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5th International Symposium on Electrets (ISE 5)

Honoring Professor Bernhard Gross



E8864467

4-6 September 1985, Castle of Heidelberg, West-Germany

Proceedings

Edited by G. M. Sessler and R. Gerhard-Multhaupt
Technical University of Darmstadt, West Germany



Sponsored by the IEEE Electrical Insulation Society

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Library of Congress Catalog Card Number 85-60544

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To be cited as:

Proceedings of the 5th International Symposium on Electrets, Heidelberg 1985.
Edited by G.M. Sessler and R. Gerhard-Multhaupt (Available from IEEE Service
Center, Piscataway, NJ, USA).

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PREFACE

This volume comprises the approximately 150 papers presented at the 5th International Symposium on Electrets (ISE 5), held from 4 to 6 September 1985 in the Castle of Heidelberg.

ISE resumes a series of international electret conferences that began in Chicago in 1967 and continued with the meetings in Miami (1972), São Carlos (1975), and Kyoto (1978). These conferences turned out to be focal points of theoretical and experimental work which has its origin in various fields of science and engineering.

The large number of paper and poster contributions to ISE 5 is a clear indication that the topic of the Symposium is timely and constitutes a very active area of research. Because of the interest in the science and the applications of electrets, meetings on this topic are needed at shorter intervals than in the past. We hope that with this Symposium a three-year cycle of such conferences will be initiated.

ISE 5 is dedicated to Professor Bernhard Gross, who is celebrating his 80th birthday in November 1985. Bernhard Gross is the nestor of modern electret research and has made invaluable contributions to many other areas of physics and engineering. He also inspired a large number of young scientists who had the privilege to work together with him or study under his guidance. By attending ISE 5, the participants and authors of the Proceedings papers want to honor Professor Gross and express their gratitude for his pioneering contributions to electret research.

The scientific career of Bernhard Gross and his importance for physics, in particular in South America, is sketched in the introductory paper of this book. The following article contains Professor Gross' own account of the development of electret research during the last 50 years and is an excellent survey on the systematics of the subject. An appendix of this paper reflects the intense personal involvement characteristic for his work.

The Symposium takes place almost exactly one century after the introduction of the term "electret" by Oliver Heaviside in his article in "The Electrician" of August 7, 1885. Although charging phenomena in dielectrics were described as early as 1600, Heaviside's work is often considered the real beginning of electret research.

The truly international character of ISE 5 is demonstrated by the following list of the 27 countries, arranged by continents, from which papers were contributed:

<u>Africa</u>	3 papers	<u>Asia</u>	43 papers
Algeria	1 paper	China	6 papers
Egypt	2 papers	India	16 papers
<u>America</u>	28 papers	Israel	1 paper
Brazil	12 papers	Japan	19 papers
Canada	4 papers	Korea	1 paper
Mexico	1 paper	<u>Australia</u>	1 paper
U.S.A.	10 papers		
Venezuela	1 paper		

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<u>Europe</u>	73 papers	Netherlands	2 papers
Belgium	1 paper	Poland	7 papers
Czechoslovakia	3 papers	Spain	2 papers
France	14 papers	Switzerland	2 papers
F.R.G.	17 papers	U.K.	6 papers
G.D.R.	6 papers	U.S.S.R.	4 papers
Greece	1 paper	Yugoslavia	1 paper
Italy	7 papers		

Use of the Proceedings during the Symposium should be facilitated by a cross-reference section located at the end of the book, relating the number of an abstract in the Program Booklet (and its Supplement) to the page numbers of the corresponding full paper in the present volume. A subject index, based on keywords kindly provided by the authors, will make the contents of the volume better accessible for those looking for specific information on particular subjects. In addition to these two indices and an author index, publishing data on the Proceedings of the previous four electret conferences and of a few related meetings will be found directly following the Preface. The members of the Scientific Advisory Committee and all those who significantly contributed toward the preparation of this Symposium are listed on the following page. We appreciate their advice and help.

ISE 5 would not have been possible without generous financial support by a number of institutions. Particular thanks are due to the Ministry for Research and Technology of the Federal Republic of Germany (BMFT) which made a grant available through the Deutsche Forschungsgemeinschaft (DFG), to the Ministry of Sciences and Arts of the State of Hesse which also granted financial support, to the German Foundation for International Development which assisted with the conference expenses of a few Symposium participants, and to a number of companies, listed separately in this volume, which donated in various ways. We are grateful to all these institutions for their valuable contributions.

Darmstadt, July 1985

Gerhard M. Sessler and Reimund Gerhard-Multhaupt

Former Electret Symposia and their Proceedings

- 1) "Electrets and Related Electrostatic Charge Storage Phenomena"
International Symposium held as part of the 132nd Meeting of the
Electrochemical Society in Chicago, Illinois, U.S.A., 15-20 October 1967
Published by the Electrochemical Society, Inc., 30 East Street,
New York, New York 10017, U.S.A. (Edited by Lawrence M. Baxt and
Martin M. Perlman), IV+150 pages, 1968.
- 2) "Electrets, Charge Storage and Transport in Dielectrics"
International Symposium held as part of the 142nd Meeting of the
Electrochemical Society in Miami Beach, Florida, U.S.A.,
8-13 October 1972
Published by the Electrochemical Society, Inc., P.O. Box 2071,
Princeton, New Jersey 08540, U.S.A. (Edited by Martin M. Perlman),
XXIV+676 pages, 1973.
- 3) "International Symposium on Electrets and Dielectrics"
Honoring the 70th Birthday of Prof. Bernhard Gross.
Held in São Carlos, São Paulo, Brasil, 1-6 September 1975
Published by the Academia Brasileira de Ciências, Rio de Janeiro, Brasil
(Edited by Milton Soares de Campos and organized by the Instituto de
Física e Química de São Carlos, Universidade de São Paulo, Caixa Postal
369, 13560-São Carlos, São Paulo, Brasil), VI+448 pages, 1977.
- 4) "Charge Storage, Charge Transport, and Electrostatics with their
Applications"
International Workshop on Electric Charges in Dielectrics held in Kyoto,
Japan, 9-12 October 1978
Copublished by Kodansha Ltd., 12-21 Otowa 2-chome, Bunkyo-ku, Tokyo 112,
Japan and Elsevier Scientific Publishing Company, 335 Jan van Galen-
straat, P.O. Box 211, NL-1000 AE Amsterdam, The Netherlands (Edited by
Yasaku Wada, Martin M. Perlman and Hiroshi Kokaido), X+444 pages, 1979.

Related Electret Conferences

- 1) "Electrets and Related High-Field Polarization"
Meeting of the Dielectrics Society held in Swansea, Wales, U.K.,
1-3 April 1974
Published in part in the Journal of Electrostatics, Volume 1 (1975).
- 2) "Thermally Stimulated Processes in Solids"
International Workshop held under the auspices of the Université des
Sciences et Techniques du Languedoc (Montpellier) in La Grande Motte,
France, 22-25 June 1976
Published in the Journal of Electrostatics, Volume 5 (1977).
- 3) "Space Charge in Dielectrics"
Colloquium held in Karpacz, Poland, 12-17 September 1977
Published in part in the Journal of Electrostatics, Volume 8 (1979).

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Grants received from:

Federal Ministry for Research and Technology of the F.R.G. (BMFT) through the Deutsche Forschungsgemeinschaft (DFG)
 Ministry of Sciences and Arts of Hesse, Wiesbaden, F.R.G.
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