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## Two-Level System with Static and Dynamic Coupling

### Section 2.4: Rate Equations and Population Inversion

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#### Systems

#### Mit4.2.5 . The

#### SU(2) and

#### SO(3) groups .

#### 4.1

#### Generalities .

#### We have

#### already seen

#### some

#### examples of

#### systems

#### described by

#### two possible

#### states. A

#### neutron in an

#### interferometer

#### , taking either

the upper or

lower path. A

photon

linearly

polarized

either

horizontally or

vertically. A

two level

system (TLS)

is the simplest

system in

quantum

mechanics,

but it ...4.

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are4. Two-

level systems

4.1

Introduction

Two-level

systems, that

is systems

with

essentially

only two

energy levels

are important

kind of

systems, as at

low enough

temperatures,

only the two

lowest energy

levels will be

involved.

Especially

important are

solids where

each atom has

two levels

with different

energies

depending on

whether the4.

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atomic system subject to an optical field is analyzed. This loads the package We define an atomic system consisting of two states (a ground state labeled 1 and upper state labeled 2). This is a "toy" system that neglects angular momentum ( $J$  and  $M$  are not defined). We apply a light field detuned from resonance by a frequency  $\hat{I}$ . Two-level System - University of California, Berkeley Systems of Play

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the input to the second. If instead we ...Spring 2006 Process Dynamics, Operations, and Control 10 ...278 CHAPTER 6. INTERACTION OF LIGHT AND MATTER Figure 6.2: Evolution of occupation probabilities of ground and excited state and the average dipole moment of a two-level atom in resonant interaction with a coherent classical field. The coherent external field

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jumping from  
 E2 to E1  
 because of  
 stimulated  
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 values in the  
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 above:  $A=4$ ,  
 $B=3$ ,  $C=2$ ,  
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sets of	labeled 1 and	dipole
systems	and upper	moment of a
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flashcards .	"toy" system	resonant
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Diagrams.	angular	with a
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Options. 17	and $M$ are not	classical field.
terms.	defined). We	The coherent
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4 Chapter 7.	resonance by	the atomic
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atomic system	INTERACTION	<b>]</b>
subject to an	OF LIGHT AND	Section 2.4:
optical field is	MATTER	Rate
analyzed. This	Figure 6.2:	Equations and
loads the	Evolution of	Population
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4.2.5 . The

SU(2) and SO(3) groups .  
4.1

Generalities .  
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