FORCES ON NEUTRAL ATOMS DUE TO ELECTROMAGNETIC FIELDS
(U) MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB
OF ELECTRONICS  D E PRITCHARD 23 OCT 85

UNCLASSIFIED N00014-83-K-0695

END
ANNUAL SUMMARY REPORT

Forces on Neutral Atoms Due to Electromagnetic Fields

Office of Naval Research
Contract N00014-83-K-0695

covering the period
1 September 1984 - 31 August 1985

Submitted by:
David E. Pritchard

23 October 1985

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Research Laboratory of Electronics
Cambridge, Massachusetts 02139

This document has been approved for public release and sale; its distribution is unlimited.
**Work by D. E. Pritchard and his collaborators is summarized here.**
ONR Progress Report 1 September 1984 – 31 August 1985

The major portion of our effort in 1984-1985 has gone into design and construction of a new large bore (3 in.) atom slower and trap which will use cryogenics both to produce ultra-low vacuums and to enable use of superconducting magnet technology. The vacuum and cryogenic dewar is under construction, the longitudinal magnets have been built (by us – after an unsuccessful attempt to find outside suppliers), and the trap magnet has been successfully tested. Considerable effort was also devoted to major renovations of our laboratory space including installation of a 18 in. hole to the newly acquired laboratory space below our laser lab – this will permit use of a vertical configuration for the apparatus, which is roughly 5 meters long. We hope to begin experiments on steady state slowing by Christmas. Early in the period some effort was devoted to measurements on slowing atoms in a magnetic slower using conventional magnets which we built in 1983-84.

Invited talks on trapping neutral atoms were given at the Gordon Conference on Spin Aligned Systems and at the International Conference on Physics of Electron and Atomic Collisions. Papers published include an article in Quantum Electronics and a contribution to the ICPEAC book of invited talks.
REPORTS DISTRIBUTION LIST FOR ONR PHYSICS DIVISION OFFICE UNCLASSIFIED CONTRACTS

Director
Defense Advanced Research Projects Agency
Attn: Technical Library
1400 Wilson Blvd.
Arlington, Virginia 22209

Office of Naval Research
Physics Division Office (Code 412)
800 North Quincy Street
Arlington, Virginia 22217

Office of Naval Research
Director, Technology (Code 200)
800 North Quincy Street
Arlington, Virginia 22217

Naval Research Laboratory
Department of the Navy
Attn: Technical Library
Washington, DC 20375

Office of the Director of Defense 
Research and Engineering
Information Office Library Branch
The Pentagon
Washington, DC 20301

U.S. Army Research Office
Box 1211
Research Triangle Park
North Carolina 27709

Defense Technical Information Center
Cameron Station
Alexandria, Virginia 22314

Director, National Bureau of Standards
Attn: Technical Library
Washington, DC 20234

Director
U.S. Army Engineering Research 
and Development Laboratories
Attn: Technical Documents Center
Fort Belvoir, Virginia 22060

ODDR&E Advisory Group on Electron Devices
201 Varick Street
New York, New York 10014
<table>
<thead>
<tr>
<th>Address</th>
<th>Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Force Office of Scientific Research</td>
<td>1 copy</td>
</tr>
<tr>
<td>Department of the Air Force Bolling AFB, DC 22209</td>
<td></td>
</tr>
<tr>
<td>Air Force Weapons Laboratory Technical Library</td>
<td>1 copy</td>
</tr>
<tr>
<td>Kirtland Air Force Base Albuquerque, New Mexico 87117</td>
<td></td>
</tr>
<tr>
<td>Air Force Avionics Laboratory</td>
<td>1 copy</td>
</tr>
<tr>
<td>Air Force Systems Command Technical Library</td>
<td></td>
</tr>
<tr>
<td>Wright-Patterson Air Force Base Dayton, Ohio 45433</td>
<td></td>
</tr>
<tr>
<td>Lawrence Livermore Laboratory Attn: Dr. W. F. Krupke University of California P.O. Box 808 Livermore, California 94550</td>
<td>1 copy</td>
</tr>
<tr>
<td>Harry Diamond Laboratories Technical Library</td>
<td>1 copy</td>
</tr>
<tr>
<td>2800 Powder Mill Road Adelphi, Maryland 20783</td>
<td></td>
</tr>
<tr>
<td>Naval Air Development Center Attn: Technical Library Johnsville Warminster, Pennsylvania 18974</td>
<td>1 copy</td>
</tr>
<tr>
<td>Naval Weapons Center Technical Library (Code 753) China Lake, California 93555</td>
<td>1 copy</td>
</tr>
<tr>
<td>Naval Underwater Systems Center Technical Center New London, Connecticut 06320</td>
<td>1 copy</td>
</tr>
<tr>
<td>Commandant of the Marine Corps Scientific Advisor (Code RD-1) Washington, DC 20380</td>
<td>1 copy</td>
</tr>
<tr>
<td>Naval Ordnance Station Technical Library Indian Head, Maryland 20640</td>
<td>1 copy</td>
</tr>
<tr>
<td>Naval Postgraduate School Technical Library (Code 0212) Monterey, California 93940</td>
<td>1 copy</td>
</tr>
<tr>
<td>Naval Missile Center Technical Library (Code 5632.2) Point Mugu, California 93010</td>
<td>1 copy</td>
</tr>
</tbody>
</table>
Naval Ordnance Station
Technical Library
Louisville, Kentucky 40214

Commanding Officer
Naval Ocean Research & Development Activity
Technical Library
NSTL Station, Mississippi 39529

Naval Explosive Ordnance Disposal Facility
Technical Library
Indian Head, Maryland 20640

Naval Ocean Systems Center
Technical Library
San Diego, California 92152

Naval Surface Weapons Center
Technical Library
Silver Spring, Maryland 20910

Naval Ship Research and Development Center
Central Library (Code L42 and L43)
Bethesda, Maryland 20084

Naval Avionics Facility
Technical Library
Indianapolis, Indiana 46218