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NONLINEAR PHENOMENA IN ELECTROMAGNETIC AND ACOUSTIC
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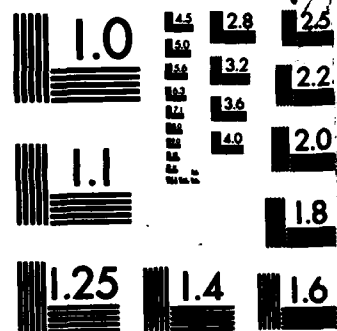
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**Nonlinear Phenomena in Electromagnetic
and Acoustic Wave Propagation**

Final Report

January 15, 1981 — January 14, 1984

Professor Joseph B. Keller

April 1984

U.S. Army Research Office

Contract: DAAG29-81-K-0032

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Nonlinear Phenomena in Electromagnetic
and Acoustic Wave Propagation

FINAL REPORT

January 15, 1981 - January 14, 1984

1. Statement of the problems studied

→ We have studied mathematical problems in electromagnetic and acoustic wave propagation which involve nonlinear partial differential equations, or linear partial differential equations with random coefficients.

2. Summary of the most important results

→ A general theory of weakly nonlinear high frequency wave propagation was developed which applies to waves in any number of dimensions. It justifies the nonlinearization technique of Whitham and Landau and extends it to interacting waves and to other types of waves. The theory was successfully applied to weak shock diffraction.

The theory of wave reflection from rough surfaces was extended to yield the correlation functions of the scattered field. It was found that the second order correlations could be expressed in terms of the reflection coefficient and the differential scattering cross section of the surface.

Many other problems were analyzed successfully.

3. List of papers published and submitted for publication

See Attachment A.

4. List of scientific personnel

See Attachment B.



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Attachment A.

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 A. S. Whittmore Survival estimation using censored data
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 J. F. Geer Eigenvalues of slender cavities and waves in
 slender tubes
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 R. Voronka Valuation of stocks and options
 To be submitted.

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 J. B. Keller Effective viscosity of a periodic suspension
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S. Coen
A. Waglein
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M. S. Falkovitz
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Sub: Am. J. Physics

Attachment B.

Army contract DAAG29-81-K-0032

Scientific Personnel, January 15, 1981 through January 14, 1984:

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Jeanmarc Vanden Broeck

John G. Watson

Meira Falkovitz

John H. Maddocks

Margaret Cheney

Michael Weinstein

Graham P. Eatwell

Stephanos Venakides

John A. Fawcett

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