns"
(Determination of object configuration from diffraction patterns by use of Fourier Transforms). J. Opt. Soc. Am. 56, 723 - 726
- E. L. Titlebaum "A Generalization of a 2-Dimensional Fourier Transform Property for ambiguity Functions"
(Relates the 2-D Fourier transform to the ambiguity function). IEEE Trans. Inf. Theory 12, 80 - 81
Jan 66

1965

- R. Barakat "Determination of the Optical Transfer Function Directly from the Edge Spread Function"
(Solution involves inversion of a Fredholm Integral of first kind). J. Opt. Soc. Am. 55, 1217
Oct 65
- D. C. Beste "An Optical Technique for simultaneous beamforming and cross-correlation" IEEE Conv. Rec. 4, 177 - 187
1965
- E. N. Leith
- S. T. Fisher "On the Fourier transformation of sampled interferograms having a small number of samples" Appl. Opt. 4, 256 - 257
Feb 65
- H. H. Hopkins "Canonical Pupil Coordinates in Geometrical and Diffraction Image Theory"
(Two postulates necessary for valid application of Fourier treatment of transfer functions to the problem of image formation: (1) isoplanatism (stationarity) and (2) Fourier transform relationship between lens aperture distribution and in image plane). Japanese J. Appl. Phv. 4, Suppl. I, 31 - 35
1965

Fourier Transform

1965 - con't

- D. H. Kelly "Spatial Frequency, Bandwidth, and Resolution" Appl. Optics
 (The concept most directly 4, 435 - 437
 related to the size of an Apr 65
 object or its image is not spa-
 tial frequency but bandwidth).
- J. E. Stewart "Spurious spectral resolution and the spectral transfer function of monochromators" Appl. Optics
 (The spectral transfer 4, 609 - 612
 function of a monochromator May 65
 is defined as the Fourier
 transform of the monochromator
 slit function. Contrast in a
 periodic spectrum, which is
 lost when the slits of the
 monochromator are widened
 sufficiently, can return with
 further widening of the slits).
- B. Tatian "Method for obtaining the Transfer Function from the Edge Response Function" J. Opt. Soc. Am.
 (Sampling theorem & fourier 55, 1014-1019
 series is employed). Aug 65

1964

- R. Barakat "Line Spread Function & cumulative line spread function for systems with rotational symmetry" J. Opt. Soc. Am.
 A. Houston 54, 768 - 773
 June 64
- E. Inglestam "Nomenclature for Fourier Transforms of Spread Functions" Appl. Optics
 (Recommendation of the sub- 3, 96
 committee for Image Assessment Jan 64
 Problems of the International
 Commission for Optics regarding
 the terminology with respect
 to "sine-wave response",
 frequency-response, etc.).

Fourier Transform

1964 - con't

- E. W. Marchand "Derivation of the Point Spread Function from the Line Spread Function"
(Solution by Integral Equations). J. Opt. Soc. Am. 54, 915 - 919
July 64
- K. Preston "Use of the Fourier transformable properties of lenses for signal spectrum analysis" Symp: Opt. & Elect. Opt. Inf. Process. 59 - 68
1964
- L. W. Smith "Modulation Transfer from Lansraux's Series"
H. Osterburg (Method for calculating diffraction images for objects of radial symmetry). J. Opt. Soc. Am. 54, 523 - 524
Apr 64

1963

- W. Brouwer et al "The role of Eikonal and Matrix methods in contrast transfer calculations" Appl. Opt. 2, 1239 - 1246
Dec 63
- E. L. O'Neill "The question of phase in image formation"
A. Walther (Discusses the possibility of retrieving phase information by taking into account the restriction that a lens must have a finite aperture). Opt. Acta. 10, 33 - 40
Jan 63
- F. D. Smith "Optical image evaluation and the transfer function"
(The significance, limitations, and advantages of the transfer function or sine wave response as applied to evaluate photographic optical systems). Appl. Opt. 2, 335 - 350
Apr 63

Fourier Transform

1963 - con't

- A. Walther "The question of phase retrieval in optics" Opt. Acta. 10, 41 - 49
 (Phase reconstruction studied under the constraint that the aperture of the lens be finite). Jan 63

1962

- J. Pastor "Influence de la limitation de la mire sur la mesure de la fonction de modulation d'un systeme optique" Opt. Acta. 9, 237 - 248
 (Finite aperture effect). July 62

1959

- N. A. Finkelstein "Analog Fourier transformer for apodization studies" J. Opt. Soc. Am. 49, 410
 C. H. Brumley (Description of a one dimensional function generator as a Fourier-transformer). Apr 59
- G. C. Higgins "Validation of sine-wave analysis for photographic systems" Opt. Acta. 6, 273 - 278
 et al (Stop function response of systems calculated from sine wave response). July 59
- J. M. Naish "Fourier Analyser for Optical Frequency response Determination" Opt. Acta. 6, 152 - 157
 (Determination of spatial frequency response of a lens by electro-mechanical means. The instrument is described). Apr 59
- R. E. Stephens "Note on Measurement of Sine-Wave Response of Lenses" J. Opt. Soc. Am. 49, 413
 1959

Fourier Transform

1958

- K. Miyamoto "On a comparison between wave optics and geometrical optics by using Fourier analysis: I general theory" J. Opt. Soc. Am. 48, 57 - 63
Jan 58
- R. L. Lamberts "Relation between the sinewave response and the Distribution of Energy in the Optical Image of a Line"
(Method of determining sine-wave response both theoretically and experimentally is presented). J. Opt. Soc. Am. 48, 490 - 495
July 58

1957

- W. Lukosa "Das Auflösungsvermögen und der Kontrastrichtung wiedergabe der optisch - photographischen Abbildung" Optik 14, 490 - 502
1957

1956

- L. Mertz "Optical Fourier Synthesizer" (Optical system for synthesis of signals by variation of Fourier harmonics in form of Young's interference fringes). J. Opt. Soc. Am. 46, 548 - 551
July 56

1954

- T. P. Cheatham "Optical Filters - Their Equivalence to and Difference from Electrical Networks" IRE Conv. Rec. 4, 6 - 12
1954
- A. Kohlenberg
- P. Lindberg "Measurement of Contrast transmission characteristics in optical image formation" (Lens performance determined by Fourier Transforms). Opt. Acta. 1, 80 - 89
Sept 54

Fourier Transform

1953

- | | | |
|---------------|--|---|
| P. Elias | "Optics and Communication Theory" | J. Opt. Soc. Am.
<u>43</u> , 229 - 232
Apr 53 |
| H. H. Hopkins | "On the Diffraction Theory of Optical Images" | Proc. Roy. Soc. London
A, <u>217</u> , 408-432
May 53 |
| J. E. Phodes | "Analysis and synthesis of Optical Images" | Am. J. Phys.
<u>21</u> , 337 - 343
May 53 |
| O. H. Schade | "Fourier Treatment of Optical Processes"
(Responses to Elias, et al. Complains that accurate measurements required and that sine-wave test charts unavailable). | J. Opt. Soc. Am.
<u>43</u> , 704 - 705
Aug 53 |

1952

- | | | |
|-------------------|---|---|
| P. Elias
et al | "Fourier Treatment of Optical Processes"
(Presentation of the fourier transform viewpoint of imaging). | J. Opt. Soc. Am.
<u>42</u> , 127 - 134
Feb 52 |
|-------------------|---|---|

Fresnel Transforms

1966

J. T. Winthrop C. R. Worthington	"Convolution Formulation of Fresnel Diffraction" (Fresnel transformation presented as a spatial convolution).	J. Opt. Soc. Am. <u>56</u> , 588 - 591 May 66
-------------------------------------	---	---

1965

H. Osterberg	"Rayleigh's Integral in the Near Fresnel Region" (Derivation of field distri- butions in the Fresnel region of an aperture).	J. Opt. Soc. Am. <u>55</u> , 1467 Nov 65
J. T. Winthrop C. R. Worthington	"Theory of Fresnel Images I" (Fresnel Diffraction pattern calculated for planer periodic objects).	J. Opt. Soc. Am. <u>55</u> , 373 - 381 April 65

1966

- | | | |
|----------------------------------|---|---|
| B. R. Brown
A. W. Lohmann | "Complex spatial filtering with binary masks"
(A computer plotter is used to "draw" a hologram. The reconstructed image is of comparable quality). | Appl. Opt.
<u>5</u> , 967 - 969
June 66 |
| J. T. Carcel
et al | "Simplification of Holographic Procedures"
(Manufacture of holograms without massive & rigid mounts). | Appl. Opt.
<u>5</u> , 1199 - 1201
July 66 |
| V. J. Corcoram
et al | "Generation of a Hologram from a moving target" | Appl. Opt.
<u>5</u> , 668 - 669
April 66 |
| J. B. DeVelis
et al | "Image Reconstruction with Fraunhofer Holograms"
(Consideration of Virtual Images) | J. Opt. Soc. Am.
<u>56</u> , 423 - 427
April 66 |
| A. A. Fiesem
R. J. Fedorowicz | "Recent Advances in multicolor wavefront reconstruction"
(Letter). | Appl. Opt.
<u>5</u> , 1085 - 1086
June 66 |
| F. S. Harris, Jr.
et al | "Copying holograms"
(Letter) (Good source of information on films). | Appl. Opt.
<u>5</u> , 665 - 666
April 66 |
| C. W. Helstrom | "Image Luminance & Ray Tracing in Holography"
(Image formation calculated by Fresnel-Kirchhoff diffraction theory). | J. Opt. Soc. Am.
<u>56</u> , 433 - 441
April 66 |
| J. P. Kirk | "Hologram on Photochromic Glass"
(Letter) | Appl. Opt.
<u>5</u> , 1684 - 1685
Oct 66 |
| E. N. Leith
J. Upatnieks | "The Way-Out Wonderful World of Holography" | IEEE Student J.
<u>4</u> , 2 - 9
March 66 |

Holography

1966 - con't

- E. N. Leith
et al "Holographic data storage in three dimensional media" Appl. Opt. 5, 1303 - 1311 Aug 66
(Holographic storage of diffraction patterns in 3-D media described from a vector viewpoint derived from the Kirchhoff diffraction integral).
- R. W. Meier "Cardinal Points & the Novel Imaging Properties of a Holographic System" J. Opt. Soc. Am. 56, 219 - 223 Feb 66
(Principal planes, points, and directions of holographic systems).
- J. Upatnieks
et al "Correction of Lens Aberrations by means of holograms" Appl. Opt. 5, 589 - 593 April 66
(Holograms, made of a wavefront from a lens with spherical aberrations in combination with the lens, serves as a corrector plate for the lens).

1965

- Anonymous "3-D Lasography - The Month-Old Giant" Laser Focus 1, 10 - 15 Jan 65
- W. T. Cathey, Jr. "Three-Dimensional Wavefront Reconstruction using a Phase Hologram" J. Opt. Soc. Am. 55, 457 Apr 65
(Letter) (Production of a brighter image by bleaching the hologram to nearly total transparency).
- R. P. Dooley "X-Band Holograph" (Letter) Proc. IEEE 53, 1733 - 1735 Nov 65
(Reports successful employment of holographic technique at X-Band).

Holography

1965 - con't

- | | | |
|-----------------------------|--|--|
| F. Gabler
F. Hersog | "Uber die Kombination des
Phasen kontrast verfahrens
mit der Fluoreszenz mikroskopie" | Appl. Opt.
<u>4</u> , 469 - 472
April 65 |
| W. E. Kock | "Some curious properties of
holograms"
(Reports unexpected results
of rotation about the three
axes of the hologram). | Proc. IEEE
<u>53</u> , 1787(Letter)
Nov 65 |
| E. N. Leith
et al | "Microscopy by Wavefront
Reconstruction"
(An analysis of aberrations). | J. Opt. Soc. Am.
<u>55</u> , 981 - 986
Aug 65 |
| E. N. Leith
J. Upatnieks | "Photography by Laser" | Scientific Am.
<u>212</u> , 24 - 35
June 65 |
| E. N. Leith
J. Upatnieks | "Microscopy by Wavefront
Reconstruction" (Letter)
(Report of experimental
results). | J. Opt. Soc. Am.
<u>55</u> , 569 - 570
May 65 |
| E. N. Leith
J. Upatnieks | "Imagery with Coherent Optics"
(Paper presented at 9th
SPIE Technical Symp.,
27 Aug 64, Miami Beach, Fla.). | SPIE - Journal
<u>3</u> , 123-126
Apr-May 65 |
| R. W. Meier | "Magnification and Third-Order
Aberrations in Holography" | J. Opt. Soc. Am.
<u>55</u> , 987 - 992
Aug. 65 |
| A. K. Rigler | "Wavefront Reconstruction by
Reflection" (Letter)
(Results of aluminizing the
emulsion side of the hologram). | J. Opt. Soc. Am.
<u>55</u> , 1693
Dec. 65 |
| G. W. Stroke
et al | "Three-Dimensional Holography with
Lensless Fourier Transform Holograms
and Coarse P/N Polaroid Film"
(Advantages of Fourier vs.
Fresnel Holograms). | J. Opt. Soc. Am.
<u>55</u> , 1327
Oct 65 |

1965 - con't

G. W. Stroke "Lensless Photography" Internat'l
Sci. & Tech.
No. 41, 52-60
May 65

1964

E. N. Leith "Wave Front Reconstruction with J. Opt. Soc. Am.
J. Upatnicks Diffused Illumination and three-
dimensional objects" 54, 1295-1301
Nov 64
(Discussion of reflection &
diffraction Holograms).

G. W. Stroke "Theoretical and experimental Symp. on: Opt. &
foundations of optical holography Electro-Opt.
(wavefront reconstruction Info. Proc. Tech.
imaging)" 749 - 769
(Identical to chapter VI of 1964
book by same author: "An
introduction to coherent
optics and holography").

1963

E. N. Leith "Wavefront reconstruction with J. Opt. Soc. Am.
J. Upatnieks continuous tone objects" 53, 1377 - 1381
Dec 63

J. R. Meyer- "Three-dimensional Wavefront Appl. Optics
Arendt reconstruction" 2, 409 - 410
Apr 63
(Three dimensional recon-
struction is possible by
means of a synthesizer which
has two optic axes).

1962

E. N. Leith J. Upatnieks	"Reconstructed wavefronts and communication theory" (Holography described from a communication theory viewpoint).	J. Opt. Soc. Am. <u>52</u> , 1123 - 1130 Oct 62
-----------------------------	---	---

1956

P. Kirkpatrick H. M. A. El-Sum	"Image Formation by Recon- structed Wave Fronts" (Conceptual explanation).	J. Opt. Soc. Am. <u>46</u> , 825 - 831 1956
-----------------------------------	--	---

1951

D. Gabor	"Microscopy by reconstructed wavefronts: II"	Proc. Phys. Soc. London <u>B 64</u> , 449 - 469 June 51
----------	---	---

1949

D. Gabor	"Microscopy by reconstructed wavefronts"	Proc. Roy. Soc. London <u>A197</u> , 454-490 July 49
----------	---	---

1948

D. Gabor	"A New Microscopic Principle"	Nature, London <u>161</u> , 777-779 May 48
----------	-------------------------------	--

Interferometry

1966

- | | | |
|------------------|--|--|
| R. H. MacPhie | "The compound intensity interferometer" | IEEE Trans.
on Antennas &
Prop.
<u>14</u> , 369 - 374
May 66 |
| A. J. Montgomery | "Two Methods of Measuring Optical Transfer Functions with an Interferometer" | J. Opt. Soc. Am.
<u>56</u> , 624 - 629
May 66 |
| W. H. Steel | Two Beam Interferometry
(Survey article). | Prog. in Opt. V
ed E. Wolf
J. Wiley & Sons
147-197
1966 |

1965

- | | | |
|----------------------------|--|--|
| M. H. Horman | "An application of wavefront reconstruction to interferometry" | Appl. Optics
<u>4</u> , 333 - 336
Mar 65 |
| E. Reisman
P. M. Sutton | "Measurement of air temperature distributions with the Schlieren Interferometer" | Appl. Optics
<u>4</u> , 144 - 145
Jan 65 |
| A. Stein
T. Schultz | "Mach-Zehnder interferometer with adjustable compensation"
(Letter) | Appl. Optics
<u>4</u> , 1510-1511
Nov 65 |

1964

- | | | |
|------------------|---|--|
| A. J. Montgomery | "New Interferometer for the Measurement of Modulation Transfer Functions"
(Experimental set up described). | J. Opt. Soc. Am.
<u>54</u> , 2, 191-198
Feb 64 |
|------------------|---|--|

Interferometry

1962

H. Mendlowitz
J. A. Simpson

"On the theory of diffraction
grating interferometers"
(One-dimensional diffraction
grating theory is developed
in vector notation).

J. Opt. Soc. Am.
52, 520 - 524
May 62

Lasers

1966

A. N. Smith J. A. Armstrong	"Intensity Noise in Multimode GaAs Laser Emission"	IBM J. Research & Development <u>10</u> , 225 - 232 May 66
--------------------------------	---	---

1965

L. I. Goldfisher	"Autocorrelation Function & Power Spectral Density of Laser-Produced Speckle Patterns"	J.Opt. Soc. Am. <u>55</u> , 247 - 253 March 65
T. Uchida	"Frequency spectra of He-Ne optical masers with external concave mirrors" (Spectral measurement of gaseous optical masers has been made by photomixing techniques and noise dis- tribution measurement).	Appl. Optics <u>4</u> , 129 - 131 Jan 65

1964

K. Miyamoto	"Propagation of Laser Light" (Communication aspects of leser propagation are considered).	J.Opt. Soc. Am. <u>54</u> , 989 - 991 Aug 64
-------------	--	--

Matched Filtering

1965

- R. O. Harger "An analysis of recorder motion errors in optical processing" (Random motion errors in recorders are analyzed in the context of complex filter optical processors). Appl. Optics 4, 383 - 386 Apr 65
- D. A. George "Matched Filters for Interfering Signals" IEEE Trans. Inf. Theory 11, 153 - 154 Jan 65

1960

- G. L. Turin "An Introduction to Matched Filters" (Describes matched filters, their use, and design). IEEE Trans. Inf. Theory 6, 311 - 329 June 60

1954

- T. P. Cheatham, Jr. "Optical Filters - Their Equivalence to & Difference from Electrical Networks" IRE Conv. Rec. pt. 4, 6 - 12 1954

Miscellaneous

1966

- D. G. Falconer "Optical Processing of bubble chamber photographs" (Application of the "optical computer" to reduction of bubble chamber data). Appl. Optics 5, 1365-1369 Oct 66
- K. Murata "Instruments for the Measuring of Optical Transfer Functions" (Survey of the field). Prog. in Opt. V, 199 - 245 1966
- R. Tremblay
A. Boivin "Concepts and Techniques of Microwave Optics" (Diffraction theory of microwave optics, microwave optical instruments, beam waveguides, and components for mm waves). Appl. Optics 5, 249 - 278 Feb 66

1965

- H. F. Budd "Dynamical Theory of Thermo-plastic Deformation" J. Appl. Phys. 36, 1613-1616 May 65
- T. M. Chen
A. VanderZiel "Noise in cathodoluminescence lights" IEEE Trans. on Electron Devices 12, 489 - 493 Sept 65
- M. G. Cohen
E. I. Gordon "Acoustic Beam Probing Using Optical Techniques" Bell Syst. Tech. J. 44, 693-721 Apr 65
- C. S. French "Fluorescence Spectra of Sharp Cutoff Filters" (Letter) Appl. Optics 4, 514 Apr 65

Miscellaneous

1965 - con't

- | | | |
|-------------------------------------|---|---|
| G. W. King | "Photooptical storage and processing of information"
(Introductory discussion to the April 1965 issue which is completely dedicated to DDP). | Appl. Optics
<u>4</u> , 369-371
Apr 65 |
| J. R. Meyer-Arendt
E. P. Shettle | "Calibration of Schlieren systems"
(Letter) | Appl. Optics
<u>4</u> , 757
June 65 |
| W. D. Montgomery | "Reconstruction of Pictures from Scanned Records"
(Necessary conditions for reconstruction of an image from a sampling lattice). | IEEE Trans.
Inf. Theory
<u>11</u> , 204-206
Apr 65 |
| R. Papoular | "Impedance matching in the optical wave band" (Letter)
(Theoretical discussion of an optical equivalent to a double stub transformer or an E-H tuner). | Appl. Optics
<u>4</u> , 139 - 140
Jan 65 |
| C. P. Saylor | "A Study of Errors in the Measurement of Microscopic Spheres" | Appl. Optics
<u>4</u> , 477 - 486
Apr 65 |
| S. Twomey
H. B. Howell | "The relative merit of white and monochromatic lights for the determination of visibility by backscattering measurements" | Appl. Optics
<u>4</u> , 501-506
Apr 65 |

1964

- | | | |
|----------------------------------|--|---|
| W. H. Armistead
S. D. Stookey | "Photochromic Silicate Glasses Sensitized by Silver Halides" | Science
<u>144</u> , 150-154
Apr 64 |
| L. T. Cutrona | "Recent Developments in Coherent Optical Technology" | 1964 Symp. on:
Opt. & Electro-
Opt. Inf.
Proc. Tech. |

Miscellaneous

1964 - con't

- | | | |
|-------------------------------|---|--|
| R. Drougard | "Optical Transfer Properties of
Fiber Bundles" | J. Opt. Soc. Am.
<u>54</u> , 907-914
July 64 |
| T. H. Moore
I. M. Krittman | "Sensing Characteristics of an
Electrostatic Recording camera" | IEEE Trans. on
Electron
Devices
<u>11</u> , 183-190
Apr 64 |
| K. F. Wallace | "Wideband readout of thermo-
plastic recordings" | 1964 Symp. on:
Opt. & Electro-
Opt. Inf.
551-556 |
| R. E. Williams | "The Panchromatic Principle in
Optical Filtering"
(Attainment of doppler
information in an optical
filter by color separation). | IEEE Trans.
Inf. Theory
<u>10</u> , 227-234
July 64 |

1963

- | | | |
|--------------------------------|--|---|
| P. J. Cressman | "New Types of Thermoplastic
Deformation"
(A mechanism is proposed in
which the surface tension of
the thermoplastic is reduced
by the presence of the
surface charge). | J. Appl. Phys.
<u>34</u> , 2327-2330
Aug 63 |
| R. W. Gundlach
C. J. Claws | "A Cyclic Xerographic Method
Based on frost deformation" | Phot.Sci. &
Engin.
<u>7</u> , 14
1963 |
| I. M. Krittman
J. A. Inslee | "Discussions and Applications of
Electrostatic Signal Recording" | RCA - Review
<u>24</u> , 406 - 420
Sep 63 |

Miscellaneous

1963 - con't

- | | | |
|-------------|---|-------------------------------------|
| K. Miyamoto | "Wave optics and Geometrical Optics in Optical Design"
(Comparison) | Prog. in Opt.
I, 31 - 66
1963 |
| R. J. Pegis | "The Modern Development of Hamiltonian Optics"
(First steps of a general aberration theory). | Prog. in Opt.
I, 1 - 29
1963 |

1962

- | | | |
|------------------|--|--------------------------------------|
| G. Amat
et al | "Optics in France"
(Includes lengthy bibliography. Limited applications to ODP. In french). | Appl. Optics
1, 260-278
May 62 |
|------------------|--|--------------------------------------|

1961

- | | | |
|-----------------|---|---------------------------------------|
| A.C.S. Van Heel | "Modern Alignment Devices"
(Survey of alignment procedures for optical systems). | Prog. in Opt.
I, 289 - 329
1961 |
|-----------------|---|---------------------------------------|

1960

- | | | |
|------------------------|---|--|
| L. T. Cutrona
et al | "Optical Data Processing and Filtering Systems" | IRE Trans.
Inf. Theory
6, 386-400
June 60 |
|------------------------|---|--|

1959

- | | | |
|---------------|------------------------------------|---|
| L. T. Cutrona | "Coherent Optical Data Processing" | IRE Trans.
Auto. Cont.
4, 137-149
Nov 59 |
|---------------|------------------------------------|---|

Miscellaneous

1959 - con't

W. E. Glenn "Thermoplastic Recording" J. Appl. Phys.
30, 1870-1873
 Dec 59

1958

K. Miyamoto "Comparison between wave optics and geometrical optics using Fourier Analysis. II Astigmatism, coma, spherical aberration" J. Opt. Soc. Am.
48, 567-575
 Aug 58

1953

J. E. Rhodes, Jr. "Microscope imagery as carrier communication" J. Opt. Soc. Am.
43, 848-852
 Oct 53
 (Analogy drawn in which the optical system in a microscope corresponds to a communication channel; the illuminations to a carrier; and the effect of the object on the illumination, to modulation of the carrier).

1949

B. H. Billings "The Electro-Optic Effect in Uniaxial Crystals of the Type XH_2PO_4 , I Theoretical" J. Opt. Soc. Am.
39, 797 - 801
 Oct 49

B. H. Billings "The Electro-Optical Effect in Uniaxial Crystals of the Type XH_2PO_4 , II. Experimental" J. Opt. Soc. Am.
39, 802-808
 Oct 49

Modulation

1966

- E. I. Gordon "A Review of Acoustooptical Deflection and Modulation Devices" Appl. Optics 5, 1629-1639 Oct 66
- A. Korpel et al "A television display using acoustic deflection and modulation of coherent light" Appl. Optics 5, 1667-1676 Oct 66

1965

- J. D. Armitage "Theta Modulation in Optics" Appl. Optics 4, 399-403 Apr 65
A. W. Lohman (This technique allows production at color images from black & white film. Also describes multiplex storage).
- C. F. Buhrer "Wide-band electrooptic light modulation utilizing an asynchronous traveling wave interaction" Appl. Optics 4, 545-550 May 65
(Modulator consisting of a periodic cylindrical waveguide containing optically active cubic electrooptic crystals. Operates from 7.5-12 GHz).
- B. S. Goldstein "X-Band Modulation of GaAs Lasers" Proc. IEEE 53, p. 195 Feb 65
R. M. Weigand
- C. H. Holmes "The electrooptic effect in calcium pyroniobate" Appl. Optics 4, 551 - 553 May 65
et al (Modulation at 3GHz).
- H. E. Nengebaner "A describing function for the Modulation transfer of Xerography" Appl. Optics 4, 453 - 459 Apr 65

Modulation

1964

- G. Bret
F. Gives "Giant-Pulse Laser and Light Amplifier using Variable Transmission coefficient Glasses as Light Switches" Appl. Phys. Letters 4, 175-176 May 64
- M. DiDomenico, Jr. "Small-Signal Analysis of Internal (Coupling Type) Modulation of Lasers" (Bandwidth less than frequency deviation of consecutive cavity modes). J. Appl. Phys. 35, 2870-2876 Oct 64
- A. Frova
P. H. Handler "Shift of Optical Absorption Edge by an Electric Field: Modulation of Light in the Space Charge Region of a Ge p - n Function" (Experimental results of 90% amplitude modulation at $\lambda = 1.56 \mu$). Appl. Phys. Letters 5, 11 - 13 July 64
- S. E. Harris "Conversion of Frequency Modulated Light to Space-Modulated Light" (Via linear dispersive media). J. Opt. Soc. Am. 54, 1147-1151 Sep 64
- D. F. Nelson
F. K. Reinhart "Light Modulation by the Electro-Optic Effect in Reverse - Biased Ga P P-N Functions" (Polarization modulation described with experimental results). Appl. Phys. Letters 5, 148-150 Oct 64
- W. Niblack
E. Wolf "Polarization Modulation and Demodulation of Light" Appl. Optics 3, 277 - 280 Feb 64

1963

- X. DeAngelis
W. Niblack "Electro-Optic Interference Filter Light Modulator"
(Potassium dihydrogen phosphate allowing 50% intensity modulation of incident light). Proc. IEEE 51, p. 1258
Sep 63
- I. P. Kaminow
T. Liu "Propagation Characteristics of Partially Loaded Two-Conductor Transmission Lines for Broad-band Light Modulators"
(Derived by consideration of a 2 dielectric transmission line). Proc. IEEE 51, 132-137
Jan 63
- C. T. Peters "Gigacycle Bandwidth Coherent Light Traveling - Wave Phase Modulator"
(Employing a transmission line type cavity requiring input power of 12 watts). Proc. IEEE 51, 147-153
Jan 63
- F. Steryer "Push Pull' Optical Modulators and Demodulators"
(Use is made of a Foster-Seeley prism to double the modulation effect of crystals). Appl. Optics 2, 1197-1198
Nov 63

1962

- M. Arm
et al "Electro-optical transfer characteristics of liquid delay-line light modulators" IRE Conv.Rec. pt. 6, 79-89
1962
- R. H. Blumenthal "Design of a Microwave-Frequency Light Modulator"
(Polarization modulation by a dihydrogen phosphate crystal excited in a microwave cavity). Proc. IRE 50, 452-456
Apr 62

Modulation

1962 - con't

- L. B. Lambert "Wideband Instantaneous spectrum analyser employing delay-line light modulation" IRE Conv. Rec. pt. 6, 69-78 1962
- T. S. Moss "Methods of Modulating Infrared Beams"
(Methods capable of 10^{10} Hz bandwidths). Infrared Physics 2, 129-139 July 62
- R. V. Pole "Spatial Phase Modulation and Remodulation"
(Describes phase to amplitude modulation schemes). Symp. on: Comm. & Inf. Theory Asp. of Mod. Opt. 153-180 1962

1961

- D. F. Holshauser et al "Microwave Modulation of Light Using the Kerr Effect"
(Kerr Cell modulation at 3 & 6 GHz with carbon disulphide). J. Opt. Soc. Am. 51, 1360-1365 Dec 61
- I. P. Kaminow "Microwave Modulation of the Electro-Optic Effect in KH_2PO_4 "
(Using a two-dielectric transmission line as a model). Phys. Rev. Letters 6, 528-530 May 61

1960

- R. Williams "Electric Field Induced Light Absorption in CdS"
(Optical pass band varied by electric field). Phys. Rev. 117, 1487-1490 Mar 60

Modulation

1955

H. Kaufman
E. H. King"Spectral Power Density Functions
in Pulse Time Modulation"IEEE Trans.
Inf. Theory
It-1, 40-46
Mar 55

1932

P. Debye
F. Sears"Scattering of light by
supersonic waves"
(i.e., compressional waves
cause grating effect).Proc. Nat'l.
Acad. Sci.
18, 409-414
June 32

Optical Information & Data Processing

1966

- C. W. Barnes "Object Restoration in a Diffraction Limited Imaging System" (Formal solution). J. Opt. Soc. Am. 56, 575 - 578 May 66
- J. L. Harris "Image Evaluation & Restoration" (Using point spread functions and their fourier equivalents). J. Opt. Soc. Am. 56, 569-574 May 66

1965

- R. O. Harger "An Analysis of Recorder Motion Errors in Optical Processing" Appl. Optics 4, 383-386 Apr 65
- C. Y. Ho "Optical Flux Analysis in a Cathode Ray Tube Scanner System" Appl. Optics 4, 373-377 Apr 65
- P. L. Jackson "Diffractive Processing of Geophysical Data" Appl. Optics 4, 419-427 Apr 65
- G. W. King "Photooptical Storage and Processing of Information" Appl. Optics 4, 369-371 Apr 65
- K. Preston, Jr. "Computing at the speed of light" (Description of Optical Correlators, Fourier Analyzers, etc.) Electronics 38, 72 - 83 Sep 65
- F. Tuttle "Optical aids in signal processing" (A variety of optical processing techniques are considered, compared, and discussed; particular emphasis on information storage density of film). Appl. Optics 4, 149-155 Feb 65

Optical Information & Data Processing

1964

- L. J. Cutrona "Recent Developments in Coherent Optical Technology" In 1964 Symp. Opt. & Electro-Opt. Info. 83-123
- L. J. Cutrona "Optical Computing Techniques" IEEE-Spectrum 101-108 Oct 64
- D. O. Smith "Thin-Film MagnetO-Optics in Information Processing" Sump. on: Opt. & Electro-Opt. Proc. Inf. Tech.
- K. R. Wallace "Wide Bandwidth Readout of Thermoplastic Recordings" Symp. on: Opt. & Electro-Opt. Proc. Inf. Tech.

1963

- P. J. van Heerden "Theory of optical information storage in solids" (Three-dimensional optical storage is possible in semi-transparent colored materials. This paper develops the theory of this form of storage). Appl. Optics 2, 393-400 Apr 63

1962

- R. L. Lamberts "Applications of Communication Theory to Optics & Photography" (Determination of spatial frequency response of lenses and films). Symp. on: Comm. & Inf. Theory Asp. of Mod. Opt. 181-200 1962
- F. M. Reza "Some Recent Developments in Information Theory" (Entropy, Encoding, Channel capacity are discussed). Symp. on: Comm. & Inf. Theory Asp. of Mod. Opt. 133-152 1962

Optical Information & Data Processing

1961

- D. Gabor "Light & Information" Prog. in Opt.
(Application of Information I, 109-153
theory to light propagation). 1961
- H. Wolter "On Basic Analogies and Principle Prog. in Opt.
Differences Between Optical and I, 155-210
Electronic Information" 1961

1960

- L. J. Cutrona "Optical Data Processing and IRE - Trans.
et al Filtering Systems" Inf. Theory
(General Description) 6, 386-400
June 60
- H. Gamo "An Aspect of Information IRE Conv. Rec.
Theory in Optics" Part 4, 189-203
(Determination of imaging 1960
properties of coherent,
partially coherent, and in-
coherent illumination).
- K. Miyamoto "On Gabor's expansion theorem" J. Opt. Soc. Am.
(To a generalization for optics 50, 856-858
of the well known sampling Sep 60
theorem of information theory,
D. Gabor proposed an expansion
theorem. A proof relating to
important cases is established).

1959

- L. J. Cutrona "Filtering Operations Using Proc. N.E.C.
et al Coherent Optics" 15, 262-275
Oct 59

1958

- D. M. Mackay "The Structural Information Capacity of Optical Instruments" (Information content of various rectangular apertures). Information & Control 1, 148-152
1958

1955

- L. S. G. Kovasznay "Image Processing" (Enhancement of picture detail using laplacian of the illumination function). Proc. IEEE 43, 560-570
May 55
- H. M. Joseph
- E. H. Linfoot "Information theory & optical images" (Summary of the theoretical basics of information theory and its application to image theory). J. Opt. Soc. Am. 45, 808-819
Oct 55
- M. Perrot "Comparaison entre la Transmission de l'Information en Optique et en Radio electricite" (Comparison of transformations existing in optics and electronics). Opt. Acta. 2, 1-5
Apr 55
- G. Peri
- G. Toraldo di Francia "Capacity of an Optical Channel in the Presence of Noise" (By standard information theory approach). Opt. Acta. 2, 5-8
Apr 55

1953

- P. Elias "Optics and communication theory" (Tutorial and very general, points out parallels in two fields). J. Opt. Soc. Am. 43, 229-232
Apr 53

1948

C. E. Shannon

"A Mathematical Theory of
Communication"
(Introduction to the
theory).

Bell Syst.
Tech. J.
27, 379-423
Oct 48
623-656
July 48

Pattern Recognition

1966

R. F. Turner	"A System for the Automatic Recognition of Moving Patterns" (By multiple scans and comparison).	IEEE Trans. Inf. Theory <u>12</u> , 195-205 Apr 66
--------------	---	--

1965

J. D. Armitage A. W. Lohmann	"Character recognition by incoherent spatial filtering" (The input to a matched filter is not the unknown character, but its Fraunhofer diffraction pattern. Only binary masks are required).	Appl. Optics <u>4</u> , 461-467 Apr 65
T. J. Harley	"Comments on a paper by J. D. Armitage and A. W. Lohmann" (Refers to "Character recognition by incoherent spatial filtering").	Appl. Optics <u>4</u> , 1666 Dec 65
T. J. Harley L. N. Kanal	"Comment on 'Recognizing Patterns in Photographs'" (Letter) (Calls attention to early contributions).	Appl. Optics <u>4</u> , 1351-1352 Oct 65
M. E. Rabedeau A. D. Bates	"Image quality requirements in optical systems for reproducing typewritten documents"	Appl. Optics <u>4</u> , 439-443 Apr 65
C. K. Rushforth	"Recognizing patterns in photographs" (Recognition with assumed knowledge and classification of patterns. Optimum classification involves non-linear processing. In two cases this reduces to correlation or matched-filter techniques).	Appl. Optics <u>4</u> , 379-381 Apr 65

1964

- | | | |
|---------------------------------|---|---|
| J. K. Hawkins
C. J. Munsey | "Eulogismographic Nonlinear
Optical Image Processing for
Pattern Recognition"
(Use of photographic film to
generate nonlinear optical
systems is described). | J. Opt. Soc. Am.
<u>54</u> , 998-1003
Aug 64 |
| W. S. Holmes
et al | "Optical-electronic spatial
filtering for pattern
recognition" | Symp. on:
Opt. & Electro-
Opt. Inf.
Proc. Tech.
199-207 |
| G. G. Lendaris
G. L. Stanley | "An opticalogical self-organizing
recognition system" | Symp. on:
Opt. & Electro-
Opt. Inf.
Proc. Tech.
535-550 |
| L. G. Roberts | "Machine perception of 3-D
solids" | Symp. on:
Opt. & Electro-
Opt. Inf.
Proc. Tech.
159-197 |
| A Vander Lugt
et al | "Character-Reading by Optical
Spatial Filtering" | Symp. on:
Opt. & Electro-
Opt. Inf.
Proc. Tech.
125-141 |

1962

- | | | |
|----------|--|---|
| M. K. Hu | "Visual Pattern Recognition by
Moment Invariants"
(Recognition of abstract
patterns by method of
moments. Allowing arbitrary
orientation and size). | IRE Trans.
Inf. Theory
<u>8</u> , 179-187
Feb 62 |
|----------|--|---|

Pattern Recognition

1962 - con't

- B. Julesz "Visual Pattern Discrimination" IRE Trans.
(On human recognition of Inf. Theory
spatial frequency patterns of 8, 84-92
abstract fields). Feb 62
- J. J. Leimer "Design Factors in the Development IRE Trans.
of an optical character recog- Inf. Theory
nition machine" 8, 167-171
(Discussion of character Feb 62
recognition and IBM 1418
optical character reader).
- P. M. Lewis "The characteristic selection IRE Trans.
problem in recognition systems" Inf. Theory
(Discussion of design problem 8, 171-178
of character recognition, Feb 62
and presentation of a system
recognizing 62 symbol alphabets).
- D. McLachlan, Jr. "The role of optics in applying J. Opt. Soc. Am.
correlation functions to pattern 52, 454-459
recognition" Apr 62

1961

- L. P. Horowitz "Pattern Recognition Using Proc. Inst.
G. L. Shelton Autocorrelation" elec. Engrs.
(The autocorrelation of a 49, 175-185
set of characters is Jan 61
determined optically).
- J. K. Wolf "On the recognition of signal IRE Conv. Rec.
J. B. Thomas patterns in noise" pt. 4, 155-161
(Consideration of statistics 1961
of recognition of a 2-D
pattern in noise with
applications to optical
matched filters).

Photography

1966

- S. Kozma "Photographic Recording of Spatially Modulated Coherent Light"
(The nonlinear effects of film on the recording of holograms and resulting distortions are presented).
J. Opt. Soc. Am. 56, 428-432
Apr 66
- R. F. van Lighten "Influence of photographic film on wavefront reconstruction. I. plane wavefront"
J. Opt. Soc. Am. 56, 1 - 9
Jan 66

1965

- W. D. Drumm "A precision Camera for micro-photographing"
Appl. Optics 4, 413-417
Apr 65
- C. S. McCamy "On the information in a microphotograph"
Appl. Optics 4, 405-411
Apr 65

1963

- R. Myszko "Effect of vibration on the photographic image"
(From statistical considerations, correlation function of the exposure random process subjected to vibrational spatial displacement derived. Correlation function is Fourier transform of product of square of the system transfer function, spectral density of input process, and filter function. Effect of vibration equivalent to insertion of additional spatial filter).
J. Opt. Soc. Am. 53, 935-940
Aug 63

Photography

1962

- | | | |
|-------------|--|---|
| E. N. Leith | "Photographic Film as an Element of a Coherent Optical System" | Photog. Science & Engineering
6, 75-80
Mar 62 |
|-------------|--|---|

1961

- | | | |
|-------------|--|---|
| R. C. Jones | "Information capacity of photographic films"
(Based on Weiner Spectrum of their granularity). | J. Opt. Soc. Am.
51, 1159-1171
Nov 61 |
| D. H. Kelly | "Systems Analysis of the Photographic process. II. Transfer function measurements" | J. Opt. Soc. Am.
51, 319-330
Mar 61 |

1960

- | | | |
|------------------|--|--|
| L. O. Hendeberg | "Contrast transfer function of the light diffusion in photographic emulsions"
(Fourier transform description of lenses and emulsions - for determination of spatial frequency response of emulsions). | Arkiv For Fysik
16, 417-456
1960 |
| L. O. Hendelberg | "The contrast transfer of periodical structures in a photographic emulsion developed with adjacency effects"
(Study of adjacency effect using transform principles). | Arkiv For Fysik
16, 457-468
1960 |
| A. L. Ingalls | "The Effect of Film Thickness Variations on Coherent Light" | Photog. Sci. & Engineering
4, 135-140
May 60 |

Photography

1960 - con't

- D. H. Kelly "System Analysis of the Photographic Process. I. A Three Stage Model" J. Opt. Soc. Am. 50, 269-276 Mar 60
 (A non-linear, isotropic model is proposed to account for the micro-imaging behavior of the photographic process).

1959

- R. L. Lamberts "Measurement of sine-wave response of a photographic emulsion" (Experimental determinations). J. Opt. Soc. Am. 49, 425-428 May 59
- H. J. Zweig "Autocorrelation and granularity. Part III. Spatial frequency response of the scanning system and granularity correlation effects beyond the aperture" J. Opt. Soc. Am. 49, 238-244 Mar 59

1957

- E. Pitts "Relation between granularity and autocorrelation II" J. Opt. Soc. Am. 47, 321-326 Apr 57
 A. Marriage

1956

- J. H. Altman "Microdensitometer for photographic research" Rev. Sci. Inst. 27, 1033-1036 Dec 56
 K. F. Stultz (Densitometer with resolving power of 800 lines/m.m. Design & schematic variable aperture).

Photography

1956 - con't

- A. Marriage
E. Pitts "Relation between granularity and auto-correlation" J. Opt. Soc. Am. 46, 1019-1027
Dec 56
- H. J. Zweig "Autocorrelation and Granularity. Part I. Theory" J. Opt. Soc. Am. 46, 805-811
Oct 56
(It is shown that two equivalent functions may be obtained from a microphotometer trace - a correlogram and a power spectrum - and that both Selwyn's measure and Jones and Higgins' measure of granularity are directly related to these functions).
- H. J. Zweig "Auto correlation and Granularity. Part II. Results on flashed black-and-white emulsions" J. Opt. Soc. Am. 46, 812-820
Oct 56

1955

- P. Croce
M. Marquet "Determination optique du'Bruit de fond' photographique" Opt. Acta. 2, 107-108
July 55
(On the spatial spectral band pass of films or lenses).

1953

- P. Fellgett "Concerning photographic grain, signal to noise ratio and information" J. Opt. Soc. Am. 43, 271-282
Apr 53
(Relationship between grain and autocorrelation function is developed).

Sources

1966

H. R. Carlon

"A useful infrared source"
(Description and empirical
measurement of a cartridge
heater with axial leads.
 λ in the range of 2.5 - 13 μ).

Appl. Optics
5, 1281-1283
Aug 66

Systems

1964 - con't

- | | | |
|-----------------------------|---|---|
| E. N. Leith
et al | "Coherent optical systems for data processing, spatial filtering, and wavefront reconstruction" | Symp. on:
Opt. & Electro-
Opt. Inf.
Proc. Tech.
143-158 |
| L. W. Smith
H. Osterburg | "Effects of arbitrarily located phase errors upon contrast in the image"
(A method for estimating phase error effects in an image is presented). | J. Opt. Soc. Am.
<u>54</u> , 525-528
Apr 64 |

1962

- | | | |
|--------------|---|--|
| E. Inglestam | "Linear & Nonlinear Links in Optical Image Transfer"
(Description of linearities & nonlinearities present in various components of an optical imaging system). | Symp. on:
Comm. & Inf.
Theory Asp.
of Mod. Opt.
5 - 30
1962 |
| A. Lohmann | "Methods of Influencing the Optical Contrast Transfer of Image Forming Devices"
(Survey of the field). | Symp. on:
Comm. & Inf.
Theory Asp.
of Mod. Opt.
51- 90
1962 |

1958

- | | | |
|------------------------------|--|--|
| P. Cauals-Frau
M. Rosseau | "Influence de l'eclairage partiellement coherent sur la formation des images de quelques objects etendus opaques"
(Calculation of images of simple geometric objects with partially coherent illumination). | Opt. Acta.
<u>5</u> , 15-27
Mar 58 |
|------------------------------|--|--|

Systems

1958 - con't

- E. H. Linfoot "Quality Evaluations of Optical Systems"
 (Various measures of quality based on fourier analysis of an optical system are compared).
 Opt. Acta. 5, 1-14
 Mar 58

1957

- E. H. Linfoot "Image Quality & Optical Resolution"
 (Proposal of structural resolving power to replace older concepts as the figure of merit for imaging systems operating on extended objects).
 Opt. Acta. 4, 12-16
 Mar 57

1956

- J. Arsac "Application des theories de l'approximation a l'etude des images optiques"
 (Figure of merits of an optical system presented as power & saturation through consideration of the system as a filter of spatial frequencies).
 Opt. Acta. 3, 55-65
 June 56
- W. H. Steel "The defocused image of sinusoidal gratings"
 (The defocused image of a sinusoidal grating of infinite extent is calculated in terms of incomplete Bessel Functions. Result is related to resolving power tests).
 Opt. Acta. 3, 65-74
 June 56

Systems

1955

- P. Dumontet "Sur la correspondance object-
image en optique"
 (Comparison of distortions
 in an optical system is
 made to the linear distortions
 created by an electrical filter.
 Differences are presented).
- E. O'Neill "The Analysis and Synthesis of
Linear Coherent and Incoherent
Optical Systems"
- Opt. Acta.
2, 53-63
July 55
- Tech. Note 122
Bost. Univ.
Phys. Re. Labs.
Sep 55

Television

1965

S. Nishikawa
et al"Area properties of television
pictures"IEEE Trans. on
Inf. Theory
IT-11, 348-352
July 65

1962

R. E. Graham

"Snow removal - A noise
stripping process for picture
signals"
(Use of nonstationary non-
linear processing to selec-
tively remove "snow" from
TV pictures).IRE Trans.
Inf. Theory
8, 129-144
Feb 62

VI. AUTHORS' AFFILIATIONS

I. UNITED STATES

Advanced Technology Corporation
Timonium, Maryland

Dooley, R. P.

American Optical Company
Southbridge, Massachusetts

Osterberg, H.
Smith, L. W.

Van Ligten, R. F.

Bell Telephone Laboratories
Murray Hill, New Jersey

Cohen, M. G.
Gordon, E. I.

Julesz, B.

Boston University
Boston, Massachusetts

Brouwer, W.
O'Neill, E. L.

Walther, A.

Columbia University
New York, New York

Williams R. E.

Conductron Corporation
Ann Arbor, Michigan

Falconer, D. G.

Kay, I. W.

Cornell University
Ithica, New York

Kinzly, R. E.

Cruft Laboratories
Harvard University
Cambridge, Massachusetts

Elias, P.

Eastman Kodak Company
Rochester, New York

Altman, J. H.
Higgins, G. C.
Kottler, F.
Lamberts, R. L.

Marchand, E. W.
Perrin, F. M.
Stultz, K. F.
Zweig, H. J.

General Electric Electronics Laboratory
Syracuse, New York

Lewis, P. M.
Pole, R. V.

Van Heerden, P. J.

Hughes Aircraft Corporation
Fullerton, California

Beste, D. C.
Bode, D. E.
Johnson, T. H.

McLean, B. N.
Turin, G. L.

IBM Corporation
San Jose, California

Armitage, J. D.
Bates, A. D.
Lohman, A.
Rabedeau, M. E.

Yorktown Heights, New York

Drougard, R.
Gamo, H.
Horowitz, L. P.
Leimer, J. J.
Shelton, G. L.

Itek Corporation
Lexington, Massachusetts

Barakat, R.
Houston,
King, G. W.
Smith, F. D.

Drumm, W. D.
Kelly, D. H.
Tatian, B.

Johns Hopkins University
Baltimore, Maryland

Joseph, H. M.
Kovaszny, L. S. G.

Mahan,

Massachusetts Institute of Technology
Cambridge, Massachusetts

Smith, R. A.

Melpar, Incorporated
Cambridge, Massachusetts

Cheatham, T. P.

National Aeronautics and Space Administration
Electronics Research Center
Cambridge, Massachusetts

Kock, W. E.

Renderio, J.

National Bureau of Standards
Washington, D. C.

Mendlowitz, H.
Meyer-Arendt, J. R.
Simpson, J. A.

McCamy, C. S.
Shettle, E. P.

Perkin - Elmer Corporation
Norwalk, Connecticut

Preston, K.

Philco Corporation
Blue Bell, Pennsylvania

Fisher, S. T.
Hawkins, J. K.
Munsey,
Sutton, P. M.

Harley, T. J.
Kanal, L. N.
Reisman, E.

Polaroid Corporation
Cambridge, Massachusetts

Jones, R. C.

Stanford University
Stanford, California

Barnes, C. W.
El-Sum, H. M. A.
Goodman, J. W.
Harris, S. E.

Kirkpatrick, P.
McLachlan, D.
Weaver, C. S.

Technical Operations Research
Burlington, Massachusetts

DeVelis, J. B.
Reynolds, G. O.

Skinner, T. J.

University of Michigan
Ann Arbor, Michigan

Cutrona, L. J.
Fedorowicz, R. J.
Fiesem, A. A.
Harger, R. O.
Jackson, P. L.
Kelly, D. L.
Kozma, A.
Leith, E. N.

Montgomery, W. D.
Powell,
Stetson,
Stroke, G. W.
Upatneiks, J.
Vander Lugt, A.
Winthrop, J. T.
Worthington, C. R.

University of Rochester
Rochester, New York

Macalara, D.

Titlebaum, E. L.
Wolf, E.

U. S. Air Force Research Laboratories
Bedford, Massachusetts

Shore, R. A.

Parrent, G. B.

Westinghouse Research Laboratories
Pittsburgh, Pennsylvania

Helstrom, C. W.

Xerox Corporation
Rochester, New York

Meier, R. W.

II. FOREIGN COUNTRIES

Government Mechanical Laboratory
Tokyo, Japan

Tsujiuchi, J.

Imperial College
London, England

De, M.
Hopkins, H. H.

Montgomery, A. J.
Gabor, D.

Institut d'Optique
Paris, France

Burtin, R.
Canals-Frau, D.
Croce, P.

Marechal, A.
Marquet, M.
Rosseau,

Instituto-Nazionale di Ottica
Firenze, Italy

Toraldo di Francia, G.

McGill University
Montreal, Canada

Kaufman, H.

King, E. H.

National Standards Laboratory
Sidney, Australia

Steel, W. H.

The Observatories
University of Cambridge
Cambridge, England

Fellgett, P.

Linfoot, E. H.

Royal Institute of Technology
Stockholm, Sweden

Hendeberg, L. O.
Inglestam, E.

Lindburg, P.

Technische Hogeschool
Delft, Netherlands

Van Heel, A. C. S.

Universität Marburg, Marburg a/d
Lahn, Germany

Wolter, H.

Universität München
Munich, Germany

Tannhauser, I. O.

VII. LIST OF MANUFACTURERS

I. Product Code:

Light Sources	1
Light Modulators	2
Optical Components (Lenses, etc.)	3
Optical Benches	4
Light Detectors	5
Photographic Equipment	6
Systems	7

II. Companies

<u>Manufacturer</u>	<u>Products by Code</u>
Bausch & Lomb Rochester, N. Y. 14602	3
Brinkmann Instruments Cantiague Road Westbury, N. Y. 11590	3, 4
Burke & James, Inc. 333 W. Lake St. Chicago, Ill. 60606	3, 4, 5, 6
Conductron Corporation Dept. 6500 3475 Plymouth Rd. Ann Arbor, Michigan 48107	1, 3, 4, 7
The Ealing Corporation 2225 Massachusetts Ave. Cambridge, Massachusetts 02140	4
Eastman Kodak Co. Rochester, N. Y. 14650	3, 5, 6
Electro Optics Associates 981 Commercial Street Palo Alto, California 94303	1, 5
Ferson Optics, Inc. 2006 Government St. Ocean Springs, Miss.	3, 5
Fish-Schurman, Corp. 70 Portman Road New Rochelle, N. Y.	1, 3

<u>Manufacturer</u>	<u>Products by Code</u>
Gaertner Scientific Corp. 1201 Wright Wood Ave. Chicago, Ill. 60614	1, 3, 4, 5
Gamma Scientific, Inc. 5841 Mission Gorge Road San Diego, California 92120	1, 5
Herron Optical Co. 9117 S. Main St. Los Angeles, California 90003	3
Isomet Corporation 433 Commercial Ave. Palisades Park, N. J.	1, 2
Klinger Scientific Apparatus Corp. 83-45 Parsons Blvd. Jamica 32, N. Y.	4
Korad Corp. 2520 Colorado Ave. Santa Monica, California 90406	1, 5
Lear Siegler, Inc. 2320 Washtenaw Ave. Ann Arbor, Michigan	1, 3
3M Company 2501 Hudson Rd. St. Paul, Minn. 55119	2, 5, 6
Optics Technology, Inc. 901 California Ave. Palo Alto, California 94304	1, 5
PEK Labs, Inc. 825 E. Evelyn Ave. Sunnyvale, California	1
Perkin-Elmer Corporation Electro-Optical Division Norwalk, Connecticut	1, 3
Raytheon 130 Second Ave. Waltham 54, Mass.	1
Siemens & Halske Aktiengesellschaft Berlin, Germany	6

<u>Manufacturer</u>	<u>Products by Code</u>
Special Optics Cedar Grove, N. J. 07009	3
Spectra-Physics 1255 Terra Belle Ave. Mountain View, California	1, 2
Spectrolab 12484 Gladstone Ave. Sylmar, California	1
TRG Control Data Corp. Rt. 110 Melville, New York 11749	1
TRW Instruments 139 Illinois St. El Segundo, California 90245	1, 5
Whittaker Corp. Gencom Division 80 Express St. Plainview, L. I., N. Y. 11503	5