


DISSERTATION TITLE

by

Yifan Zhou

---

 Creative Commons Attribution-No Derivative Works 3.0 License

A Dissertation Submitted to the Faculty of the

DEPARTMENT OF ASTRONOMY

In Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

2019

THE UNIVERSITY OF ARIZONA  
GRADUATE COLLEGE

As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Yifan Zhou, titled Dissertation Title and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

\_\_\_\_\_  
MEMBER1 Date: February 20, 2019

\_\_\_\_\_  
MEMBER2 Date: February 20, 2019

\_\_\_\_\_  
MEMBER3 Date: February 20, 2019

\_\_\_\_\_  
MEMBER4 Date: February 20, 2019

\_\_\_\_\_  
MEMBER5 Date: February 20, 2019

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

\_\_\_\_\_  
Dissertation Director: DIRECTOR Date: February 20, 2019

## STATEMENT BY AUTHOR

This dissertation has been submitted in partial fulfillment of the requirements for an advanced degree at the University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this dissertation are allowable without special permission, provided that accurate acknowledgment of the source is made. This work is licensed under the Creative Commons Attribution-No Derivative Works 3.0 United States License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nd/3.0/us/> or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, USA.

SIGNED: Yifan Zhou

## ACKNOWLEDGEMENTS

## DEDICATION

*Dedicated to some nice folks.*

## TABLE OF CONTENTS

LIST OF FIGURES . . . . .	7
LIST OF TABLES . . . . .	8
ABSTRACT . . . . .	9
0.1 INTRODUCTION . . . . .	10
REFERENCES . . . . .	11

## LIST OF FIGURES

## LIST OF TABLES



## ABSTRACT

## 0.1 INTRODUCTION

## REFERENCES