THE PARTICLE AS A MEMORY ALBUM

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Dedicated to my family

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Chapter 1

Introduction

This book analyzes the ability of particles to act as images storage device. The analysis is performed using a very unique methodology. This methodology assumes that all objects in the universe are particles. These particles can be of different sizes. All kinds of particles inherit same basic characteristics regardless of their size. As we are unable to directly observe very small particles, we simply observe particles we can directly observe and assume that the smaller particles which we cannot observe have the same feature as that of big particles.

The book is divided into different chapters dealing with different aspects of particles ability to store and emit images.

Chapter 1: Introduction

This chapter introduces the purpose and structure of this book.

Chapter 2: Logical structure of mass

This chapter discusses the logical structure of mass.

Chapter 4: The ability of particles to capture images

This chapter shows that particles have capacity to capture images.

Chapter 5: The ability of particles to emit images

This chapter discusses the capability of particles to retain and emit images.

Chapter 7: Summary

This chapter summarizes the finding of the previous chapters.

Chapter 2

Logical structure of mass

This chapter discusses the logical structure of mass and its advanced capability to interact with surrounding environment.

2.1 Methodology

Objects around us are collection of particles, which show specific behaviors. We can improve our understanding of mechanisms governing the behavior of objects around us, if we understand how particles forming the objects interact with one other. As interaction between smaller particles cannot be observed directly, there is need for finding an indirect way to determine how smaller particles interact. This book uses methodology as illustrated in Fig. 2.1 to help understand interactions among smaller particles. This methodology assumes that:

- All kinds of particles are formed from the same basic material.
- All kinds of particles were formed through somewhat similar process and thus have somewhat similar functioning mechanism.
- Large size particles are created through repetition of the same basic process which created small particles.
- As we are unable to directly observe the interactions among smaller particles, we study the interaction among large particles for the purpose of improving understanding of the interaction among smaller particles.

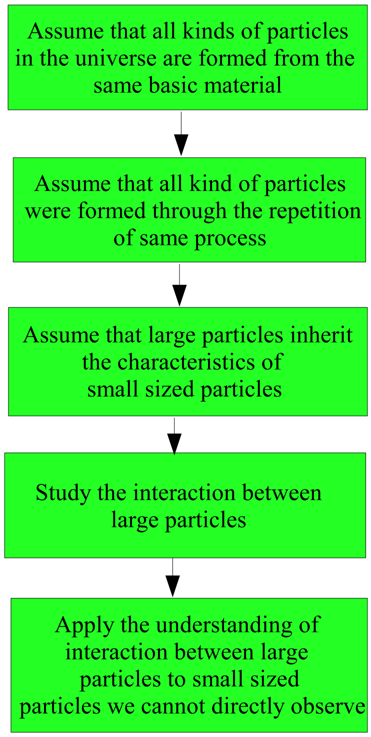

Figure 2.1: Methodology

2.2 Relationship between photons and mass

Einstein proposed relationship between mass of an object and the total energy it can contain as:

$$E = mc^2 \tag{2.1}$$

where
E: Energy contained in the object
m: Mass of the object at rest
c: Speed of light

Let's discuss Equation 2.1 in details.

- E is also believed to be the quantity of energy in which mass can convert into. However, there is no experimental proof that any object with non-zero mass ever completely converted into energy (photons).

- Particles behave like as they have gained mass when they are moved at high speed in particle accelerators. This observation is used as an experimental evidence that energy can convert into mass. However, no one has ever been successful in creating a completely new mass by only increasing the concentration of photons in an empty three dimensional space. The book "Intelligent Particle - An introduction to the intelligent nature of particles" introduces a mechanism through which light particles can behave like heavy particles without any actual increase in their mass.

Based on above arguments, this book assumes that:

- Mass is merely a container of photons.

- Conversion of mass into energy is a process which releases photons which are contained in this container. Similarly, increase in the mass of object is the process which results in increase in the number of photons contained in this container.

- Photons contained in an atoms are released when the atom is cracked. There is no conversion of particles which form an atom (such as protons and neutrons) into photons when an atom is cracked. In other words, an atom does not contain a factory to convert particles such as, electron and photons into photons.

- Mass does not contain a factory to convert photons into particles like electron and protons.

Mass can be represented mathematically as:

$$\text{Mass} = \sum_{i=1}^{n} \text{Photon}_i + C_{Photon} \tag{2.2}$$

where
C_{Photon}: Container for photons
Photon_i: i-th photon contained in container C_{Photon}
n: Total number of photons contained in container C_{Photon}

2.3 Mechanism to exchange particles

Hertz, Hallwach, J. J. Thomson, Philip and Einstein contributed to develop understanding of photoelectric effect. Figure 2.2 shows the details of different parts forming the photoelectric effect apparatus. Electrons are emitted when light falls on a metallic plate.

In photoelectric effect:

- Electron emitted from the surface of the metallic emitter have different velocities.
- The maximum kinetic energy K_{max} of the emitted electron does not dependent on the intensity of the light which falls on the surface of the metallic emitter.
- K_{max} increases with the frequency of light as shown in Figure 2.3.

Einstein was awarded Noble Prize in year 1922 for his contribution to physics by developing theory about photoelectric effect. According to Einstein's theory of photoelectric effect, relationship between K_{max} and the energy of incident photon is given by:

$$K_{max} = hf - \phi \tag{2.3}$$

where
K_{max}: Maximum kinetic energy of the emitted electron
hf: Energy of the photon
ϕ: Work function of the metal
ϕ is described as minimum energy an electron needs to leave the metal and is given by:

$$\phi = hf_0 \tag{2.4}$$

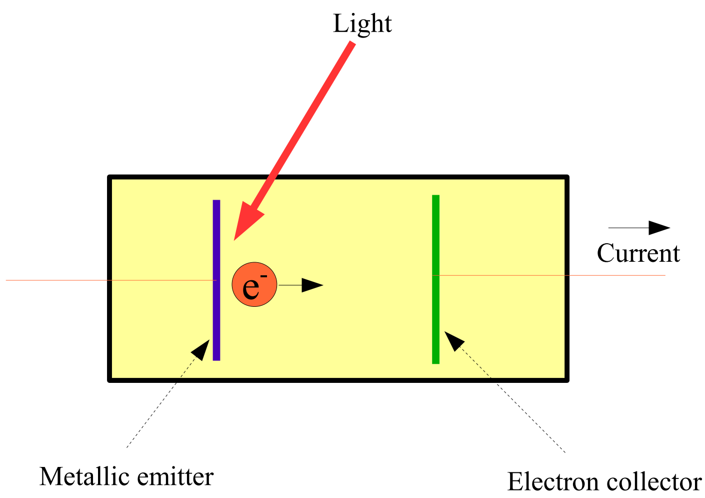

Figure 2.2: Photoelectric effect apparatus

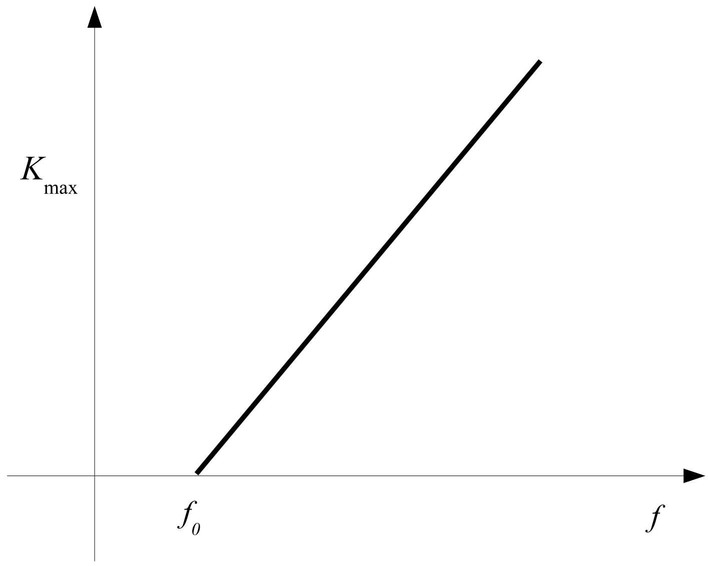

Figure 2.3: Relationship between K_{max} and the intensity of light

It is thought that energy of photon is directly proportional to its frequency:

$$E \propto f \tag{2.5}$$

Let's assume a photoelectric experiment, in which only monochrome light source is used to incident photons on the metallic emitter. In this case, all measurable quantities in Equation 2.3 are constant:

$$K_{max} = C_1 = \text{Constant} \tag{2.6}$$

$$h = C_2 = \text{Constant} \tag{2.7}$$

$$f = C_3 = \text{Constant} \tag{2.8}$$

$$\phi = C_4 = \text{Constant} \tag{2.9}$$

Equation 2.3 can be rewritten as:

$$C_1 = C_2 C_3 - C_4 \tag{2.10}$$

Figure 2.4 shows photons falling on atoms that exist at the surface of the metal. Photons can be absorbed by both nucleus and electrons orbiting the nucleus. A single electron has a chance to absorb energy from multiple photons on three different occasions:

- While electron is bound to the nucleus of metal.
- While electron is released from the atom and is still inside the metal.
- While electron is in the space outside the surface of the metal and is moving toward the electrons collector in the photoelectric device.

Total probability of electron to meet photons in a unit time in photoelectric device can be described by the relationship:

$$p_{collision} = min(p_1 + p_2 + p_3, 1) \tag{2.11}$$

where
$p_{collision}$: Total probability of the electron to meet the photons in a unit time in the photoelectric device
p_1: Probability of the electron to meet photons while the electron is still bound to the metal nucleus
p_2: Probability of electron to meet the photons, while electron is released from nucleus and is moving toward the surface of the metal after gaining energy from photons
p_3: Probability of electron to meet the photons, while electron is outside

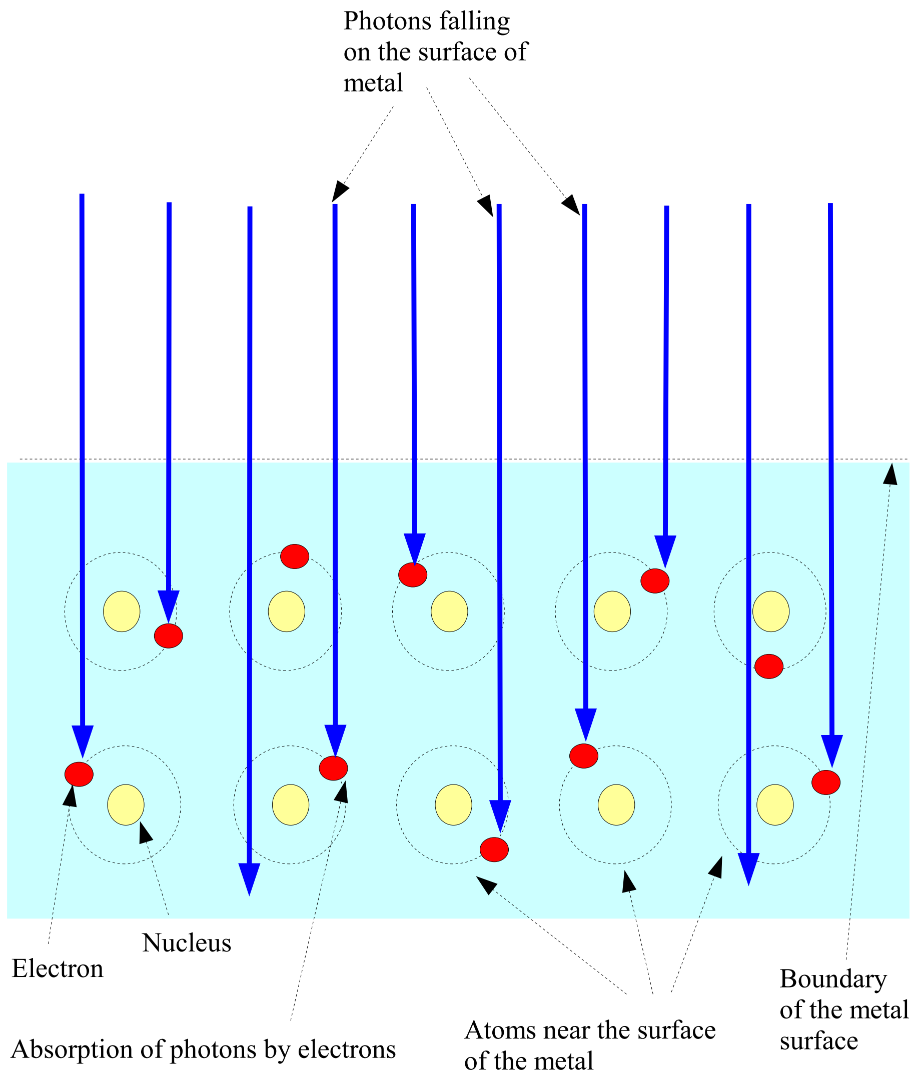

Figure 2.4: Absorption of photons by metal

the surface of the metal and is moving toward the electron collector in the photoelectric device

It is obvious that probability of a single electron to meet photons increases as the number of photons falling on the metallic emitter increases. The relationship can be described as:

$$p_{collision} \propto n_{photon} \tag{2.12}$$

where
n_{photon}: Number of photons that falls on the unit surface area of the metallic emitter in a certain period of time
Theoretically, K_{max} should increase with increase in n_{photon}:

$$K_{max} \propto p_{collision} \propto n_{photon} \tag{2.13}$$

In photoelectric effect, increasing the intensity or the number of photons falling on the metallic emitter surface does not increase the value of K_{max}. K_{max} is constant when monochrome light falls on the metallic emitter.

$$K_{max} = C_1 \tag{2.14}$$

This book suggests that *electron does not absorb more energy than hf regardless of having a chance to do so.* To understand the mechanism of energy transfer between electron and photon, let's assume two patterns of energy transfer between electron and photons in photoelectric effect.

Pattern 1: One electron interacts with only one photon.

Pattern 2: One electron interacts with multiple photons.

Let's look at these patterns in details.

Pattern 1:

In this pattern, which is much simpler compared to the pattern 2, a single electron absorbs only one photon in a certain period of time. After the electron has absorbed the energy from photon, it no longer accepts further energy from other photons. The electron gets the energy equal to hf when a single photon has transferred all its energy to the electron.

$$K_{max} = hf - \phi \tag{2.15}$$

This book suggests that energy transfer between electron and photon is not an event that is repeated many times, but is a single discrete event which happens only once within a certain period of time. This pattern of interaction can be realized through different ways such as:

- An electron is capable of absorbing energy from only one photon within a certain period of time.
- A photon collides with only those electrons which have not gained energy from any other photon within a certain period of time.
- An electron and group of photons avoid each other after there has been an energy transfer among an electron and other photons within a certain period of time.

Second and third reasons indicate the intelligent behavior of electron and photons, in which electron and photons are capable of sensing one another and making complex decisions.

Controlled transfer of energy with the surrounding environment is an essential feature of living cells like bacteria. Figure 2.5 shows the basic structure of bacteria.

The cytoplasmic membrane contains pores through which nutrients, wastes and other products of the cell pass through as shown in Figure 2.6. *Cell only takes the amount of the nutrients, it can consume.* It is the exactly the behavior of the electrons in the photoelectric effect. This book claims that *particles have the capability to interact with environment intelligently.*

Figure 2.7 shows docks on the surface of particle (such as photons and electrons), on the same pattern as the pores on the cytoplasmic membrane. The reason the docks on the surface of particle have not been observed yet, can be contributed to the fact that science has not yet progressed to the stage where the surface of small particles could be directly observed.

Pattern 2:

In this pattern, energy that a single electron accumulates is a sum of energy transfers from multiple photons. Let's assume n photons transferred their energy to electron in a certain period of time and each of these photons transferred only a part of the total energy it has. In this case, total energy transferred to the electron is given as:

$$E_{sum} = hf \sum_{i=1}^{n} k_i \tag{2.16}$$

Here, k_i is the fraction of the total energy of photon i that is transferred to the electron. However, according to Equation 2.3, the condition below need to be satisfied.

$$(hf \sum_{i=1}^{n} k_i - \phi) \leq K_{max} \tag{2.17}$$

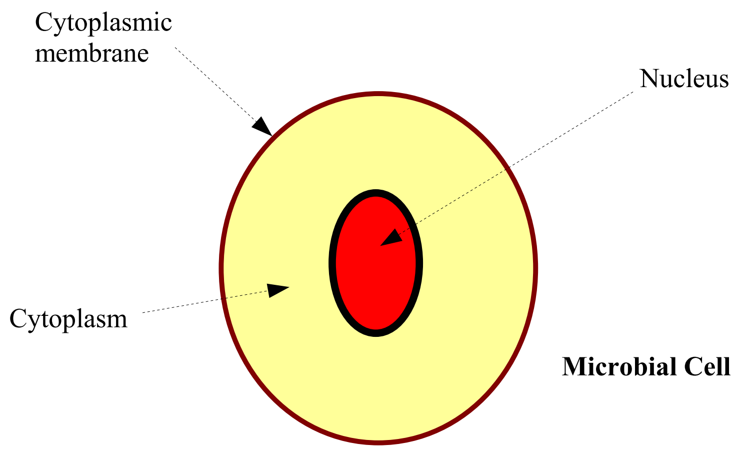

Figure 2.5: Basic structure of bacteria

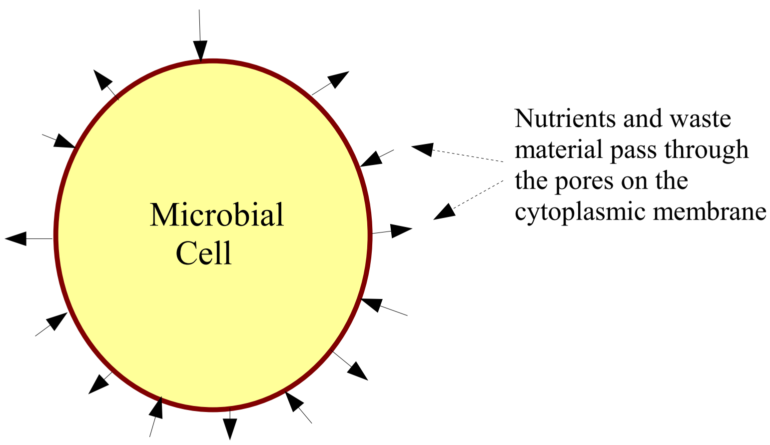

Figure 2.6: Pores on the surface of cells

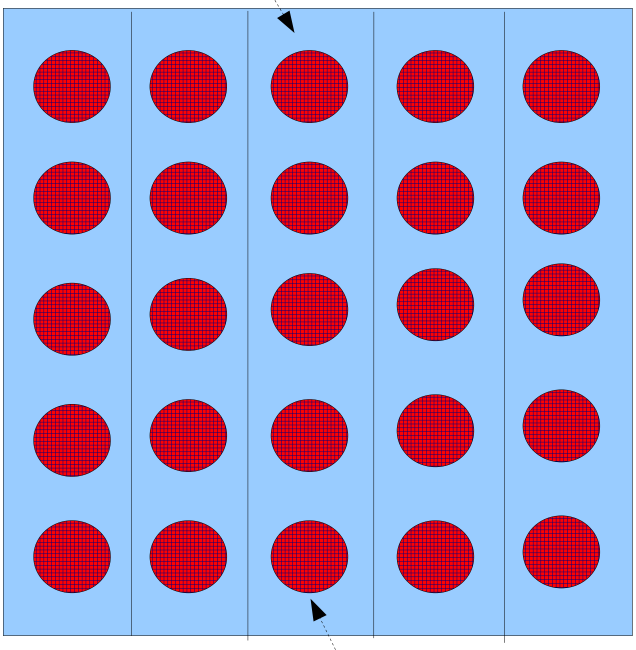

Figure 2.7: Surface of particle with docks to exchange field particles

$$\sum_{i=1}^{n} k_i \leq \text{Constant} \tag{2.18}$$

The above condition can be satisfied, only when the photons and/or electrons have an *intelligent behavior* or in other words they have *processing power to make complex decisions*. Figure 2.8 shows the simplest behavior by which Equation 2.18 can be satisfied. A group of photons queues before the electron to transfer the energy. Different photons transfer a part of energy to the electron, until it is filled to the level hf. The different intelligent aspects of this kind of energy transfer are:

- Photons are capable to determine current level of stored energy in electron.
- Electrons are capable to acknowledge the current level of energy stored in them.
- Electron and photons are capable to follow a protocol of energy transfer.

Electron and photon need to have sophisticated functionality to perform such energy transfer.

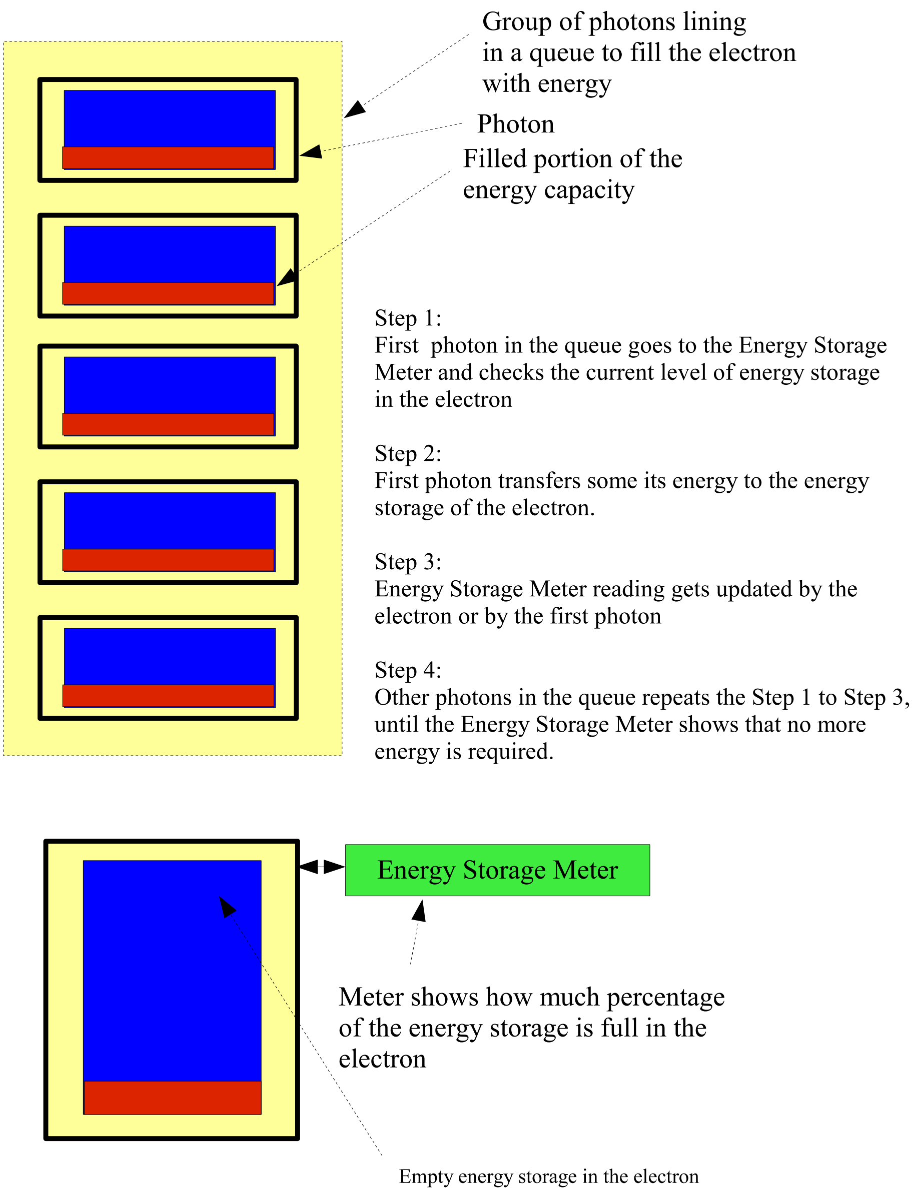

Figure 2.8: Complex behavior of electron and photons

2.4 Array of particles acting as DNA

Mass is a collection of atoms. Each atom further contains smaller particles like protons and electrons. Electrons exist in orbits around nucleus in specific order. Specific arrangements of electrons define the behavior of the atom. Array of electrons is specific order define the behavior of atom. Living objects are collection of biological cells. Biological cells behavior is controlled by array of particles called DNA. In section 2.3, it has been observed that mass (a collection of particles) behaves like biological cells. Biological cell contain DNA which contains coded instructions controlling how the cell behaves. DNA is made of four types of base known as adenine (A), cytosine (C), guanine (G), and thymine (T). DNA can be treated like a long series of these bases. Here, this book assumes that DNA of particle is also made of these four types of bases, which are represented in this book as 00, 01, 10 and 11. A series of these bases controls the behavior of the particle. In section 2.3 it has been observed that particle can also contain docks for exchange of particles in the same pattern as biological cells. As particle is a much smaller structure compared to biological cells, this book represents 0 as a dock (pore) without a photon and 1 as a dock (pore) with a photon. As DNA is a coded instruction which need to be transmitted, this book assumes a communication bus between the coded instructions (DNA) and the photons which behave according to these coded instruction. In Figure 2.9, left side of the communication base represents the coded instructions and the right side of the communication base represents the photons which follow the coded instructions received through the communication bus. Figure 2.9 illustrate the logical view of mass according to this book. It is a also our daily observation that exposing any matter to light changes its characteristics. Logical view of matter as illustrated in Figure 2.9 can be true, if photon can drop their speed to zero. Let's consider the example of tennis ball which strikes a wall and bounces back as shown in Figure 2.10

Speed of tennis ball reduces to zero at the moment tennis ball strikes the wall as shown in Figure 2.11.

Now let's assume that photon is like a tennis ball which strikes and bounces back from a hurdle (mirror) as shown in Figure 2.12.

The moment photon strikes the mirror, it drops its speed to zero. After striking the mirror, photon changes its direction of motion and accelerates itself to c in a very short period of time as shown in Figure 2.13. Based on this observation, it can be claimed that photon has the capability to drop its speed to zero. If it is insisted that the space surrounding the mirror is a free space, then according to Einstein, speed of photon must increase from zero to c in no time as photon must always travel at c in free space.

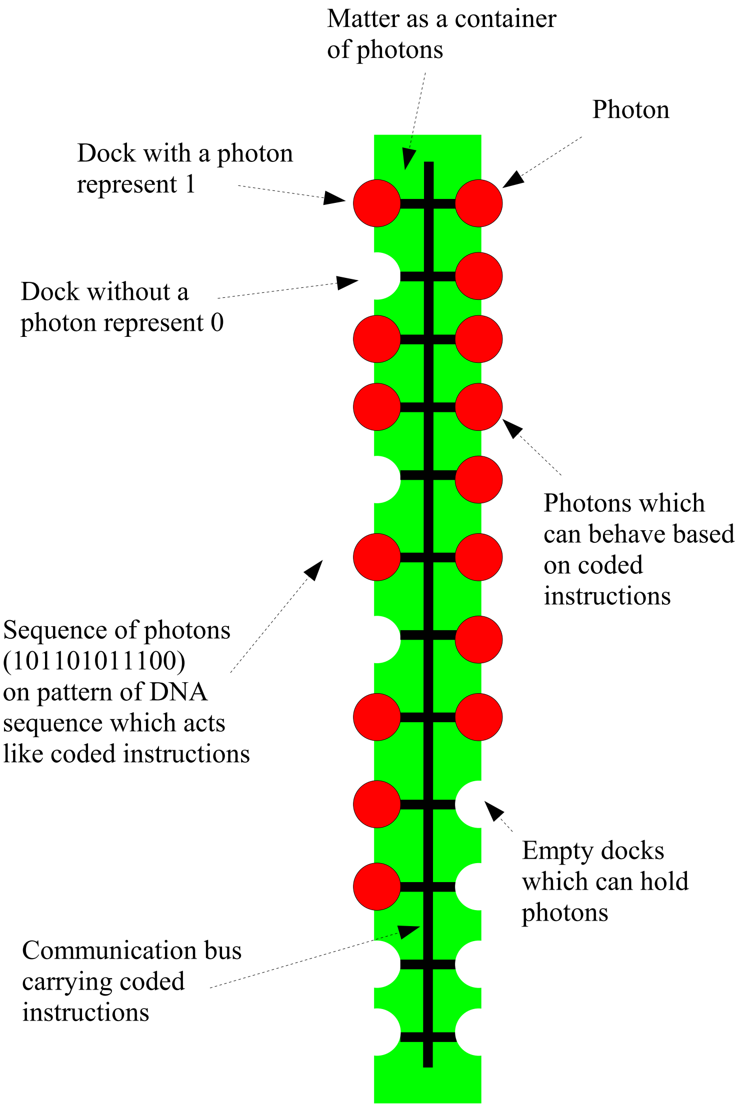

Figure 2.9: Mass as a container of photons

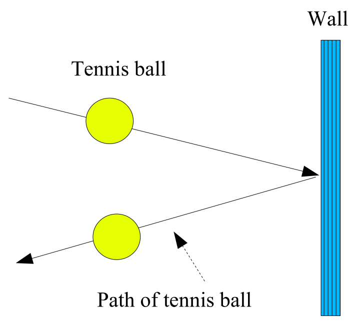

Figure 2.10: Tennis ball striking a wall

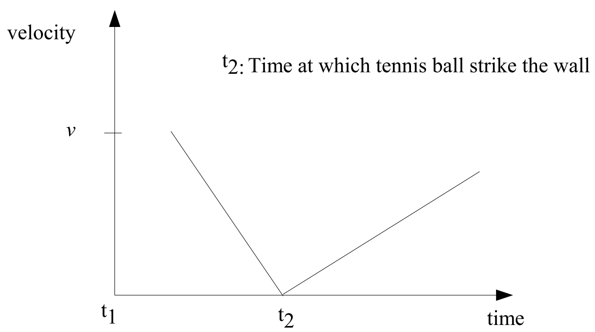

Figure 2.11: Change in speed of tennis ball

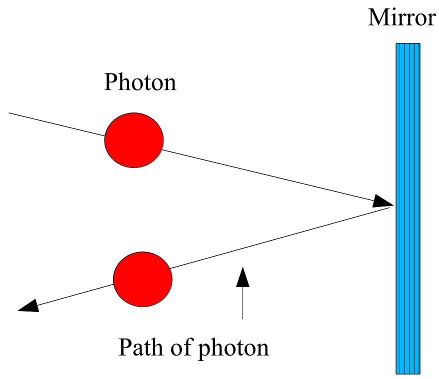

Figure 2.12: Photon being reflected from a mirror

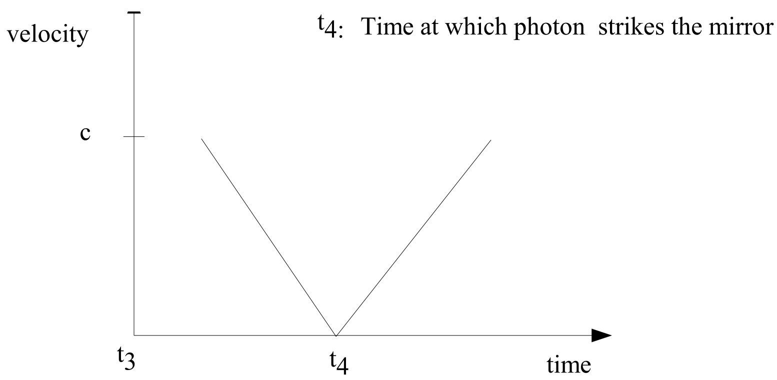

Figure 2.13: Change in speed of photon

According to the methodology as described in Figure 2.1, every large particle is formed by the repetition of the same process which forms the smaller particle. Based on this methodology, let's assume that photon has the same structure as mass in Figure 2.9. Figure 2.14 shows the logical view of photon as a container of gravitons. Figure 2.14 can also mean that photon behave differently in proximity of different cosmological bodies. In section 2.3, it has been observed that mass (a collection of particles) behaves like biological cells. As mentioned before too, biological cell contain DNA which contains coded instructions controlling how the cell behave. DNA is made of four types of bases known as adenine (A), cytosine (C), guanine (G), and thymine (T). DNA can be treated like a long series of these bases. Here, this book assumes that DNA of photon is also made of four types of bases, which are represented in this book as 00, 01, 10 and 11. A series of these bases controls the behavior of photon. In section 2.3 it has been observed that particle can also contain docks for exchange of particles in the same pattern as biological cells. As photon is a much smaller structure compared to biological cells, this book represents 0 as a dock without a graviton and 1 as a dock with a graviton. As DNA is a coded instruction which need to be conveyed, this book assumes a communication bus between the coded instructions (DNA) and the gravitons which behave according to these coded instruction. In Figure 2.14, left side of the communication base represents the coded instructions and the right side of the communication base represents the gravitons which follow the coded instructions received through the communication bus.

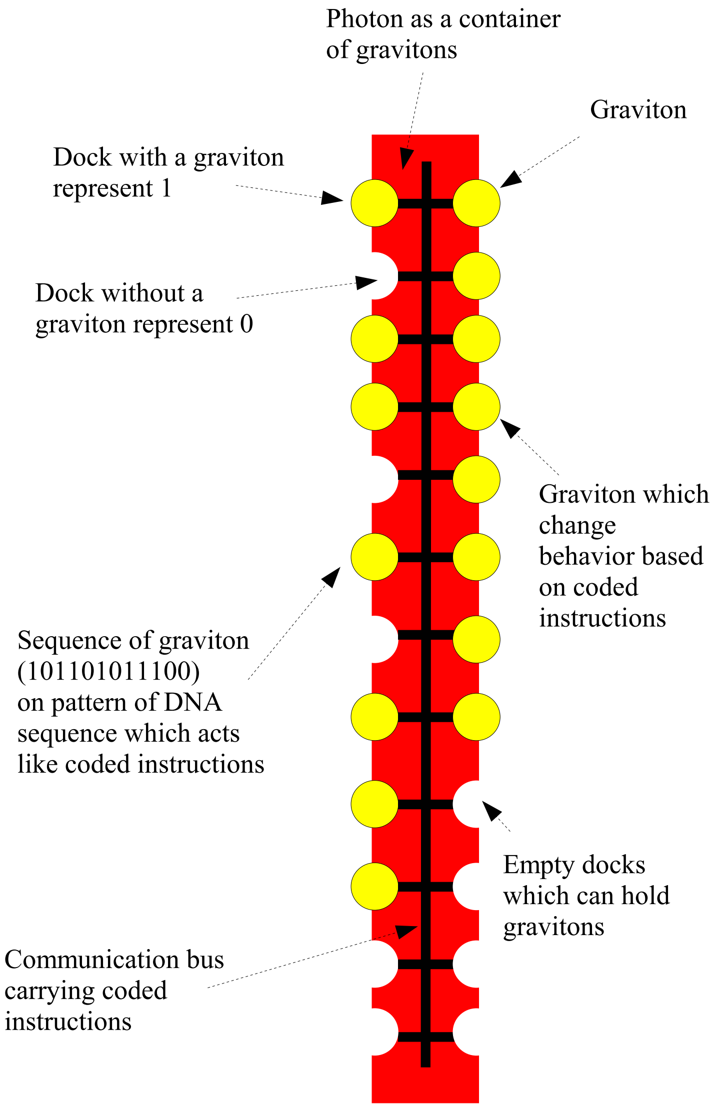

Figure 2.14: Photon as a container of gravitons

Chapter 3

The ability of particles to capture images

This chapter discusses the ability of particles to capture images.

3.1 The particle as a camera

To understand how a particle can behave like a camera, let's consider a square shaped object which is rising at a fixed speed as illustrated in Figure 3.1. The red colored square is at different heights at instance t_1, t_2 and t_3. Let's suppose there is a photographer which takes photos of the rising square at instance t_1, t_2 and t_3. These photos are also illustrated in Figure 3.1. The photo in Figure 3.1 is a collection of tiny squared shaped cell areas. The rising square is represented by the collection of red color squared shaped tiny cell areas. Now let's discuss an alternative to photo which can also store the same information as a photo:

- Let's replace each tiny squared shaped cell area on the photo with a single pore.
- Each such pore is capable of capturing and storing a single photon.
- The frequency of the photon which enters the pore, represents the color.
- Each pore accepts photon only once in a fixed period of time. After this fixed period of time, each pore does not accept or emit photon from the pore.

The above alternative to photo, can store the image in the same way as a photo. As discussed in Section 2.3:

- The surface of a particle has pores to capture photons as shown in Figure 2.7.
- The pores on the surface of the particles capture a limited number of photons in a unit of time.

The surface of the particle can act like a photo, where the retention period of the image is equal to the fixed period of time during which each pore does not accept or emit a photon from each pores.

3.2 Different mechanisms to store images

Let's discuss different mechanisms which can be used to store multiple images. Figure 3.2 illustrates a projector which projects a new image every second toward a cylinder shaped particle. Each image is projected for one second.

- The blue part of the surface of the cylinder shaped particle in Figure 3.2 has pores to capture the photons.
- The cylinder shaped particles rotate around its own axis at the speed of 0.1 degree per second.
- Due to rotation around its own axis, every new image from the projector is projected to a different portion of the surface of the cylinder shaped particle and the particle's surface is able to store all images.

The cylinder shaped particle is able to store 3600 images which are projected from the projector. After one second, the particle surface is unable to store any more images.

There can be different ways through which surface of the particle is able to keep on storing images. Figure 3.3 illustrates two types of pores structure which can capture an image. In single layer pores structure, the pores can capture only one photon. Thus, in the example here, the particle can store only 3600 images. In the second type of multiple layers pores structure, the pores which capture and store photons have four layers. During the ith rotation around its own axis, the ith layer is filled with photons. The multiple layers structure in example here, is able to store 4 times more images compared to single layer pore structure.

Let's discuss another possible mechanism which can be used to increase the number of stored images. Figure 3.4 illustrates a part of the surface of the particle containing pores to accommodate photons.

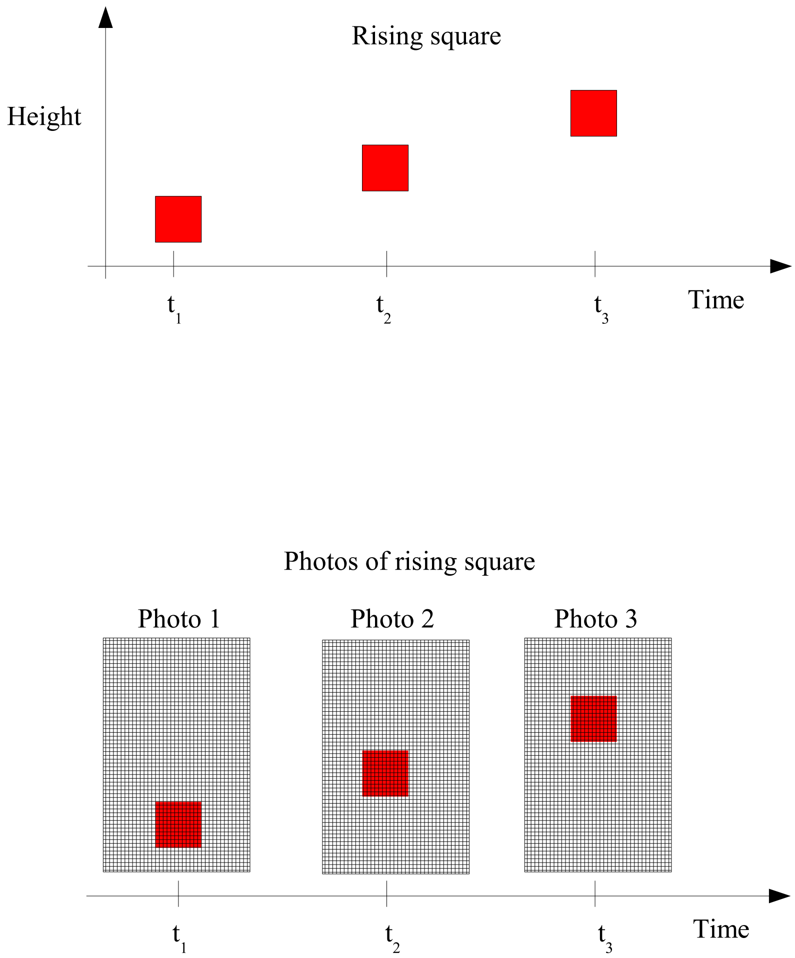

Figure 3.1: Photographs of a moving object

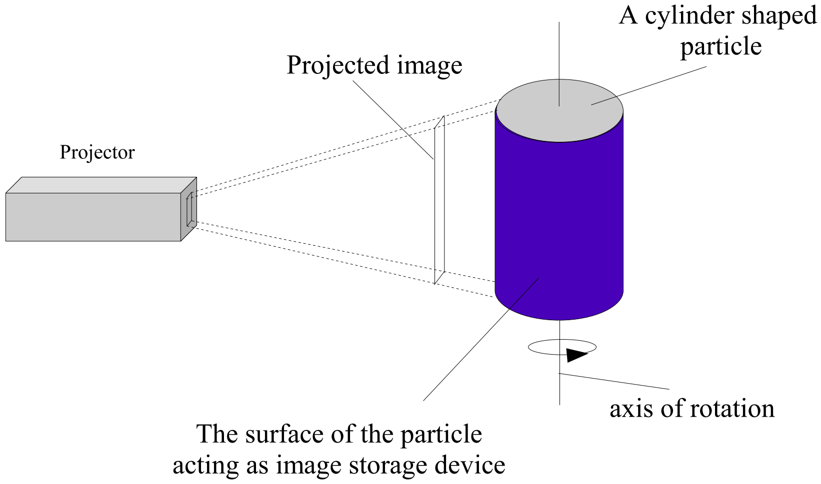

Figure 3.2: Storing image from projector

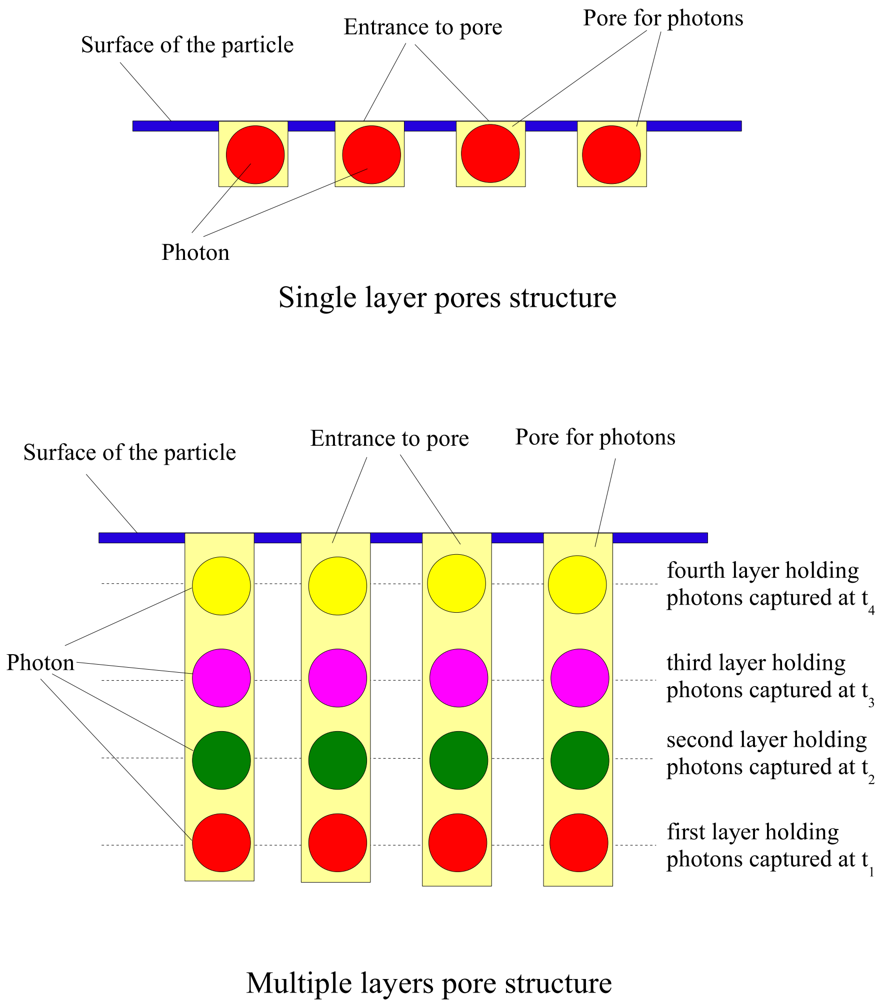

Figure 3.3: Single layer and multiple layer pores to capture photons

- The density of the pores on the surface of the particle is much higher compared to the density of pores required to store a single image.

- The particle's duration for a single rotation around its own axis is different for each spin. This helps the image from the projector projected toward different part of the surface of the particle. Figure 3.5 illustrates a surface of the particle, which stores portions of image A, image B, image C and image D.

Figure 3.6 illustrates another example in which multiple particles together capture different parts of 360 degree view of the surrounding. In the example of Figure 3.6:

- Four particles rotate in orbit with the same constant speed.

- The distance between one particle to next/previous adjacent particle is one fourth of the size of the orbit.

- Each particle takes t_{Orbit} seconds to make one complete rotation in the orbit.

- Each particle in the orbit also spins around its own axis with a constant speed.

- Each particle takes t_{Spin} seconds to spin around its own axis.

- t_{Spin} is one fourth of t_{Orbit}.

- A single spin of a particle around its own axis captures one fourth of 360 degree view.

- Each particle together captures and preserve one single 360 degree view.

Figure 3.7 illustrates another example in which multiple particles of different sizes collaborate together to capture and store multiple 360 degree view of the surrounding. In this example there are four small particles and one large particle.

- Small particles in Figure 3.7 have the same characteristics and behavior as orbiting small particles in Figure 3.6

- In Figure 3.7, four small particles rotate around a large particle.

- In Figure 3.7, small particle transfer their stored image to large particle after their scan of 90 degree view is complete.

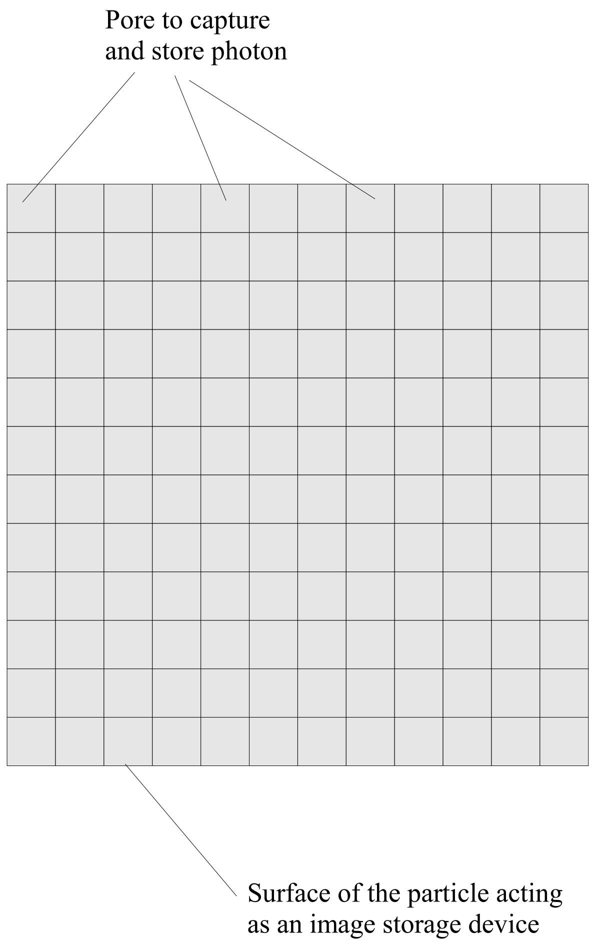

Figure 3.4: Pores on the surface of the particle

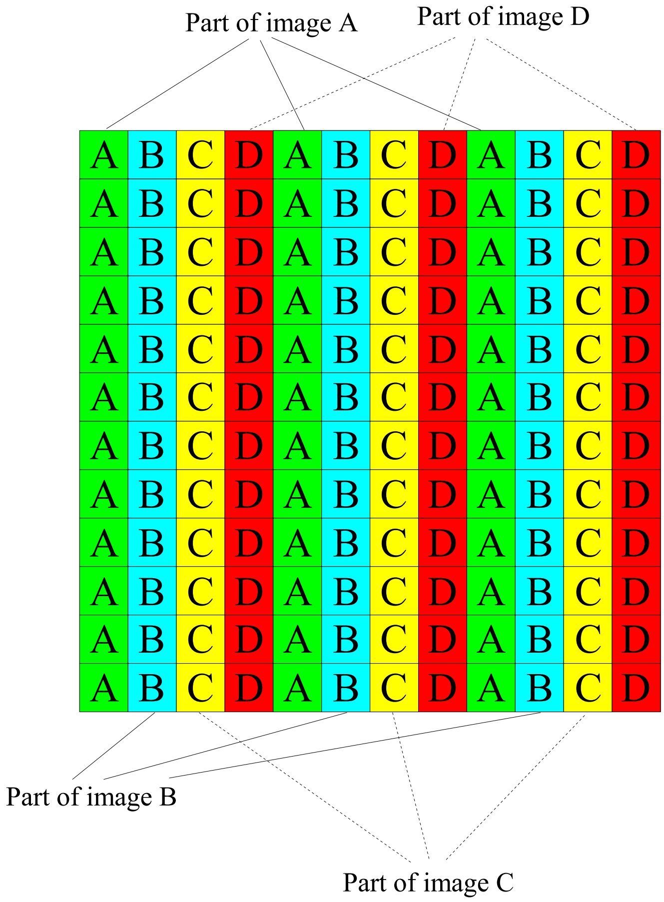

Figure 3.5: Multiple images stored on the surface of a particle

- The large particle is also rotating around its own axis at slow rate and it allows small particles transfer their image to different parts of the large particle.

- Each small particle is able to capture new 90 degree view during ever spin.

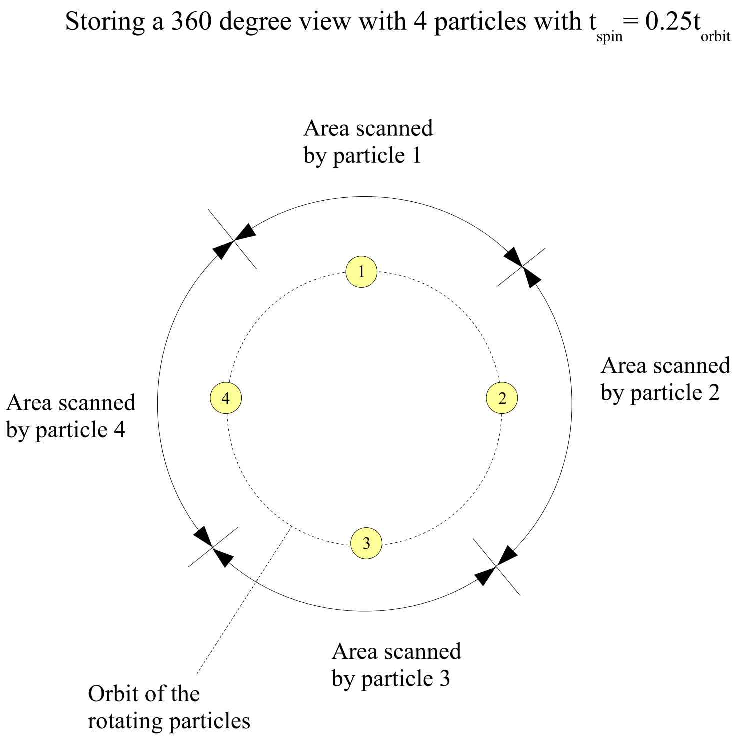

Figure 3.6: Group of particles capturing a 360 degree view

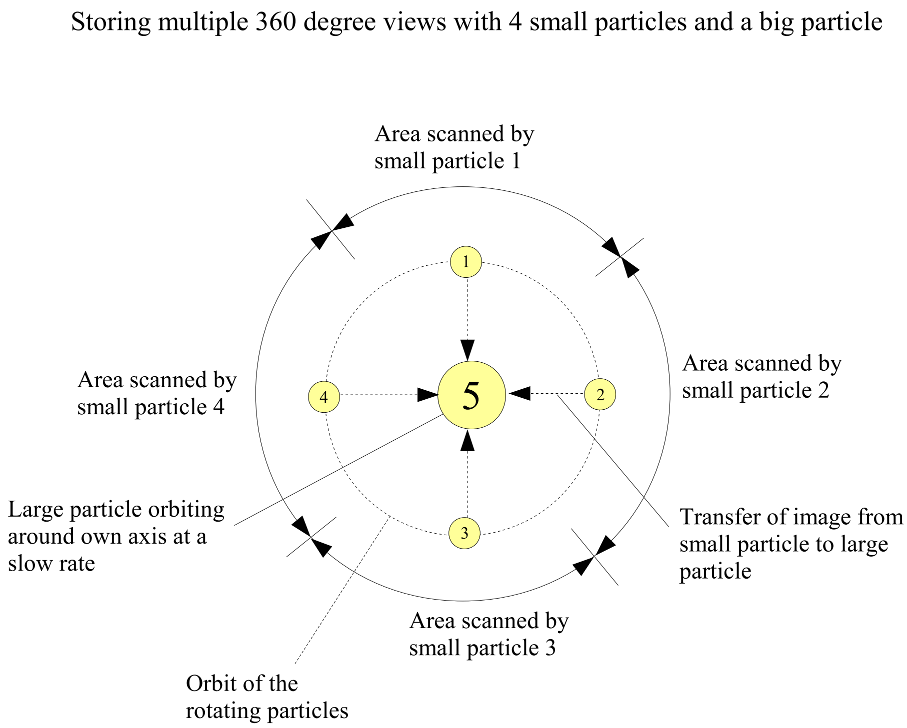

Figure 3.7: Group of particles capturing multiple 360 degree views

Figure 3.8 illustrates another example, where the particle which capture the images is at rest but the projector which projects image is moving. This mechanism can help project images from projector to the different surface parts of the particle.

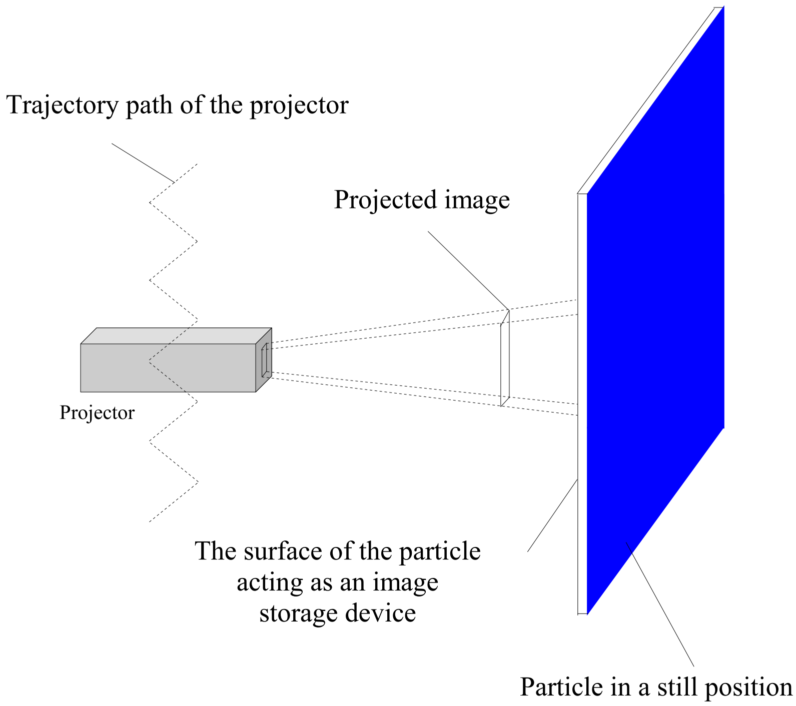

Figure 3.8: Still particle and projector in motion

Chapter 4

The ability of particles to emit images

This chapter discusses the ability of particles to retain and emit images.

4.1 Logical view of image storing device

Figure 2.9 illustrates the logical view of the mass. The particle with mass has two important functional parts.

- DNA program which is an array of photons and acts like coded instructions.
- Collection of photons which are controlled by this DNA program.

Let's redefine the logical view of the particle as an image storage device. Figure 4.1 illustrates a logical view of a particle as an image storage device.

- An array of docks with/without photons acts like coded instructions.
- A subset of this array of docks with/without photons act like coded instructions for managing stored images.
- A further part of this subset of coded instructions, defines the retention period of image. Different arrangements of photons in docks mean different retention periods. In this logical view, retention period is an adjustable value. Zero retention time and unlimited retention time could be defined using specific photons arrangements.
- Another array of docks containing photons represents stored images A, B and C.

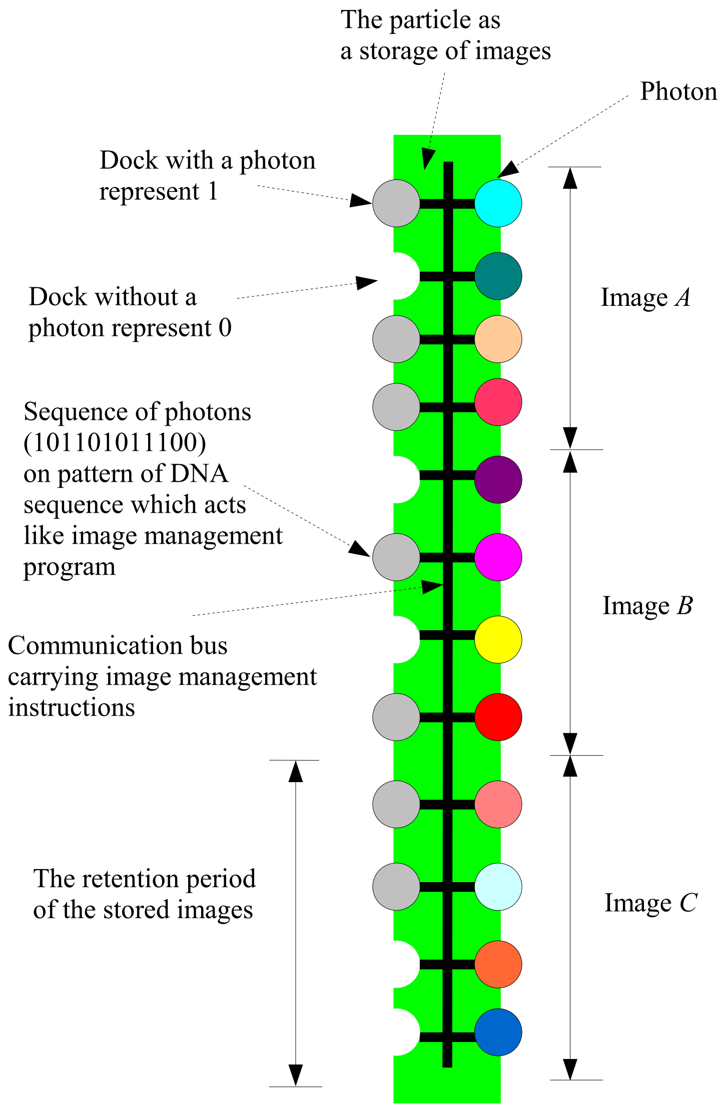

Figure 4.1: Logical view of particle as an image storage device

Figure 4.1 shows three images A, B and C stored in this particle. A group of particles with coordination with one another can store large number of images.

4.2 Ability to emit image

The particle should be able to emit the image in its original form when;

- The defined image retention period lapses.
- The particle receives an instruction to emit the image.
- The particle control system collapses resulting in collection of photons leaving the particle.

It is not possible to determine how to adjust the retention period of an image or how to send an instruction to emit an image. However, the control system of the particle can be collapsed by exposing the particle to intense environment. The next section describes an experiment to confirm the ability of the particles to store images.

4.3 Experiment

This section describes an experiment that can be used to confirm the ability of the particles to store images:

- Prepare two metal sheets A and B of exact same size.
- The metal forming the sheet A and B need to have very high melting point.
- Expose metal sheet A to a monochrome light of one type at normal room temperature for extended period of time.
- Expose metal sheet B to a monochrome light of another type at normal room temperature for extended period of time.
- Expose metal sheet A and B to very high temperature and measure the spectrum.
- An observed change in the spectrum of metal sheet A and metal sheet B will indicate the ability of the particles to store and emit images.

4.4 Stored images from past around us

The universe contains very large number of cosmological bodies. The particles forming the external surface of a cosmological body could store images of surrounding events throughout the life of the cosmological body. If some of the cosmological bodies are emitting images from past, we should be able to observe events from past when we point our telescope toward night sky.

Human body is a collection of body parts. Each body part is a very sophisticated system realized by collaborations of large number of cells. Each cell is a further collection of particles. The particles which form external surface of body parts could be storing images of what is happening around us all our life.

Chapter 5

Summary

This book analyze the role of the particles as image storage devices by using very unique methodology and concludes that:

- The particles may have the capability to store images.
- The particles may have the ability to retain images for very extended period of time.
- The particles may have capacity to follow instructions to emit stored images.
- The particles forming our external surface might be storing images throughout our life.
- Some of the cosmological bodies might be emitting images from past.