Search for Neutrino Transients Using IceCube and DeepCore

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by

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PREFACE

This "dissertation" is based on data acquired with the IceCube Neutrino Observatory whose maintenance and operation is the result of an immense international collaborative effort. The bulk of the work pertaining to experimental hardware, data acquisition, reconstruction algorithms, systematics, and simulation presented in this document can be attributed to many IceCube collaborators. However, the refinement of the event selection and subsequent analysis of the data are the original work of the author.

ACKNOWLEDGEMENTS

I want to thank my fellow graduate student office mates whose constant distractions helped me retain my sanity.

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INTRODUCTION

The expansion of traditional optical astronomy into wavelengths unobservable to the human eye revealed a myriad of phenomena previously unknown to science. Using wavebands of light spanning several orders of magnitude allows for the discovery of completely new astronomical sources. Additionally, it allows for the study of completely different physical processes within and around source objects. For all the vast advances in our understanding of the universe the opening up of the electromagnetic spectrum has brought us, though, it relies entirely upon the physical properties of its messenger particle, the photon.

CHAPTER II

DETECTOR

The IceCube Neutrino Observatory is km^3-scale neutrino detector located deep within the glacial ice of the Antarctic ice sheet at the geographical South Pole. The detector consists of 5160 photo-multiplier tubes (PMTs) housed within glass pressure vessels.

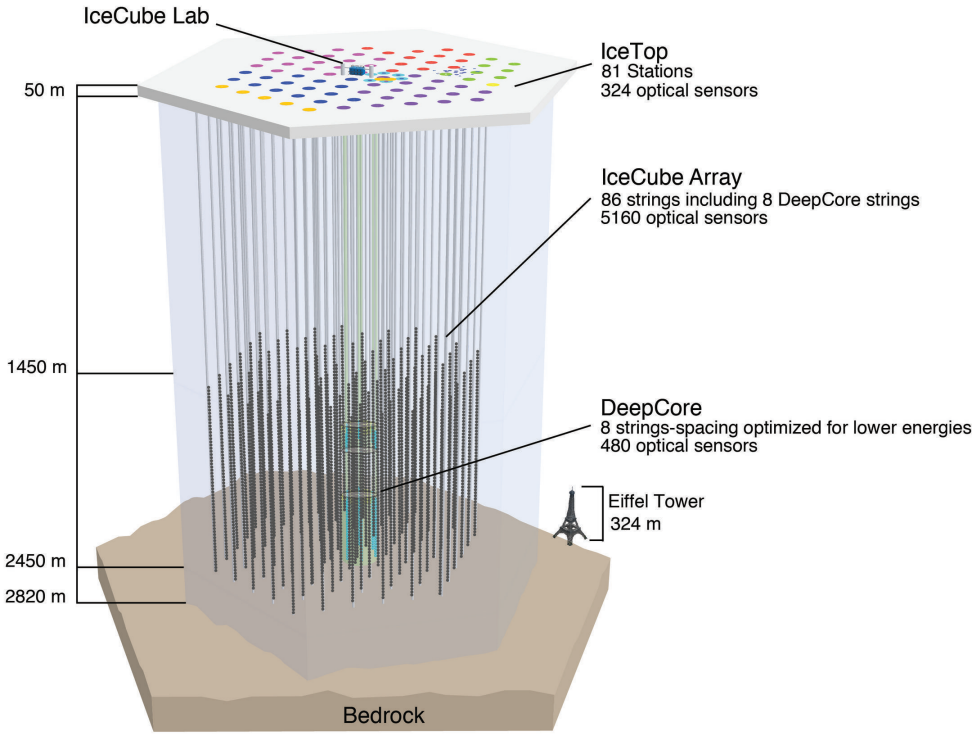

Figure 1: Diagram of the IceCube Neutrino Observatory.

CHAPTER III

PREVIOUS POINT SOURCE SEARCHES

CHAPTER IV

DATA ACQUISITION

Blah blah blah [1].

CHAPTER V

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Ancillary material should be put in appendices, which appear just before the bibliography.

REFERENCES

[1] The IceCube Collaboration, "The IceCube Data Acquisition System: Signal Capture, Digitization, and Timestamping," *ArXiv e-prints*, Oct. 2008.

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