

AD-A074 594

MISSOURI UNIV-ST LOUIS DEPT OF PHYSICS  
POTENTIAL LASER ACTION IN HE-METAL VAPOR MIXTURES. (U)  
SEP 79 J J LEVENTHAL

F/G 20/5

N00014-76-C-0760

UNCLASSIFIED 3

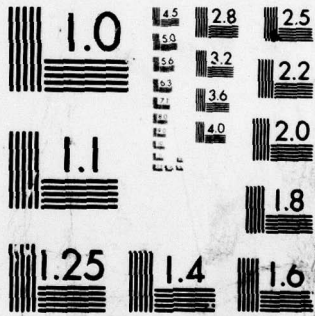
NL

1 OF 1  
AD  
A074594



END  
DATE  
FILMED

11-79  
DDC



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

12

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

ADA 074594

1. REPORT NUMBER: 143; 2. GOVT ACCESSION NO.; 3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle): Potential Laser Action in He-Metal Vapor Mixtures; 5. TYPE OF REPORT & PERIOD COVERED: Research Summary; 6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s): Jacob J. Leventhal, Professor of Physics; 8. CONTRACT OR GRANT NUMBER(s): N00014-76-C-0760

9. PERFORMING ORGANIZATION NAME AND ADDRESS: University of Missouri-St. Louis, 8001 Natural Bridge Road, St. Louis, Missouri 63121; 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 24 Sep 79

11. CONTROLLING OFFICE NAME AND ADDRESS: Office of Naval Research, Arlington, Virginia; 12. REPORT DATE: September 24, 1979; 13. NUMBER OF PAGES: 4

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): LEVEL; 15. SECURITY CLASS. (of this report): unclassified; 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE: UNC

16. DISTRIBUTION STATEMENT (of this report): Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from 16):

DDC  
RAPID  
OCT. 3 1979  
REGISTRY

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number): Excited State Production, Laser, Population Inversion, Superradiant, Soft X-Ray

20. ABSTRACT (Continue on reverse side if necessary and identify by block number): Energy transfer in atomic and molecular interactions is experimentally studied by analyzing photons from radiative decay of excited species formed in the collision process. Emphasis is on production of excited states that radiate in the soft x-ray and optical regions of the spectrum. Selective excitation in such processes can lead to the inverted state distributions necessary for the laser or superradiant operation.

DDC FILE COPY

110 890

79 09

28 035

Research Summary: ONR Contract No. N00014-76-C-0760

"Potential Laser Action in He-Metal Vapor Mixtures"

Principal Investigator: J. J. Leventhal  
Professor of Physics  
Department of Physics  
University of Missouri-St. Louis  
St. Louis, Missouri 63121

1. Contract Description: Experiments are performed which are designed to study energy partitioning among quantum state of atomic and molecular collision products. Emphasis is placed on processes which are potential pumping mechanisms for laser or superadiant operation in the soft x-ray to near infrared regions of the spectrum.
2. Scientific Problem: The most important aspects of this work are to determine the fundamental rules that govern internal energy level selection in molecular collisions. Using the experimental technique developed at UMSL for the study of such processes, specific collision systems can be tested for promise as lasants.
3. Scientific and Technical Approach: The experiments are performed by combining molecular beam techniques with those of emission spectroscopy. A low energy mass selected ion beam is intersected by a thermal energy atomic or molecular beam, and the radiation (soft x-ray, vuv, near uv, visible and near ir) from radiative decay of excited species formed in the collision process detected by single photon counting. By scanning the wavelength a collision-produced emission spectrum

