

INVERSION OF ARECIBO INCOHERENT SCATTER RADAR CODED
LONG PULSE BACKSCATTER SPECTRA

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THESIS

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ABSTRACT

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CHAPTER 1

INTRODUCTION

Large power VHF/UHF radar systems used with very large gain antennas in ionospheric research are known as incoherent scatter radar (ISR). The highest sensitivity ISR in operation in the world today is located at the Arecibo Observatory in Puerto Rico, and this thesis describes coded long pulse scattered signal spectrum measurements conducted with the Arecibo ISR from ionospheric altitudes above about 75 km.

The mechanism underlying incoherent scattering in ISR operations is the “dipole radiation” of each free electron in the ionosphere made to oscillate by the transmitted radar pulse – this is known as the Thomson scattering process

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CHAPTER 2

THE IONOSPHERE AND THEORY OF IONOSPHERIC INCOHERENT SCATTERING

CHAPTER 3

RADAR CONFIGURATION AT ARECIBO OBSERVATORY

CHAPTER 4

COMPUTATION OF ARECIBO ISR CODED LONG PULSE IONLINE SPECTROGRAM