AD-A107 388   WAYNE STATE UNIV DETROIT MICH DEPT OF PHYSICS   F/G 14/2
LASER PHOTOACOUSTIC TECHNIQUE FOR NDE.(U)
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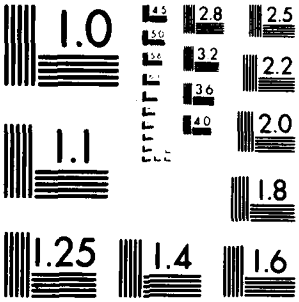
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER (19) 15746.14-MS (18) ARO

2. GOVT ACCESSION NO. AD-A107 388

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle) (6) LASER PHOTOACOUSTIC TECHNIQUE FOR NDE.

(12)

5. TYPE OF REPORT & PERIOD COVERED Final 8/16/78 to 8/15/81

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s) (10) R. L./Thomas

8. CONTRACT OR GRANT NUMBER(s) DAAG29-78-G-0182 (15) DAAG 29-79-C-0151

9. PERFORMING ORGANIZATION NAME AND ADDRESS

Department of Physics
Wayne State University
Detroit, MI 48202

16

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS

U. S. Army Research Office
P. O. Box 12211
Research Triangle Park, NC 27709

(11)

12. REPORT DATE 10/26/81

13. NUMBER OF PAGES

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

LEVEL II

15. SECURITY CLASS. (of this report) Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. ~~DISTRIBUTION STATEMENT (of this Report)~~

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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

NA

18. SUPPLEMENTARY NOTES

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Laser photoacoustic technique in the non-destructive evaluation (NDE) of ceramics and metals.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The physics of the scanning photoacoustic microscopy (SPAM) has been developed. SPAM has been applied to NDE problems in high performance ceramics, and has been shown to be potentially useful for NDE in other solids, such as metals and semiconductors.

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A NEW PHOTOACOUSTIC TECHNIQUE FOR NDE

FINAL REPORT

R. L. THOMAS

OCTOBER 26, 1981

U. S. ARMY RESEARCH OFFICE

CONTRACT NO. DAAG 29-78-G-0151

WAYNE STATE UNIVERSITY

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[illegible] (SPAM) [illegible] flaws which lie just below the [illegible] solid. This problem is particularly acute for the [illegible] but brittle, ceramic materials, SiC and Si_3N_4. The [illegible] was to investigate and develop an entirely new NDE [illegible] scanning photoacoustic microscopy [illegible] applicability for subsurface NDE of ceramics.

[illegible] Results

[illegible] the course of this study, we have developed the gas-filled cell [illegible] optimized and verified the relevant experimental [illegible] the data collection, processing and display. [illegible] an experimental and theoretical investigation of the physics [illegible] and scattering which is responsible for the SPAM [illegible] of simple fabricated subsurface flaws. [illegible] SPAM technique to various materials problems and [illegible] of subsurface flaws at depths ranging from [illegible] to about one millimeter and with lateral resolution of about [illegible] subsurface flaws.

[illegible] studies have been sufficiently encouraging that [illegible] and one U.S. Army Laboratory have adopted the [illegible] one major scientific conference (IEEE Ultrasonics [illegible]) devoted a special session to this topic. Technical details of [illegible] in the following list of publications, Part C of this [illegible]

[illegible] View of Progress in Quantitative [illegible]

[illegible] by Photoacoustic [illegible] R.L. Thomas and L.D. Favro, Appl. [illegible]).

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[illegible]", L.D. Favro, L.I. Inglehart, P.K. Kuo, [illegible] R.L. Thomas, to be published in Proceedings of the [illegible] Review of Progress in Quantitative NDE, July 12-17, [illegible].

[illegible] of Closed Cracks," Y.H. Wong, [illegible] Thomas, and M. Srinivasan, accepted for [illegible] J. Appl. Phys., Feb. 1982.

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[illegible] Surface Cracks [illegible] Microscopy," [illegible]

[illegible] Cells, [illegible] F. Fan, [illegible], [illegible]
[illegible]
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[illegible] of [illegible]
[illegible]," [illegible] F. Fan and L. D. Favro (submitted for publication).

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