Building Single Molecules from Single Atoms

A DISSERTATION PRESENTED

BY

Үіснао Үи

TO

THE DEPARTMENT OF PHYSICS

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN THE SUBJECT OF

PHYSICS

Harvard University Cambridge, Massachusetts March 2021 ©2021 – YICHAO YU ALL RIGHTS RESERVED.

Building Single Molecules from Single Atoms

Abstract

Contents

0	Introduction	Ι
I	Apparatus	2
2	Raman sideband cooling	3
3	Interaction of single atoms	4
4	Photoassociation of single atoms	5
5	Two-photon spectroscopy of NaCs ground state	6
6	Coherent optical creation of NaCs molecule	7
7	Conclusion	8



Acknowledgments

,

Introduction

Apparatus

Raman sideband cooling

Interaction of single atoms

Photoassociation of single atoms

Two-photon spectroscopy of NaCs ground

state

Coherent optical creation of NaCs

molecule

Conclusion