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**TECHNICAL PUBLICATIONS AND
PRESENTATIONS**

1965

**AEROSPACE RESEARCH LABORATORIES
OFFICE OF AEROSPACE RESEARCH
UNITED STATES AIR FORCE
WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

TECHNICAL PUBLICATIONS AND PRESENTATIONS, 1965

PREFACE

This publication lists the technical reports, technical articles, papers presented, books/chapters of books, OAR research review articles, lectures and seminars (ARL speakers), guest speakers, and technical briefings, authored or co-authored by scientists of the Aerospace Research Laboratories, and published, presented or prepared in calendar year 1965. In addition, this edition includes a record of the Air Force Institute of Technology graduate student theses completed during the year under sponsorship of ARL.

This publication is divided into ten sections: Plans and Analysis Office, Chemistry Research, Fluid Dynamics Facilities, Plasma Physics Research, Applied Mathematics Research, Thermo-Mechanics Research, General Physics Research, Hypersonic Research, Solid State Physics Research and Metallurgy and Ceramics Research. Inquiries concerning any items listed herein should be addressed to the author.

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WINGERSON, R. C. "Plasma Physics", A Series of 40 lectures in the Graduate Engineering Space Physics Program at AFIT, Winter Quarter (1965).

WINGERSON, R. C. "Thermodynamics and Statistical Mechanics", a series of 40 lectures in the Graduate Engineering Space Physics Program at AFIT, Spring Quarter (1965).

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BOTTICHER, W., University of Kiel, Germany, lecture at ARL on "Converging Cylindrical Shock Waves in a Pinch-Discharge", (18 October 1965).

CARSWELL, A. R., RCA Victor Co., Research Laboratories of Montreal, Canada, presented a lecture "Side Light Emanating from Laser Discharges", in the ARL Auditorium (18 November 1965).

DARWIN, H. W., EURATOM, Fontenay-aux-Roses, Seine, France, presented a lecture "Spectroscopic Mass Spectroscopic and Probe Measurements of Low Pressure Discharges in Helium, Hydrogen and Lithium Vapor", in the ARL Conference Room (5 November 1965).

GOELER, S. V., Princeton Plasma Research Laboratory, presented a lecture on "The Behavior of Quiescent Negative Ion Plasmas", in the ARL Auditorium (22 September 1965).

PATT, H. J., Physics Department, University of Aachen, Germany, "The Analysis of an Arc Discharge in a Poiseville Flow", (29 March 1965).

SANDRI, G., Aeronautical Research Associations, Princeton, New Jersey, "Statistical Mechanics", (8-9 February 1965).

SANDRI, G., Aeronautical Research Associations, Princeton, New Jersey, presented two lectures on "Statistical Mechanics of Dense Plasmas", in the ARL Conference Room (19-20 July 1965).

SCHLUTER, H., Physics Department, University of Texas, lecture on "Spectroscopic Investigations of R. F. Discharges in Hydrogen", (22 April 1965).

SHKAROFSKY, I. P., RCA Victor Co., Research Laboratories of Montreal, Canada, presented a lecture "Determination of the Statistical Single Particle Distribution Function in Plasmas", in the ARL Auditorium (18 November 1965).

VON GIERKE, G., Max Planck Institute, Munich, Germany, presented a lecture "Investigation of the Toroidal Confinement of a Plasma", in the ARL Conference Room (22 November 1965).

WARD, A. L., Harry Diamond Laboratories, Washington, D. C., presented a lecture "Some Aspects of High Voltage Breakdown", in the ARL Auditorium (6 October 1965).

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- BLANCH, G. "Why Teach Sets", an invited address before Greater Dayton Council of Mathematics Teachers, Y.M.C.A., Dayton, Ohio (October 14, 1965).
- FETTIS, H. E. "Computation of Elliptic Integrals Using Gauss Transformation", Ohio Section M.A.A., Akron, Ohio (1964).
- FETTIS, H. E. "An Algorithm for Converting a Power Series to a Continuous Function", Ohio Section, M.A.A., Columbus, Ohio (1965).
- FETTIS, H. E. "Continued Fractions and Power Series", Dayton Section, SIAM (June 1965).
- FETTIS, H. E. "Solution of Transcendental Equations by Conversion to Differential Equations", Am. Math. Soc., Ithaca, N. Y. (1965).
- FETTIS, H. E., CASLIN, J. C., GORESH, J. "Solution of a Problem in Heat Transfer on the IBM 1620", Winter Meeting of Common, Los Angeles, California, December 1965).
- GUDERLEY, K. G. "Equivalence of Two Formulations of a Technical Optimization Problem", presented at Dayton SIAM Meeting (December 1965).

- HARTER, H. L., MOORE, A. H. "Asymptotic Variances and Covariances of Maximum Likelihood Estimators, from Censored Samples of the Parameters of Weibull and Gamma Populations", presented at Institute of Mathematical Statistics Meeting, Tallahassee, Florida (May 1965). Abstracted in *Annals of Mathematical Statistics*, 36 (1965).
- HARTER, H. L. "History of the Use of Order Statistics", presented at Joint Meeting of American Statistical Association, Columbus, Ohio (21 May 1965).
- HARTER, H. L. "Maximum-Likelihood Estimation of the Parameters of a Four-Parameter Generalized Gamma Population from Complete and Censored Samples", presented at annual meeting of American Statistical Association, Philadelphia, Pa. (September 1965).
- KRISHNAIAH, P. R. "Tables of Percentage Points of the Multivariate Distribution", presented at the meeting of the Institute of Mathematical Statistics (1965).
- LEE, J. "Remarks on the Liquid Metal Condensation", 7th National Heat Transfer Conference, Cleveland, Ohio (August 1964).
- LEE, D. A. "Solutions of an Integro-Differential Equation Arising in Plasma Theory", presented to Dayton Chapter, Society for Industrial and Applied Mathematics (22 December 1964).
- LEE, D. A., GARSCADDEN, A., BLETZINGER, P. "The Wave Nature of Moving Striations", presented at the VII International Conference on Ionized Gas Phenomena, Belgrade (August 1965).
- LEE, J. "Decay of Isotropic Mixing Field Under a Second-Order Chemical Reaction", Mechanics Department, State University of New York, at Stony Brook (1965).
- LEE, J. "Comparison of Closure Approximation Theories in Turbulent Mixing", AIAA, San Diego (1965).
- LUM, M. D. "Results on Detection Capability of Aerial Patrols", presented at Hdqs. OAR (7 May 1965).
- LUM, M. D. "An ARL Representation in General Pinson's Group at the OAR-TARC Briefing", Shaw Air Force Base, S. C. (9-10 August 1965).
- MOND, B. "On the Direct Sum and Tensor Product of Matrix Games". Presented at Fifth Conference on Game Theory, Princeton, New Jersey (April 1965).
- MOND, B. "What is Game Theory", Mathematics Seminar, Wittenberg University, Springfield, Ohio (February 1965).
- SHISHA, O., CARGO, G. T. "A Criterion for the Comparability of Means". Presented at the 70th Annual Meeting of the American Mathematical Society (January 1964).
- SHISHA, O. "Bounds on Differences of Means". Presented at the ARL Symposium on Inequalities (August 1964).
- SHISHA, O. "Hermite-Fejer Polynomials for Functions of Several Variables", American Mathematical Society, New York, N. Y.
- SHISHA, O. "Means and Inequalities", Antioch College (17 February 1965).
- SHISHA, O. "Bounds on the Ratio of Means", University of Cincinnati (2 March 1965).
- SHISHA, O. "Monotone Approximation", Indiana University (19 November 1965).
- WOLAVER, L. E. "Some Initial Configuration Effects on Motion at L4 in Sun-Earth-Moon System", Annual Seminar in Celestial Mechanics, Yale University (February 1965).
- WOLAVER, L. E. "Effect of Initial Configuration on Libration Point Motion", AIAA/ION Astrodynamics Specialists Meeting, AIAA Paper 65-684 (September 1965).
- WOLAVER, L. E. "Approximation Methods for Determining Auto-Correlation of Nonlinear Control Systems Driven by Random Noise", 12th Annual Air Force Science and Engineering Symposium (October 1965).

Papers Presented at Meetings — Contract

- BLISCHKE, W. "Minimum-Variance Bounds in the Non-Regular Case", Central Region Meeting, Institute of Mathematical Statistics, Chicago, Illinois (December 1964).
- FICHERA, G. "Symposium on the Numerical Solution of Partial Differential Equations", University of Maryland (May 1965).
- KEMPTHORNE, O. "Some Developments in the Design of Experiments Over the Past Ten Years", Army Conference, Washington, D. C. (November 1964).

Lectures and Seminars — ARL Speakers

- BARNETT, D. L. "Problems in the Theory of Finite Groups", Dayton Section, Society for Industrial and Applied Mathematics (April 1965).
- CELLEY, K. G. "Reduction of a 2-Point Boundary Value Problem to Initial Value Problems by a Projection in Function Space". Talk at local meeting of Society of Industrial and Applied Mathematics (1965).
- SHISHA, O. "Bounds on Ratios of Means", University of Cincinnati (24 February 1965).

SHISHA, O. "Means and Inequalities", Antioch College (17 February 1965).

WOLAVER, L. E. "Invited Lecture at Yale University Celestial Mechanics Seminar", (1965).

Guest Speakers

KELMAN, R. University of Maryland (7-8 January 1965).

OAR Research Review Articles — Internal

FETTIS, H. E. "Conversion of a Power Series to a Continued Fraction", Vol. IV, No. 4 (June 1965).

HUGELMAN, R. D. "Momentum Integral Solutions for Magneto-hydrodynamic Boundary Layers", Vol. IV, No. 8 (October 1965).

KRISHNAIAH, P. R. "International Symposium on Multivariate Analysis", Vol. IV, No. 10 (December 1965).

LUM, M. D. "Optimization of Aerial Defense Patrols for Detection of Aerial Targets", Vol. III, No. 11 (January 1965).

NIKOLAI, P. J. "Numerical Treatment of Boundary Value Problems", Vol. IV, No. 8 (October 1965).

Books/Chapters of Books — Internal

BLANCH, G. "Mathieu Functions", pp. 721-750, Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables, edited by Milton Abramowitz and Irene A. Stegun, U. S. Department of Commerce, National Bureau of Standards, Applied Mathematics Series (1965).

BLANCHE, G., CLEMM, D. S. "Tables Relating to the Radial Mathieu Functions of the Second Kind", Government Printing Office, Washington, D. C. (1965).

GUDERLEY, K. G. "Transonic Flows in Research Frontiers in Fluid Dynamics", Chapter 9, edited by R. J. Seeger and G. Temple, Interscience Publishers (1965).

GUDERLEY, K. G., ARMITAGE, J. V. "A General Approach to Optimum Rocket Nozzles in Theory of Optimum Aerodynamic Shapes", edited by A. Miele (1965).

KRISHNAIAH, P. R. "Some Procedures for Selection of Multivariate Normal Populations Better than a Control". Proceedings of the International Symposium on Multivariate Analysis, Academic Press (to be published).

SHISHA, O., MOND, B. "Bounds on Differences of Means", to appear in the Proceedings of the Symposium on Inequalities, Academic Press, New York.

SHISHA, O. "Ratios of Means and Applications", to appear in the Proceedings of the Symposium on Inequalities, Academic Press, New York, N. Y.

SHISHA, O. Editor of the "Proceedings of the Symposium on Inequalities", to be published by Academic Press.

SHISHA, O. Member of the Committee for a "Walsh Jubilee Volume". This volume will honor Professor J. L. Walsh, who up to his recent retirement was Perkins Professor of Mathematics at Harvard University, on his seventieth birthday.

ARN — THERMO-MECHANICS RESEARCH LABORATORY

ARL Technical Reports — Internal

ANDERSON, W. J. "Supersonic Wind Tunnel Tests of Wavy-Walled Cylinders", ARL 65-203 (October 1965).

CRAMER, K. R. "Variable Conductivity MFD Couette Flow", ARL 65-13 (January 1965).

FIORINO, 1/LT. T. D., POPLAWSKI, 1/LT. R. "Experimental Optimization of the Reverse Flow Swirl Chamber", ARL 65-86 (April 1965).

Persen, L. N. "A Simplified Approach to the Influence of Gortler-Type Vortices on the Heat Transfer from a Wall", ARL 65-88 (May 1965).

PINCHAK, 1/LT. A. C., POPLAWSKI, 1/LT. R. "Aerodynamic Performance of Reversed Flow Vortex Chambers", ARL 65-219 (October 1965).

RAO, M. A. "A Survey Study on the Effects of Vibrations, Sound Fields, and Pulsations on Heat Mass Transfer from Flat Plates, Cylinders, and Ducts", ARL 65-217 (October 1965).

SCHRADE, H. O. "Electric Arc Discharges in a Transverse Magnetic Field, Part I", (in preparation).

SCHREIBER, P. W. "Radiation from an Alternating Current Nitrogen Arc", ARL 65-105 (May 1965).

SKIFSTAD, 1/LT. J. G. "Review of Theoretical Analysis of Arc Heating in a Tube", ARL 65-207 (October 1965).

UHLENBUSCH, J. "Theory and Calculation of Stationary and Quasi-Stationary Cylindrical Arcs", ARL 65-109 (May 1965).

ARL Technical Reports — Contract

ADAMS, D. E. "An Evaporative Film Calorimetric Enthalpy Probe", ARL 65-47 (March 1965).

BALJE, O. E. "A Study on the Performance Potential of Conventional and Shear Force Pumps", ARL 65-118 (June 1965).

- BUYUKTUR, A. R., KESTIN, J., MAEDER, P. F. "Influence of Combined Pressure Gradient and Turbulence on the Transfer of Heat from a Plate", ARL 65-31 (February 1965).
- BOND, C. E. "The Magnetic Stabilization of an Electric Arc in Transverse Supersonic Flow", ARL 65-185 (September 1965).
- CAMBEL, A. B., SMITH, D. C., TANKIN, R. S. "Interferometric Diagnostics of Argon Plasmas", ARL 65-173 (August 1965).
- CREMERS, C. J. "The Spectrometric Measurement of the Temperature Field in an Arc with a Transpiration-Cooled Anode", ARL 65-117 (May 1965).
- ECKERT, E. R. G., ANDERSON, J. E. "Performance Characteristics of a Fully-Developed Constricted Transpiration-Cooled Arc", ARL 65-68 (April 1965).
- GREY, J., WILLIAMS, P. M., FRADKIN, D. B., JACOBS, P. F., SHERMAN, M. P. "Laminar Mixing and Heat Transfer Phenomena Between a Partially Ionized Gas and a Gaseous Coolant", ARL 65-73 (April 1965).
- HANSON, F. B., RICHARDSON, P. D. "Upstream Fluctuations in Flow in a Forward Stagnation Region", ARL 65-72 (April 1965).
- HARDING, L. J. "A Digital Computer Program for Condensation in Expanding One-Component Flows", ARL 65-58 (March 1965).
- HEATH, G. L. "An Investigation of Diffusion of Supersonic Flows in Curved Constant Area Passages", ARL 65-179 (September 1965).
- JACKSON, T. W., PURDY, K. R., KEITH, H. G., WILLOUGHBY, D. A., WILLBANKS, C. E. "The Effect of a Resonant Acoustic Field on Laminar Flow in a Circular Tube", ARL 65-96 (May 1965).
- JACKSON, T. W., PURDY, K. R., KEITH, H. G., RUDLAND, R. S. "Investigations of the Effect of Acoustic Vibrations on Convective Heat Transfer", ARL 65-97 (May 1965).
- KAHN, B. "A Continuation of the Basic Study of Slender Channel Electrode Dynamics", ARL 65-4 (January 1965).
- KESTIN, J., SHAH, V. L. "The Effect of Small Oscillations on Shearing Stresses and Heat Transfer Rates in Laminar, Two-Dimensional, Free Convection", (to be published).
- KESTIN, J., PERSEN, L. N. "The Transfer of Heat Across a Two-Dimensional, Oscillating Boundary Layer", (to be published).
- KLEIN, L., BABROV, H. J. "Spectroscopic Studies of Argon and Nitrogen Plasmas at Reduced Pressure, Temperature Distributions in Plasmas and Wall-Stabilized Arcs", ARL 65-92 (May 1965).
- LEE, B. H., RICHARDSON, P. D. "Effect of Sound on Heat Transfer from a Horizontal Circular Cylinder at Large Wavelengths", ARL 65-192 (September 1965).
- LOVE, T. J., HSIA, H. M. "Radiative Heat Transfer Between Parallel Plates Separated by a Non-Isothermal Medium with Anisotropic Scattering", ARL 65-211 (October 1965).
- LOVE, T. J., BEATTIE, J. F. "Experimental Determination of Thermal Radiation Scattering by Small Particles", ARL 65-110 (June 1965).
- MARLOTTE, G. L., LENN, P. D. "Basic Research on Gas Flows Through Electric Arcs, Phase III, Studies of the Inlet Region", ARL 65-231 (November 1965).
- MINARDI, J. E. "Comparison of Transient Compressors for the Production of High Temperature and High Density Gases," ARL 65-181 (September 1965).
- MORRIS, J. C. "Research on Radiation from an Arc Heated Plasma", ARL 65-164 (August 1965).
- NORTON, D. J., MURTHY, S. N. B. "An Investigation on the Energy Transfer in a Tube Arc Heater", ARL 65-54 (March 1965).
- PFENDER, E., RAITBY, G. D., ECKERT, E. R. G. "An Anode Comparison Study in a Wall-Stabilized Argon Arc", ARL 65-232 (November 1965).
- PAI, SHIH I. "A Critical Survey of Magnetofluid Dynamics, Part III: Quasi-One Dimensional Analysis of Magnetogas Dynamics", ARL 63-175, Part III (December 1965).
- ROM, J. "Analysis of the Near Wake Pressure in Supersonic Flow Using the Momentum Integral Method", ARL 65-52 (September 1965).
- ROM, J. "Near Wake Flow Studies in Supersonic Flow", ARL 65-152 (March 1965).
- SHEER, C. "Study of the Effects of Mechanical and Thermal Electrode Properties on the Behavior of the Fluid Transpiration Arc", ARL 65-163 (July 1965).
- SIVIER, K. R. "Digital Computer Studies of Condensation in Expanding One-Component Flows", ARL 65-234 (November 1965).
- SIVIER, K. R., PAI-LIEN, L. C., McBRIDE, D. D., OKTAY, E. "Initial Studies of Condensing Metal Vapors Carried by Expanding Inert Gases", ARL 65-59 (March 1965).
- SMITH, D. C., CAMBEL, A. B. "Laminar Axially Symmetric Compressible Jet with an Arbitrary Prandtl Number", ARL 65-67 (April 1965).
- SMITH, D. C., CAMBEL, A. B. "Laminar and Turbulent Magneto-hydrodynamic Free Jet", ARL 65-12 (August 1965).

SWEDLOW, J. L. "The Thickness Effect and Plastic Flow in Cracked Plates", ARL 65-216 (October 1965).

TSCHANG, P. S. "Temperature Determination in Moderately Dense High-Temperature Gases by Transient Thermocouple Probes", ARL 65-95 (May 1965).

WECHSLER, A. E., GLASER, P. E., JASPERSE, J. "Characteristics of Metal Vapors", ARL 65-53 (March 1965).

Journal Articles – Internal

GYARMATHY, G. "An Analytical Method to Calculate Spontaneous Condensation Processes", (In German), VDI-Forschungsheft, Nr. 509 (May 1965).

PINCHAK, 1/LT. A. C. "Application of Laboratory Experiments in Two-Phase Flow to Observed Air-Sea Interactions". Preprint, AIAA, USN Marine Systems and Anti-Submarine Warfare Conference, San Diego, California, also in AIAA Bulletin (January 1965).

PINCHAK, 1/LT. A. C., POPLAWSKI, 1/LT. R. "On the Attainment of Extremely High Rotational Velocities in Confined Vortex Flows". Abstract published in AIAA Bulletin (June 1965).

PINCHAK, 1/LT. A. C., ZUKOSKI, E. E. "Gas Phase and Surface Phenomena in Seeded Plasmas", AIAA Journal, pp. 270-277 (February 1965).

SCHERBERG, M. G., ANANDHA, R. "Experimental Investigation and Confirmation of the Reversed Heat Conduction in Natural Convection at a Thermal Leading Edge on a Vertical Wall", Int. J. Heat and Mass Transfer, ARL 65-271 (1965).

SCHERBERG, M. G. "Natural Convection at a Thermal Leading Edge on a Vertical Wall", Int. J. Heat and Mass Transfer., Vol. 8, pp. 1319-1331, ARL 65-263 (1965).

VON OHAIN, H. J. P., LAWSON, M. O. "Direct Electrofluidynamics Energy Conversion Processes for Power Generation", 11th Annual Air Force Science and Engineering Symposium (1965).

Journal Articles – Contract

BARRETO, E., MULCAHY, M. J. "On the Production and Neutralization of a Charged Aerosol by Corona Fields", Journal of Geophysical Research (to be published).

BOND, C. E. "Magnetic Confinement of an Electric Arc in Transverse Supersonic Flow", AIAA Journal, Vol. 1, No. 3 (1965).

BOND, C. E. "Experimental Observations of an Electric Arc Magnetically Suspended in a Transverse Supersonic Flow", (to be published).

BROOKS, R. E., HEFLINGER, L. O., WUERKES, R. F., BRIONES, R. A. "Halographic Photography of High-Speed Phenomena with Convectonal and Q-Switched Ruby Lasers", Applied Physics Letters (June 1965).

CREMERS, C. J., ECKERT, E. R. G. "The Temperature Field in an Arc with a Transpiration Cooled Anode", AIAA Paper 65-94, (January 1965).

FRIND, G. "An Ablation-Type Plasma Generator", Journal of Spacecraft and Rockets, AIAA Journal (May-June 1965).

GRIFFIN, J. L., SHERMAN, P. M. "Computer Analysis of Condensation in Highly Expanded Flows", AIAA Journal, Vol. 3, No. 10 (October 1965).

KESTIN, J. "The Effect of Free Stream Turbulence on Heat Transfer", Academic Press, Vol. III (to be published).

LAVAN, Z. "Luminescence in Supersonic Swirling Flows", Journal of Fluid Mechanics (1965).

LOVE, T., GROSH, R. J. "Radiative Heat Transfer in Absorbing, Emitting, and Scattering Media", Journal of Heat Transfer, ASME, Vol. 87, Series C, No. 2 (May 1965).

MALDONADO, D., CARSON, A. P., OLSEN, H. "A New Method for Obtaining Emission Coefficients from Emitted Spectral Intensities", Journal of Optical Society of America (1965).

OLSEN, H. N. "Part I – Circularly Symmetric Light Sources", Journal of the Optical Society of America (October 1965).

PFENDER, E., CREMERS, C. "Steadiness of a Plasmajet", AIAA Journal (March 1965).

RICHARDSON, P. D. "A Correlation of the Influence of Sound on Heat Transfer as Measured by Fand and Kaye", ASME Journal of Heat Transfer, Vol. 87, p. 314 (May 1965).

RICHARDSON, P. D. "The Estimation of the Temperature Profile in a Laminar Boundary Layer with a Schlieren Method", J. Heat and Mass Transfer, Vol. 8, pp. 557-566 (1965).

SUTERA, S. P. "Vorticity Implication in Stagnation-Point Flow and its Effect on Heat Transfer", Journal of Fluid Mechanics, Vol. 21, p. 513 (February 1965).

TSCHANG, PIN-SENG. "Determination of D. C. Arc Plasma Current Density by Hall-Effect Magnetic Probe", AIAA Journal, Vol. 3, No. 5 (May 1965).

YEN, J. T., HUANG, H. "Magnetoplasma-dynamic Heat Transfer in a Channel with Hall Currents and Energy Conversion", International J. Heat and Mass Transfer (to be published).

Papers Presented at Meetings -- Internal

- ANDERSON, W. J. "Oscillatory Pressures in an Idealized Boundary Layer with an Application to Panel Flutter of Cylindrical Shells", AIAA Symposium on Structural Dynamics and Aeroelasticity at MIT (August-September 1965).
- GERSTEN, K. "Heat Transfer in Laminar Boundary Layers with Oscillating Outer Flow". Presented at AGARD Specialists' Meeting on "Recent Developments in Boundary Layer Research" in Naples (May 10-14, 1965).
- HASINGER, S. H., KEHRT, L. G., GOKSEL, O. T. "Cavitation Tests with a High Efficiency Shear Force Pump", Winter Annual Meeting, ASME, Chicago, Illinois (November 1965).
- LAMB, J., SCHREIBER, P. "The Differential Interferometer Applied to Plasma Diagnostics", ARN Workshop Session on Plasma Diagnostics (September 29, 1965).
- LAWSON, M., DECAIRE, J. "Experimental Investigation on Power Generation Using Electro-Fluid Dynamic Processes", 6th Biennial Gas Dynamics Symposium, AIAA, Northwestern University (August 1965).
- POPLAWSKI, 1/LT. R., PINCHAK, 1/LT. A. C. "On the Attainment of Extremely High Rotational Velocities in a Confined Vortex Flow", AIAA Paper, No. 65-400 (July 1965).
- SCHERBERG, M. G., RAO, M. A. "Experimental Investigation and Confirmation of the Reversed Heat Conduction in Natural Convection at a Thermal Leading Edge on a Vertical Wall", ASME Winter Annual Meeting, Chicago, Illinois (November 1965).
- SCHRADE, H. O. "On Arc Pumping and the Motion of Electric Arcs in Transverse Magnetic Field in Amperian and Retrograde Direction", proceedings of the VII International Conference on Phenomena in Ionized Gases, Belgrade (September 1965).
- SOEHNGEN, E. E. Invited discussion on paper on "Investigation of a Magnetically Balanced Arc in Transverse Flow", ASME Annual Meeting (November 1965).
- WEICHEL, H. "Experimental and Analytical Study of Arc Retrograde Motion", proceedings of the VII International Conference on Phenomena in Ionized Gases, Belgrade (September 1965).
- GERSTEN, K. "Heat Transfer in Laminar Boundary Layers with Oscillating Outer Flow". Paper presented at AGARD Specialists' Meeting on "Recent Developments in Boundary Layer Research", in Naples (May 10-14, 1965).
- GREY, J., FRADKIN, D. B., WILLIAM, M. P. "Laminar Arcjet Mixing and Heat Transfer: Part 2 - Experiments". Propulsion Specialist Conference AIAA, Colorado Springs (June 1965).
- JACKSON, T. W., PURDY, K. R. "Resonant Pulsating Flow and Convective Heat Transfer", 8th National Heat Transfer Conference, Los Angeles, California (August 8-11, 1965).
- PYTTE, A. WINSOR. "A Two-Temperature Theory for a Helium Arc Plasma in a Cylindrical Duct", by Pytte - VII International Conference on Phenomena in Ionized Gases, Belgrade (August 21-22, 1965).
- SHERMAN, M. P., GREY, J. "Laminar Arcjet Mixing and Heat Transfer: Part I - Theory". Propulsion Specialists' Conference AIAA, Colorado Springs, Colorado (June 1965).
- SHINE, J. C., KAHN, B., BRANDWAIER, H. E. "An Experimental Investigation of the Performance Characteristics of an Electrogasdynamic Power Generator", Curtiss-Wright Corporation, ASME International Conference on Energetics, Rochester, New York (1965).
- YEN, J. "On the Non-frozen-in of Magnetic Fields in Collisionless Plasmas", 3rd National Western Meeting - American Geophysical Union, Dallas, Texas (1965).
- YEN, J. "On the Non-constancy of Adiabatic Invariants", 3rd National Western Meeting - American Geophysical Union, Dallas, Texas (1965).

Lectures and Seminars -- ARL Speakers

- CRAMER, K. R. "Advanced Heat Transfer (MHD) -- AFIT", Series of 17 lectures, M. E. Graduate Course (November 1965).
- GYARMATHY, G. "Seminar Lecture on Condensation Phenomena", Rocketdyne Division, NAA (February 1965).
- GYARMATHY, G. "Free Condensation Phenomena in Steam Turbines". Presented to Members of ARN (1965).
- GYARMATHY, G. "Condensation Phenomena in Steam Turbines". Presented at the Department of Mechanics and Aerospace Engineering, Illinois Institute of Technology (9 April 1965).
- GYARMATHY, G. "Air Condensation in Rapidly Expanding Hypersonic Flow", XVI Int. Aeronautical Congress, Athens (with DAUM, F.) (1965).

Papers Presented at Meetings -- Contract

- FISCHER, E., UHLENBUSCH, J. "D. C. Arcs in Transverse Force Fields", VII International Conference on Phenomena in Ionized Gases, Belgrade (August 22-27, 1965).

- GYARMATHY, G. "Transport Processes, Growth and Evaporation of Small Droplets", (in German), presented at the Department of Mechanical Engineering, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland (18 June 1965).
- GYARMATHY, G. "Wet Vapor Turbine Theory", University of California, Los Angeles (July 1965).
- GYARMATHY, G. "The Effect of Expansion Rate on Spontaneous Condensation", Yale University (September 1965).
- KEHRT, L. G., HASINGER, S. H. "Cavitation Tests with a High Efficiency Shear Force Pump", ARL Auditorium (1 November 1965).
- PINCHAK, I/LT. A. C. "Continuum Mechanics", Series of 18 Lectures given at ARL (from 4 May 1965 through 29 June 1965).
- SCHERBERG, M. G. "Heat Transfer at a Thermal Leading Edge on a Vertical Wall". Presented at Michigan State University (May 1965).
- SCHERBERG, M. G., "Heat Transfer at a Thermal Leading Edge". Presented at University of Michigan (June 1965).
- SCHERBERG, M. G. "The Leading Edge Problem in Natural Convection", University of Michigan (April 2, 1965).
- SKIFSTAD, I/LT. J. G. "Continuum Mechanics", Series of 18 Lectures given at ARL (from 4 May 1965 through 29 June 1965).
- SKIFSTAD, I/LT. J. G. "Lecture on ARN Research Project", University of Tennessee Space Institute, Tullahoma, Tennessee (May 12, 1965).
- SOEHNGEN, E. E. "On Some Problems of Magnetically Induced Plasma Streaming in Arc Discharges", Thermodynamik-Colloquium of the Swiss Federal Institute of Technology, Zurich (September 20, 1965).
- SOEHNGEN, E. E. "On the State-of-the-Art of Magneto-Plasma Dynamics Arc Thrusters and on ARN Research in Magnetic Field Interaction with Arc Discharges", Deutsche Versuchsanstalt F. Luftfahrt, Stuttgart, Germany (September 20, 1965).
- SOEHNGEN, E. E. "On Magnetically Induced Plasma Streaming as Applied to Aerospace Systems", Mechanical Engineering Department, Purdue University (October 26, 1965).
- VON OHAIN, H. J. P. "Lecture on Electrofluidynamics", presented to Students at Northwestern University (April 1965).
- WEICHEL, I/LT. H. Gave presentation of his work on "Retrograde Motion at ARL", presented to AFIT Board of Visitors (22 March 1965).
- Guest Speakers**
- BENENSON, D. BAKER, State University of New York at Buffalo, presented paper "Investigation of the Effects of Forced Convection upon the Steady-State Characteristics of Electric Arcs", (September 29, 1965).
- BOTTICHER, W., Lochte-Haltgreven, Keel, Germany, "Arc Research at Keel University of Specific Interest to ARN" (October 1965).
- CHURCH, C., Research and Development Center, Westinghouse Electric Corporation, "Highly Radiating Plasmas in a Pulse Wall Stabilized Arc Discharge", (September 1965).
- DONALDSON, C. D., Princeton University, "Flows, Heat Transfer and Mixing in Cavity Flow", (12 April 1965).
- DRELLISHAK, K., Electro-Optical Systems, Inc., "Diagnostics Efforts at EOS", (September 29, 1965).
- FISCHER, E., Aachen, Germany, "Analytical Solution of Arcs in Gas Flow", (19 May 1965).
- HAHNE, E. "Heat Transfer by Natural Convection in Fluids Near the Critical Point", (August 1965).
- JOHN, R., AVCO, "Recent Advances in Electric Propulsion", (1 June 1965).
- JOHNSON, B., Case Institute of Technology, Lecture on Laser Technology (7 June 1965).
- KNOCHE, K. F., Ohio State University visiting Scientist, "Irreversibility of Combustion Processes", (25 October 1965).
- MORRIS, J., AVCO, "Radiation Measurements from Arc Heated Plasmas", (September 29, 1965).
- MYERS, T., University of Missouri, "Arcs in Cross Flow", presented to Plasma Flow Group (15 March 1965).
- NOESKE, H., AVCO, "Dynamic Characteristics of Arcs with Respect to Stability", (14 May 1965).
- OLSEN, H., Northrop Space Laboratories, "Investigation of the Interaction of a Pre-ionized Gas with an Electric Arc", (September 29, 1965).
- PAI, S., University of Maryland, "Approximate One-Dimensional HD Flow Theory", (4 March 1965).
- PATT, I., Aachen, Germany, "Plasma Dynamics in Wall Stabilized Arcs", (29 March 1965).
- PFENDER, E., EDDY, T., KNOCHE, K., University of Minnesota, "Arc Plasma Temperature Measurements, The Question of Local Thermodynamic Equilibrium", (September 29, 1965).

PRZYBILLA, DR., OSRAMG Co., Germany, "Major Field Effects on Arc Discharges", (12 October 1965).

RUNSTAEDLER, P., Dartmouth College, "Research Program on Arc Anodes to Plasma Flow Group", (17 February 1965).

STOJANOFF, C., Electronics Research Laboratory, Columbia University, "Plasma Diagnostics on a Fluid-Transpiration Arc", (September 29, 1965).

TANKIN, R., Northwestern University, "Interferometric Diagnostics of Argon Plasmas", (September 29, 1965).

WECHSLER, A., Arthur D. Little Inc., "Radiation Characteristics of Metal Vapors", (September 29, 1965).

VON ZARDWARD, Presentation on "STL Image Converter Camera Technique", (7 January 1965).

OAR Research Review Articles – Internal

CRAMER, K. "Variable Conductivity MFD Couette Flow", Vol. IV, No. 3 (May 1965).

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