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Research by AFRL Scholars; June 1998-September 2000

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Final Report

AIR FORCE RESEARCH LABORATORY
Space Vehicles Directorate
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"This technical report has been reviewed and is approved for publication"

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14. ABSTRACT

Five AFRL Scholars were appointed under task requirement notices to pursue projects supporting on-going research efforts at AFRL/VSB. The scholars and the topics investigated included the following: Susan Triantafillou - "A Lattice Boltzmann Model of Cloud-Forming Processes"; Anthony Midey – " The Role of Ion Chemistry in the Kinetic Control of Combustion Processes"; Gary Lapham – "A Study of the Relationship between Gravity Waves and Stratospheric Turbulence"; Steven Pullins – "The Hyperthermal Dynamics Associated with Meteoritic Materials"; Jennifer Lipson – "Infrared Emissions from Reaction of Hydrocarbons with O Atoms"; Anthony Midey – The Role of Ion Chemistry in the Kinetic Control of Combustion Processes" (second year appointment). Reports documenting these investigations are available from DTIC.

15. SUBJECT TERMS
AFRL Scholar; Lattice Boltzmann; Clouds; Ion Chemistry; Control of Combustion; Gravity Waves; Stratospheric Turbulence; Hyperthermal Dynamics; Meteoritic Materials; Infrared Emissions; Reactions of Hydrocarbons; O Atoms.

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Contract F19628-98-C-0029
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The contract began June 23, 1998, with a total effective period of 48 months. Quarterly R&D Status Reports were submitted to AFRL with the 7th Quarterly R&D Status Report being the last to report on contractual effort. The 8th quarterly R&D Status Report was submitted on September 6, 2000, reporting no activity on the contract with all appointed AFRL Scholars having completed their assignments. The 9th Quarterly R&D Report was submitted to AFRL on December 6, 2000, since all contract effort had ceased prior to September 2000.

Effort on the contract was pursued by AFRL Scholars appointed via a Task Requirement Notice (TRN) with each TRN stipulating the required effort, the AFRL Scholar, the funding, and the effective period of the TRN.

TRN 101, "A Lattice Boltzmann Model of Cloud-Forming Processes", was undertaken by Susan Triantafillou as the AFRL Scholar. TRN 101 was for an effective period of 14 months starting June 23, 1998. The effort was summarized in a report to AFRL by the AFRL Scholar under date of July 1, 1999.

TRN 102, "The Role of Ion Chemistry in the Kinetic Control of Combustion Processes", was undertaken by Anthony J. Midey, Jr., as the AFRL Scholar. TRN 102 was for an effective period of 14 months starting June 23, 1998. The effort was summarized by the AFRL Scholar in a presentation at the 47th ASMS Conference on Mass Spectrometry and Allied Topics, June 12-18, 1999, and in a report to AFRL under date of July 7, 1999.

TRN 103, "A Study of the Relationship Between Gravity Waves and Stratospheric Turbulence", was undertaken by Gary S. Lapham as the AFRL Scholar. TRN 103 was for an effective period of 12 months starting September 8, 1998. The effort was summarized by the AFRL Scholar in a report and presentation to AFRL on September 29, 1999.

TRN 104, "Pre-Appointment Visit for AFRL Scholar Nominee", involved the appointment of Joel A. Bacon for a three day period at AFRL in December 1998 and was summarized by the AFRL Scholar Nominee in a series of discussions with designated AFRL personnel and a presentation at AFRL.

TRN 105, "The Hyperthermal Dynamics Associated with Meteoric Metals", was undertaken by Steven H. Pullins as the AFRL Scholar. TRN 105 was for an effective period of 14 months starting December 23, 1998. The effort was summarized by the AFRL Scholar in a report and presentation to AFRL on November 30, 1999.

TRN 106, "Infrared Emissions From Reactions of Hydrocarbons With 0 Atoms", was undertaken by Jennifer B. Lipson as the AFRL Scholar. TRN 106 was for an effective period of 12 months starting June 7, 1999, and was later extended by AFRL officials to August 31, 2000. The effort was summarized in a report by the AFRL Scholar to AFRL under date of August 30, 2000.

TRN 107, "The Role of Ion Chemistry in the Kinetic Control of Combustion Processes - 2nd Year Appointment", was undertaken by Anthony J. Midey, Jr., as the AFRL Scholar. TRN 107 was effective for a period of 12 months starting June 22, 1999. The effort was summarized by the AFRL Scholar in a report to AFRL under date of June 27, 2000.