

**REPORT DOCUMENTATION PAGE**

AFRL-SR-BL-TR-01-

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188).

ces,  
this  
son

0539

1. AGENCY USE ONLY (Leave Blank)		2. REPORT DATE October 4, 2001	3. REPORT TYPE AND DATES COVERED Final Technical Report 15APR00 - 14APR01		
4. TITLE AND SUBTITLE DURIP: Optical Fiber Gratings Using UV Light and IR Light			5. FUNDING NUMBERS F49620-00-1-0263		
6. AUTHORS Jack Feinberg (Department of Physics)					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Southern California Department of Contracts and Grants Los Angeles, CA 90089-1147			8. PERFORMING ORGANIZATION REPORT NUMBER Final Technical		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Dr. Howard R. Schlossberg AFOSR 801 N. Randolph Street, Room 732 Arlington, VA 22203-1977			10. SPONSORING / MONITORING AGENCY REPORT NUMBER		
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION / AVAILABILITY STATEMENT Unlimited			12b. DISTRIBUTION CODE		
13. ABSTRACT (Maximum 200 words) DURIP Equipment only grant. Equipment purchased: Precision translation stage, pulsed Nd:YAG laser, and CO2 laser. Technical accomplishments are described in the final technical report of F49620-98-1-0051.					
14. SUBJECT TERMS optical fibers fiber gratings fiber optic communications			15. NUMBER OF PAGES 2		
			16. PRICE CODE		
17. SECURITY CLASSIFICATION OF REPORT Unclassified		18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unlimited	

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFOSR)  
NOTICE OF TRANSMITTAL DTIC. THIS TECHNICAL REPORT  
HAS BEEN REVIEWED AND IS APPROVED FOR PUBLIC RELEASE  
LAW AFR 190-12. DISTRIBUTION IS UNLIMITED.

20011126 109

CONF

**Final Report**  
**F49620-00-1-0263**

Submitted to:  
Air Force Office of Scientific Research  
801 N. Randolph Street, Room 732  
Arlington, VA 22203-1977

**ATTN.: Dr. Howard Schlossberg**

- 1) Date submitted: OCTOBER 4, 2001
- 2) Title: DURIP 00-01 OPTICAL FIBER GRATINGS USING UV LIGHT AND IR LIGHT
- 3) Principal Investigator: JACK FEINBERG, DEPARTMENT OF PHYSICS  
Office: (213) 740-1134, Fax: (213) 740-6653
- 4) Time period covered: APRIL 15, 2000 – APRIL 14, 2001
- 5) Institution Name: UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES, CALIFORNIA  
90089-0484
- 6) Federal agency identifying award number: F49620-00-1-0263
- 7) Special circumstances regarding equipment acquisition: None

FINAL REPORT

F49620-00-1-0263

DURIP 00-01: OPTICAL FIBER GRATINGS USING UV LIGHT AND IR LIGHT

This is an "equipment only" grant under the Defense University Research Instrumentation Program. A report of the results obtained with this equipment is contained in the final report for Grant F49620-98-1-0051, "OPTICAL FIBER GRATINGS USING NEAR-UV LIGHT. To avoid duplication of paperwork, only a partial summary of that report will be duplicated here.

This grant is to purchase equipment to further investigate the physical properties of optical gratings written in optical fibers using ultraviolet and infrared light. The major equipment purchased in this grant includes:

<b>Equipment Description (Vendor)</b>	<b>Expense</b>
Precision translation stage (Newport)	\$41,414
CO2 laser (Synrad)	\$7,142
Tunable IR laser (Santec)	\$41,414

A precision translation stage from the vendor Aerotech was not delivered before the end of this grant, so that order for \$32,475 was cancelled.

Key accomplishments using the above equipment are:

- 1) We performed experiments to reveal how light alters the refractive index of germanium-doped optical fibers. We found that loading the fiber with hydrogen turns on a separate physical mechanism so that all of the Ge atoms become photosensitive, instead of only the Ge defects.
- 2) We perfected methods of writing long-period gratings in fibers with no unwanted harmonics or sidelobes.
- 3) We fabricated a large number of fiber gratings in germanium-doped fibers and supplied these gratings to other research groups for demonstration of systems applications. These include using fiber gratings as adjustable dispersion compensators and as adjustable delay elements in a fiberoptic network.
- 4) We performed and presented new results on the strength of gratings written through the polymer coating of optical fibers.
- 5) We invented a new type of fiber sensor that needs no spectrometer and that works in real time. It senses either temperature or strain.

A more detailed report of the results achieved using this equipment can be found in the final report of Grant F49620-98-1-0051.