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X-RAY HOLOGRAPHY WITH X-RAYS.(U)  
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18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Holography, X-Rays		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A study was made of the possibility to produce x-ray holograms near 44 Angstroms with a novel double Fresnel Zone plate arrangement. Locally available sources (CHESS) are not suitable, however.		

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Final Report

Grant # N00014-77-C-0543.

The project "X-ray Holography with X-rays" was first supported as a travel grant. A cooperative effort was planned with a group in West Germany, Drs. Niebuhr and Schmahl at the Göttingen Observatory. The Göttingen group had developed methods of producing highly accurate Fresnel zone plates for use with x-rays and we had started preliminary experiments to use Fresnel zone plates for x-ray holography. The experiments were to be performed at the DESY-Germany synchrotron facility. Because of the enormous pressure by particle physicists to build PETRA almost no time could be given to a project like ours and the cooperation coupled with visits and trips was cancelled. In the meantime the Cornell electron-positron storage ring CESR was in the discussion stages and it was decided to spend the grant money on a feasibility study of eventually using Fresnel zone plates for x-ray holography with the Cornell synchrotron facility CHESS. This work was pursued last year and during last summer with two undergraduate research helpers and myself.

First it was established that in a continuation of a previous effort x-ray holograms could be produced with a novel double Fresnel zone plate arrangement near  $44\text{\AA}$ . The CHESS source is, however, very unsuited as a source of soft x-rays. A radically different approach would have to be used to do x-ray holography in the range of 30KeV and up for which CHESS is dedicated as a national facility. Such a proposal would go far beyond the very limited objective of this grant. It was decided then to use the knowledge and experience gained by the present grant to develop a proposal particularly suited for CHESS. This proposal is in preparation.

In summary then, Grant #N00014-77-C-0543 allowed us to positively explore the feasibility of a two-Fresnel zone plate scheme in the  $40\text{\AA}$  range. As efforts to collaborate for such a source failed we then turned to efforts to match the much higher energy range of the new CHESS facility at Cornell with our objective. This endeavor has just started. We felt that this was a good point at which to terminate work on Grant #N00014-77-C-0543 and to start afresh with a new proposal for future efforts.

**Bibliography:**

1. Benno Reuter and H. Mahr, "Experiments with Fourier Transform Holograms Using 4.48nm x-rays," J. of Physics E (1976) Vol. 9, 746.

There were no publications or theses, nor was there any capital equipment purchased on this grant.

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CORNELL UNIVERSITY  
Ithaca, New York

Final Equipment Report

Date 7 April 1980

TO: Defense Contract Audit Agency - Day Hall  
FROM: Purchasing Department, Room 100, Day Hall 129 Maple Ave.  
SUBJ: Contract W00014-77-C-0543; information concerning  
property accountability under Appendix C, ASPR., Cornell  
University Acct. No. 176-8364.

1. Work commenced on 1 July 1979.
2. Contract was physically completed on 31 March 1980.
3. Last Amendment Number A0001.
4. Value of residual material (exclusive of equipment) remaining  
under contract \$ None. (If none, state "None").
  - a. Inventory list prepared (x)Yes ( )No
  - b. List has been submitted to the Technical Inspector on  
31 March 1980.
5. Contract-Acquired Property

<u>Type</u>	<u>Amount</u>	<u>Transferred to</u>	<u>Date</u>
a. Real Property	\$ <u>-0-</u>	_____	_____
b. Plant Equipment	\$ <u>-0-</u>	_____	_____
c. Minor Equipment	\$ <u>-0-</u>	_____	_____
d. Special Tooling	\$ <u>-0-</u>	_____	_____
Total	\$ <u>-0-</u>	_____	_____

6. Government-Furnished Property

a. Real Property	\$ <u>-0-</u>	_____	_____
b. Plant Equipment	\$ <u>-0-</u>	_____	_____
c. Minor Equipment	\$ <u>-0-</u>	_____	_____
d. Special Tooling	\$ <u>-0-</u>	_____	_____
Total	\$ <u>-0-</u>	_____	_____

7. Patent and royalty certificates executed on 7 April 1980

~~XXXXXXXXXX~~ E.B. Pirko  
Gov't. Property Control Officer  
Cornell University, Ithaca, N.Y.

Sponsored Programs  
Copies to: ~~XXXXXXXXXX~~ Accounting  
~~XXXXXXXXXX~~  
Project Director  
Ofc. of Sponsored Programs



# Cornell University

Purchasing Department  
120 Maple Avenue, Ithaca, New York 14850

March 31, 1980

Mr. Laurence Arra, Property Administrator  
Department of the Navy  
ONR-Eastern/Central Regional Office  
Building 114 Section D  
666 Summer Street  
Boston, MA 02210

Subject: Final Inventory N00014-77-C-0543

Dear Mr. Arra:

Enclosed are four copies of the final inventory of equipment acquired under the subject contract with the Materials, Supplies and Equipment Certificate attached.

We are reporting a negative inventory.

Sincerely yours,

(Mrs.) E.B. Pirko  
Government Property  
Control Officer

EBP:gc

encls: 4 w/attach.

cf: V.A. Morano, ONR-NY

Prof. H. Mahr, LASSP

Mrs. B. Keib, Sponsored Programs Acctg.

P.A. Curtiss, Office of Sponsored Programs

MATERIALS, SUPPLIES, EQUIPMENT CERTIFICATE

To: Director, Office of Naval Research, Boston Branch  
666 ~~425~~ Summer Street, Boston, Massachusetts 02210

From: Cornell University  
Purchasing Department  
120 Maple Avenue  
Ithaca, NY 18450

The undersigned, as an authorized representative of the contractor, having completed the work called for by Contract No. N00014-77-C-0543, hereby certifies that all materials, supplies, and equipment which were furnished to the contractor by the Government for use on the contract, or for which the contractor has been or will be reimbursed by the Government under the terms of the contract, if not specifically included in the attached inventory listings, were expended in performing the work called for by the contract.

- Completed inventory listings attached
- No residual inventory
- All inventory accounted for under Facility Contract No. \_\_\_\_\_

E. B. Pirko  
Signature (Mrs.) E.B. Pirko

Government Property Control Officer  
Title

31 March 1980  
Date

APPROVED: \_\_\_\_\_  
(ONR Branch Office Property Administrator)

Date: \_\_\_\_\_



