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"Psec Nonlinear Optical Measurements of Photonic Crystal Materials"

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**5b. GRANT NUMBER**

**5c. PROGRAM ELEMENT NUMBER**

**6. AUTHOR(S)**
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**5d. PROJECT NUMBER**

**5e. TASK NUMBER**

**5f. WORK UNIT NUMBER**

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**12. DISTRIBUTION AVAILABILITY STATEMENT**



**13. SUPPLEMENTARY NOTES**

**14. ABSTRACT**

We are requesting funds to purchase a psec visible wavelength laser which will be used to build a psec Z-scan and a degenerate 4-wave mixing experimental apparatus to allow us to measure the optical nonlinearities of our new crystalline colloidal array optical limiting and switching materials. In addition, this laser will be used to create psec optical defects in the photonic bandgap crystals (PBGC) we recently fabricated, in order to determine whether we can devise methods to inject and extract light into and from these enabling materials. This equipment will enhance the education of graduate students and postdoctoral fellows in the areas of nonlinear optical measurements. Most importantly, it will enable rational experimental design of materials since the same researchers synthesize the materials and then walk into an adjacent lab to prove the material's properties.

**15. SUBJECT TERMS**

| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON |
|---|---|---|---|---|---|
| a. REPORT | b. ABSTRACT | c. THIS PAGE | | | Sanford A. Asher |
| | | | | | 19b. TELEPONE NUMBER *(Include area code)* (412) 624-8570 |

# Psec Nonlinear Optical Measurements of Photonic Crystal Materials

**FINAL PROGRESS REPORT**

**PROFESSOR SANFORD A. ASHER**

**DECEMBER 13, 2000**

**U.S. ARMY RESEARCH OFFICE**

**GRANT NUMBER DAAD-19-99-1-0078**

**DEPARTMENT OF CHEMISTRY**
**UNIVERSITY OF PITTSBURGH**
**PITTSBURGH, PA 15260**

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# TECHNICAL PROGRESS REPORT

## A. STATEMENT OF PROBLEM

We were to use these funds together with a DURIP proposal funded by ONR to purchase a psec laser in order to constrcut a Z-scan and a degenerate 4-wave mixiing experimental apparatus to measure the nonlinear response of our new crystalline colloidal array optical limiting and switching materials. In addition, this laser was to be used to create psec optical defects in our photon bandgap crystals in order to determine whether we can devise methods to inject and extract light into and from these enabling materials.

## B. SUMMARY OF IMPORTANT RESULTS

We have ordered the laser and optical equipment and are awaiting its arrival. This laser will be placed in a new state-of-the art laser laboratory the University of Pittsburgh has built for these experiments. We expect its arrival in January, 2001.

## C. PUBLICATIONS

None as yet.

## D. LIST OF SCIENTIFIC PERSONNEL EMPLOYED ON PROJECT

Funding was only for equipment.

## E. REPORT ON INVENTIONS

None, as yet.