DOE/ER/54805--Vol. 1

Final
TECHNICAL REPORT
for
DOE AWARD DEFG-05-90ER54805-96

"Experimental Studies of Plasma Fluctuations using Electron Cyclotron
Fluctuations on the Texas Experimental Tokamak"

REPORT PERIOD

May 1, 1995 -- Oct. 31, 1996

Submitted by

Dr. Rex Gandy, Principal Investigator

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

“ Experimental Studies of Plasma Fluctuations using Electron Cyclotron
Fluctuations on the Texas Experimental Tokamak”

REPORT PERIOD

May 1, 1995 – Oct. 31, 1996

Electron cyclotron emission can be used as a measure of electron temperature. If the fluctuations in the cyclotron emission can be measured, then the electron temperature fluctuations can be measured. This measurement is important because electron temperature fluctuations may play an important role in anomalous transport in tokamaks. The purpose of this research grant is to measure electron temperature fluctuations and thereby help to understand anomalous transport.

During this period of the grant significant progress was made in the understanding of electron temperature fluctuations. The best measure of this progress is the resulting publications and book chapters(see following list). These publications report for the first time, a significant poloidal asymmetry in the electron temperature fluctuations. This asymmetry pointed to the possibility that trapped electron modes may play an important role in the genesis of the fluctuations.

During this period Dr. Rex Gandy was the principal investigator, and Dr. Christopher Watts was employed as a post-doctoral associate. Dr. G. Cima of the University of Texas also worked very closely on this project.

PUBLICATIONS

1. Watts and Gandy; "Dynamics of Electron Temperature Fluctuations during Sawtooth Oscillations on TEXT-U", Phys. Rev. Lett., 75, 1759 (1995).
2. Watts, Cima and Gandy; "Evidence for Poloidal Asymmetry of Core Electron Temperature Fluctuations in the Texas Experimental Tokamak", Phys. Rev. Lett., p. 2274, March 1996.

3. Watts, Gandy, Cima, Bravenac, Ross, Wootten, Ouroua, Heard, Crowley, Schoch, Brower, Jiang, Deng, Domier and Luhmann; " Poloidal Asymmetry and Gradient Drive in Core Electron Density and Temperature Fluctuations on the Texas Experimental Tokamak", 3 Physics of Plasmas, May 1996.

BOOK CHAPTERS

1. "Proceedings of the Ninth Joint Workshop on Electron Cyclotron Emission and Electron Cyclotron Heating"; edited by J. Lohr; ISBN 981-02-2338-2, published by World Scientific Publishing Co., (contributed section, pages 379-385), 1995.