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1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE	3. REPORT TYPE AND DATES COVERED Final 30 Jun 94 to 15 Jan 98	
4. TITLE AND SUBTITLE (AASERT 94-119) High Power Microwaves			5. FUNDING NUMBERS 61103D 3484/TS	
6. AUTHOR(S) Professor Kristiansen				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Texas Tech University 203 Holden Hall, M/S 41035 Lubbock TX 79409-1035			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFOSR/NE 110 Duncan Ave RMB115 Bolling AFB DC 20332-8050			10. SPONSORING/MONITORING AGENCY REPORT NUMBER F49620-94-1-0299	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT APPROVAL FOR PUBLIC RELEASED: DISTRIBUTION UNLIMITED			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) Over the period 30 June 1994 through 15 January 1998, one graduate student, Kevin Woolverton, and seven undergraduate students, Mark Sudduth, Mark Barkley, Lance Salo, Christopher Holderman, Chad Michaelis, Beverly Garcia (minority student), and Eva Rivas (minority student) worked on this project. Kevin Woolverton had the day-to-day responsibility for our vicator and mode converter research. The undergraduates, except for Beverly Garcia and Eva Rivas, assisted in various aspects of data collection and analysis, computer program development, and in electronic device designs. Beverly and Eva mainly assisted in the administrative work, purchasing, messages, account bookkeeping, report preparation, etc.				
14. SUBJECT TERMS		19980317 097		
		15. NUMBER OF PAGES		
		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 UL

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**Final Technical Report on Research Training of the
AASERT - Funded Students on AFOSR Grant F49620-94-1-0299
30 June 1994 - 15 January 1998**

Over the period 30 June 1994 through 15 January 1998, one graduate student, Kevin Woolverton, and seven undergraduate students, Mark Sudduth, Mark Barkley, Lance Salo, Christopher Holderman, Chad Michaelis, Beverly Garcia (minority student), and Eva Rivas (minority student) worked on this project. Kevin Woolverton had the day-to-day responsibility for our vircator and mode converter research. The undergraduates, except for Beverly Garcia and Eva Rivas, assisted in various aspects of data collection and analysis, computer program development, and in electronic device designs. Beverly and Eva mainly assisted in the administrative work, purchasing, messages, account bookkeeping, report preparation, etc.

Initially, Kevin Woolverton spent much of his time redesigning and upgrading the equipment from the last graduate student using it. He analyzed the various parameter variations for the cylindrical symmetric vircator using the Magic PIC computer code and the details of his work can be found in the annual progress reports for the years 1995 and 1996 submitted as requirements for the Parent Grant, F49620-93-1-0203.

Kevin Woolverton has rebuilt and calibrated the experimental facility and finished taking data to compare with his theoretical work in the fall of 1997. During the summer of 1997, he was at the Phillips Laboratory at Kirtland AFB learning to run the 3-D SOS PIC Code. He analyzed the variations for the cylindrically symmetric vircator using both the Magic and SOS PIC Computer Codes.

His work formed the basis for contributed papers* at international conferences and are listed below. His final technical report on this work covering the period 15 May 1993 - 14 May 1997 was submitted in July of 1997 as required for the Parent Grant, F49620-93-1-0203.

In his course work, he has maintained a 3.9 GPA and completed his Ph.D. in Electrical Engineering in December of 1997, with an official graduation date of May 1998. One copy of his Ph.D. thesis is attached. Dr. Woolverton is now employed by Intel Corporation in Santa Clara, California.

***Papers**

1. "A Study of Coaxial Vircator Geometries", Research and Development Summer Research Publication at Phillips Lab, NM, August 1996, K. Woolverton.
2. "Computer Simulations of Coaxial Vircators", K. Woolverton, M. Kristiansen, and L.L. Hatfield. SPIE Conference, 42nd Annual Meeting, San Diego, CA, July 27 - August 1, 1997,
3. "Diode Polarity Experiments on a Coaxial Vircator", K. Woolverton, M. Kristiansen, and L.L. Hatfield. 24th Int'l. Conf. on Plasma Science, San Diego, CA, May 19-22, 1997,
4. "Improved Efficiency on a Coaxial Vircator Geometry", K. Woolverton, M. Kristiansen, and L.L. Hatfield. Submitted to the 25th IEEE International Conference on Plasma Science, June 1-4, 1998.
5. "Improved Coaxial Vircator Efficiency", K. Woolverton, M. Kristiansen, and L.L. Hatfield. Submitted to IEEE Transactions on Plasma Science Special Issue '98.

Other papers published and/or presented by Dr. Woolverton during his AASERT support period.

"Coaxial Vircator Source Development", K. Woolverton, M. Kristiansen, and L.L. Hatfield, 11th International Conference on High Power Particle Beams, Prague, Czech Republic, June 10-14, 1996.

"Diode Polarity Experiments on a Coaxial Vircator", Proc. 11th IEEE International Pulsed Power Conference, Baltimore, MD, June 29-July 2, 1997.