# The Bhaskara Law’s Interpretation of Energy Phenomena including the Curie Effect.

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**Abstract.** This paper proposes a novel theory named "Bhaskara Law" that sheds light on the intricate relationship between fundamental forces, matter’s properties, and energy creation/destruction. Bhaskara Law argues that the direct application of a fundamental force on matter isn’t the sole driver of these processes. Instead, it emphasizes the crucial role of the resulting changes triggered within the matter, impacting other fundamental forces or its intrinsic properties. The Curie effect serves as a compelling example to illustrate this theory. Here, we explore the core tenets of Bhaskara Law, its alignment with existing energy principles, and potential avenues for further exploration.

## 1.Introduction:

The quest to comprehend the fundamental principles governing energy transformations in physical systems has been a cornerstone of scientific inquiry for centuries. From the pioneering work of Faraday and Maxwell to the revolutionary insights of Einstein and beyond, the pursuit of understanding the nature of energy and its interactions with matter has driven scientific progress and technological innovation.In this vein, we present Bhaskara Law, a novel theoretical construct aimed at unraveling the complexities underlying the creation and destruction of energy during interactions with matter through fundamental forces. Bhaskara Law represents a synthesis of theoretical insights and empirical observations, offering a fresh perspective on the dynamics of energy transformations.

At the heart of Bhaskara Law lies a profound insight into the interconnectedness of fundamental forces and properties associated with matter. Unlike traditional approaches that focus solely on the direct effects of external forces on energy states, Bhaskara Law posits that such interactions engender changes not only in the targeted properties but also in other fundamental forces or properties, thereby giving rise to the creation or destruction of energy.To ground our theoretical framework in empirical reality, we turn to the Curie effect—a well-established phenomenon in the realm of magnetism. The Curie effect, observed in ferromagnetic materials undergoing a transition to paramagnetic behavior at a critical temperature, serves as a poignant example of how external forces can induce profound changes in fundamental properties, leading to energy transformations. Through a meticulous analysis of the Curie effect within the framework of Bhaskara Law, we endeavor to shed light on the intricate interplay between fundamental forces and energy dynamics. By elucidating the underlying mechanisms governing energy creation and destruction, Bhaskara Law not only advances our theoretical understanding but also holds promise for practical applications in diverse fields ranging from materials science to energy technology. In the ensuing sections of this paper, we delve deeper into the theoretical underpinnings of Bhaskara Law, elucidate its implications through concrete examples, and discuss avenues for further exploration and validation. Through our collective efforts, we aspire to contribute to the ongoing dialogue surrounding energy transformations in the natural world and pave the way for new insights and discoveries.

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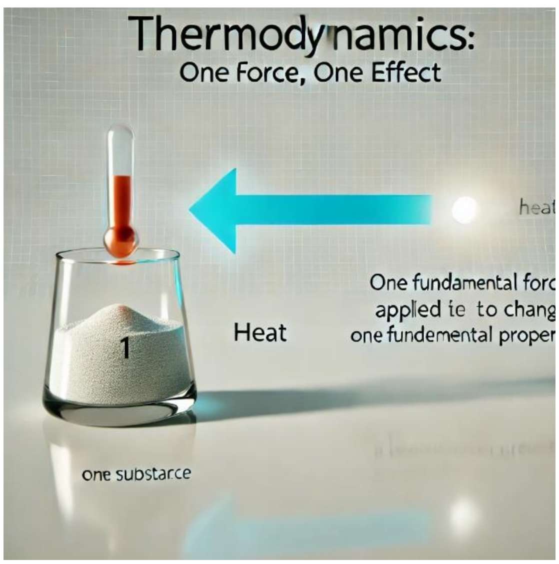


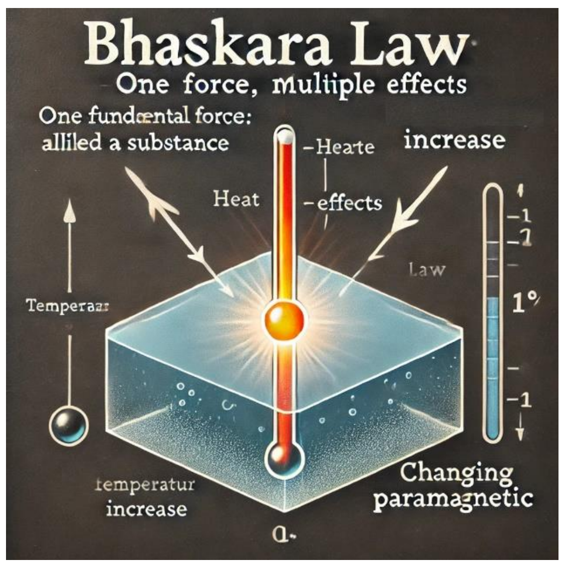




Fig 1.1

Fig 1.2

Figure 1.1: This figure illustrates the basic principles of thermodynamics, including concepts such as energy conservation, heat transfer, and the laws governing thermodynamic systems.

Figure 1.2: This figure introduces Bhaskara Law, which explains the unique process of energy creation and destruction, expanding the understanding of energy dynamics beyond conventional theories.

# 2. Bhaskara Law: Expanding the Horizons of Energy and Matter Interactions

The study of energy and matter has long been governed by established principles and laws that provide a framework for understanding the natural world. However, Bhaskara Law introduces a groundbreaking perspective, offering a deeper and more nuanced understanding of energy interactions. By categorizing energy and matter into three distinct categories, Bhaskara Law not only enriches our comprehension of physical phenomena but also challenges conventional wisdom, opening up new possibilities for exploration and discovery in physics.

## 2a. The First Category: Fundamental Forces Impacting a Single Fundamental Property

The first category is the most familiar and widely understood in classical and modern physics. This category involves a fundamental force acting on a single fundamental property of matter, leading to a direct and predictable reaction.

Example: Gravitational Force and Potential Energy

A quintessential example of this category is the interaction between gravitational force and the potential energy of an object. When a force is applied to lift an object, the energy expended is directly converted into the potential energy of the object.

Consider a mass(m) being lifted to a height (h) in a gravitational field with acceleration due to gravity (g):

[ U = mgh ]

Here, the gravitational force acts on the mass of the object, leading to an increase in its potential energy. This straightforward interaction is well understood and is a cornerstone of classical mechanics. The energy spent in lifting the object is precisely equal to the increase in potential energy, with no additional effects observed.

This is a clear representation of how a fundamental force (gravity) impacts a single fundamental property (potential energy) in a predictable and well-defined manner.

This category serves as the foundation for much of our understanding of the physical world. It is governed by fundamental laws such as Newton's laws of motion, conservation of energy, and the first law of thermodynamics. However, Bhaskara Law challenges us to look beyond this simple and direct relationship between force and energy, introducing us to more complex interactions that can lead to surprising and transformative effects.

2b. The Second Category: One Fundamental Force Creating Multiple Changes in Fundamental Properties.

The second category described by Bhaskara Law introduces a more complex interaction: a single fundamental force acting on matter and creating changes in more than one fundamental property. This scenario reveals the intricate ways in which different aspects of matter can be simultaneously influenced by a single force, leading to phenomena that are not immediately apparent in simpler interactions.

Example: Curie Effect

A classic example of this category is the Curie effect, where the application of heat (thermal energy) to a ferromagnetic material like nickel results in two simultaneous changes: an increase in temperature and a transition from ferromagnetic to paramagnetic behavior.

When a nickel plate is heated, the thermal energy increases the temperature of the material. As the temperature approaches the Curie point (around 358°C for nickel), the material undergoes a phase transition in its magnetic properties. Below the Curie temperature, the nickel is ferromagnetic, meaning its magnetic moments are aligned, resulting in strong magnetic properties. Above the Curie temperature, thermal agitation causes these magnetic moments to become disordered, and the material becomes paramagnetic, exhibiting much weaker magnetic properties.

In this scenario, a single fundamental force (thermal energy) creates changes in two fundamental properties of the nickel: temperature and magnetism. The energy spent on heating the nickel is not only responsible for raising its temperature but also induces a change in its magnetic state. This dual impact of a single force illustrates the concept of unforced oscillations as described by Bhaskara Law, where energy transformations lead to multiple outcomes beyond what is typically expected.

The Curie effect exemplifies the richness of interactions in this second category, where a single input can lead to multiple and sometimes unexpected changes in the properties of matter. This understanding allows us to appreciate the complexity of energy interactions and the potential for new discoveries in the field of material science, thermodynamics, and magnetism.

## 2c. Third Dimension: The Intersection of Multiple Fundamental Forces

The third dimension described by Bhaskara Law is both the most complex and the most intriguing. It involves two or more fundamental forces acting on an object simultaneously, resulting in interactions that may diverge significantly from those predicted when each force is considered independently. This dimension suggests that when multiple forces intersect, they can create complex and possibly unexpected behaviors that challenge our current understanding of physics.

However, the full implications of this dimension are not yet fully understood, and it presents a promising area for further investigation. The combined effects of multiple forces may lead to entirely new physical phenomena, revealing deeper insights into the nature of energy, matter, and the fundamental forces that govern the universe. Further research and experimentation are needed to explore these interactions more thoroughly, potentially uncovering new laws or principles that could significantly advance our knowledge of physics.

# 3.BHASKARA LAW:

"When we exert an effect on matter through one of the fundamental forces of nature, it is the resulting changes in the other fundamental forces or fundamental properties associated with the matter, in addition to the direct effect we exert, that create or destroy energy."

ழ= W – E

where:

- ழ (Tamil Letter can be pronounced as ZHA) represents the net creation or destruction of energy

- W represents the total input energy

- E represents the total output energy

A positive value for (ZHA) indicates energy creation, while a negative value signifies destruction. The Bhaskara Law asserts that this net change is not solely due to our direct input but also the induced changes in fundamental properties of matter. The Curie effect serves as a primary example, where ferromagnetic materials transition to a paramagnetic state upon heating, with a consequent shift in magnetic energy.

The validation of the Bhaskara Law would have profound implications for our understanding of thermodynamics and necessitate a fundamental re-evaluation of energy conservation. Its technological applications could pave the way for novel energy generation methods or even energy manipulation techniques that surpass our current knowledge.

# 4.Forced and Unforced Oscillation

In the study of physical phenomena, “oscillation” often refers to repetitive or periodic movements or changes in systems. However, this idea can be extended to a broader context, describing how energy interacts with matter. Bhaskara Law introduces a unique perspective, distinguishing between forced oscillations and unforced oscillations, and providing a framework to understand what drives these processes.

Physics is grounded in the principles of thermodynamics, which dictate how energy is conserved and transformed. However, Bhaskara Law introduces an intriguing nuance: the concept of "unforced oscillation," where energy is generated or altered without direct input. To elucidate this idea, let’s delve into a simple yet profound example and explore how Bhaskara Law offers a fresh perspective on energy interactions.

**Forced Oscillations**

A forced oscillation occurs when an external energy input is required to induce a change or maintain a process. In this case, energy is directly applied to the system to cause the desired effect. This principle is foundational to many physical processes where energy is consumed to perform work, resulting in a specific outcome.

**Examples of Forced Oscillations:**

**a. Lifting a Mass:**

When you lift a mass, you expend energy to counteract gravity. The force applied to raise the mass generates an increase in potential energy, but this process requires continuous energy input. As soon as the energy stops, the lifting stops, and the mass remains in its new position. This is a classic example of a forced oscillation since you are supplying energy to perform work.

Mathematically:

**$W=mgh$**

**where**

**W is the work done,**

**m is the mass,**

**g is the gravitational constant, and**

**h is the height**

**b. Heating a Plate:**

Heating an object, such as a metal plate, requires an input of energy to raise its temperature. This energy is supplied in the form of heat, which increases the internal energy of the material. Without the external input of energy (from a heater or other source), the temperature of the plate would not increase. This process represents a forced oscillation, as it relies on a consistent energy supply to induce the temperature change.

The heat supplied can be calculated by:

$Q=mc\Delta T$

where

Q is the heat added,

m is the mass,

c is the specific heat capacity, and

$\Delta T$ is the change in temperature.

Both of these examples showcase processes that cannot occur spontaneously. They require an external source of energy to initiate and sustain them, defining them as forced oscillations.

## Unforced Oscillations

An unforced oscillation, on the other hand, occurs without the need for direct energy input. In these cases, a system exhibits behavior that results from internal properties, external conditions, or inherent responses to environmental factors, without a sustained external force being required to create it. These processes occur naturally .

## Examples of Unforced Oscillations:

a. **Curie Effect**
b. **Seebeck Effect**
c. **Thermoelectric Effect**
d. **Piezoelectric Effect**
e. **Magnetostriction**
f. **Electrostriction**

## Curie Effect

Now, let us consider the Curie effect, where a ferromagnetic material, such as nickel,undergoes a transformation when heated to its Curie temperature. Nickel is ferromagnetic at room temperature, meaning it is strongly attracted to magnets. However, when it reaches its Curie temperature (around 358°C or 631.15 K for nickel), its magnetic properties change, and it becomes paramagnetic, meaning it is no longer strongly attracted to a magnet.

In this process, two things are happening:

1. The temperature of the nickel plate increases, as we would expect from the input heat energy.

2. The nickel undergoes a magnetic phase transition from ferromagnetic to paramagnetic, which is an additional effect.

Importantly, only one type of energy is being supplied: the heat energy that raises the temperature of the nickel plate. However, as the temperature rises and reaches the Curie point, the material's magnetic properties change without any additional input.

This is where the unforced oscillation comes into play. By applying heat, we expect to see only one outcome the increase in temperature. However, the Curie effect gives us two outcomes:

1. The temperature of the nickel plate increases, as expected.
2. The nickel’s magnetic property changes from ferromagnetic to paramagnetic, which is an additional, spontaneous effect.

The key here is that we do not supply any extra energy to cause the change in magnetic properties; it occurs naturally as a byproduct of the heating process. This additional transformation represents an unforced oscillation because the second outcome (the change in magnetism) happens without the need for additional energy beyond what was required to heat the material.

**Explaining Unforced Oscillation through the Curie Effect**

The unforced oscillation phenomenon in the Curie effect demonstrates how multiple outcomes can result from a single energy input. In this case, heat energy is the only input, yet we observe both a temperature increase and a change in magnetic properties.

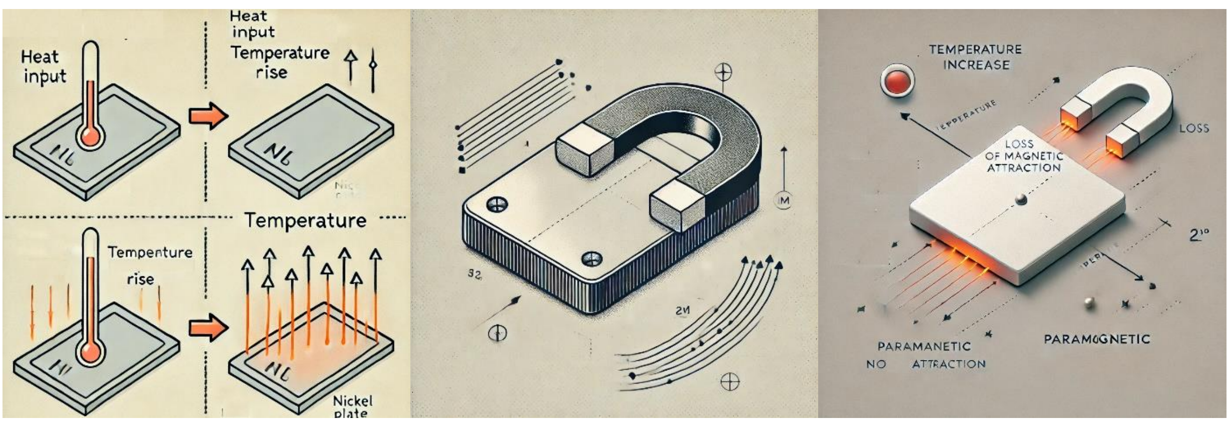
This contrasts with the examples of forced oscillation, where a specific input leads to only one predictable output, such as lifting an object (where work equals the increase in potential energy) or heating a plate (where heat input equals the temperature rise). In forced oscillations, energy expenditure leads directly to the expected outcome, with no additional or spontaneous effects.

With the Curie effect, however, the input heat not only increases the temperature of the nickel plate, but also triggers a magnetic phase transition. The additional change (from ferromagnetic to paramagnetic) represents an unforced outcome because no extra energy is supplied to cause it. The system responds naturally, without any need for further external force, to reach a new equilibrium state at the Curie temperature.

**Comparison with Forced Oscillation**

In the examples of forced oscillation (heating a plate or lifting a mass), energy is spent directly to achieve a single outcome, and no additional transformations occur. These processes strictly adhere to thermodynamic principles, where the energy input is fully accounted for by the resulting change. However, in the Curie effect, the same thermodynamic principles do not apply in such a straightforward manner because of the unforced, spontaneous nature of the magnetic transition.

Bhaskara Law provides a theoretical framework for understanding why unforced oscillations, like the Curie effect, occur. According to this law, certain conditions can lead to energy transformations that yield more than one outcome, with the additional changes happening naturally and without requiring more energy than what is already supplied.




4.1 4.2 4.3

4.1 A rectangular nickel plate being heated, leading to a temperature increase.

4.2 A rectangular nickel plate strongly attracted to a permanent magnet with an arrow indicating the force needed to separate them.

4.2 A rectangular nickel plate being heated, leading to two outputs: temperature increase and the plate becoming paramagnetic, no longer attracted to the magnet.

# 5. Bhaskara Law: The Regulation of Unforced Oscillation

Bhaskara Law introduces a profound new perspective on the interaction of energy and matter, particularly in how it helps explain the phenomenon of unforced oscillation. While classical physics, particularly thermodynamics, explains how fundamental forces like heat or mechanical work cause specific and predictable changes in matter, Bhaskara Law expands this understanding. It reveals that when one fundamental force acts upon a substance, it can create additional effects, disturbing other fundamental forces or properties, leading to a phenomenon where multiple changes occur without the need for direct additional energy input. where energy transforms into outcomes beyond the primary effect expected from traditional laws. These additional outcomes manifest when one fundamental force not only impacts its primary target but also induces changes in other properties of the substance. Such phenomena are key to understanding the versatility of Bhaskara Law.

Unforced oscillation, on the other hand, describes processes where additional effects arise naturally from a primary energy input, without the need for direct or ongoing external forces. In such cases, energy from a fundamental force (like heat or mechanical work) leads to not only the primary intended outcome but also secondary changes in the system's properties.

**Bhaskara Law and the Emergence of Unforced Oscillation:**

Bhaskara Law was formulated to explain scenarios where traditional thermodynamic principles appear incomplete. While the laws of thermodynamics tell us how energy transforms in a system, they typically account for one input and one output — for example, heat causing an increase in temperature. However, Bhaskara Law demonstrates that when a fundamental force acts on matter, it can disturb other fundamental properties or forces, leading to multiple outcomes from a single energy input.

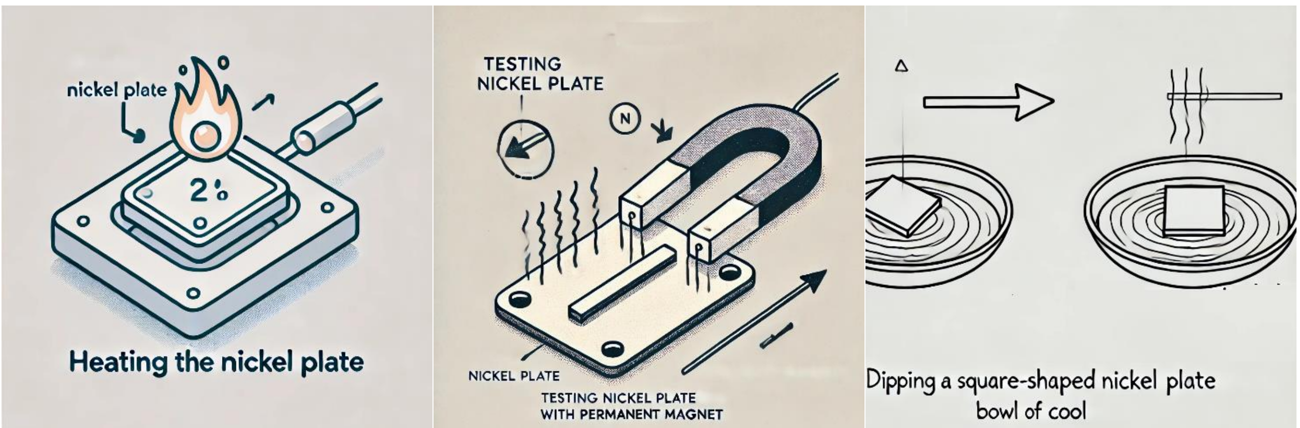
The Key Principle: One Force, Multiple Effects:

The core principle of Bhaskara Law is that when one fundamental force acts on a substance, it can lead to more than one effect, particularly by disturbing other properties of that substance. These secondary effects happen naturally, without the need for extra energy, giving rise to unforced oscillation. This is particularly evident in systems where a single input of energy triggers multiple changes in the behavior or state of the substance.

# 6.ANALYSING BHASKARA LAW

To illustrate Bhaskara Law, let's use an example involving the Curie effect, We'll consider a nickel plate undergoing heating and observe the changes in its magnetic properties at its Curie temperature.

## Experimental Setup:




**6.1** **6.2** **6.3**

**1.Heating Nickel plate and read the temperature**
**2.Testing magnetic property**
**3.Dip the heated Nickel plate into water**

Material: Nickel plate (mass m=0.2666 kgm)
Dimensions: 100 mm x 100 mm x 3 mm
Initial Conditions: Room temperature ($25^\circ$C or 298.15 K)
Equipment: Heater, thermometer, permanent magnet, water bath
Procedure:

1. Heating to $110^\circ$C:

- Heat the nickel plate to $110^\circ$C (383.15 K).
- Bring the plate near a permanent magnet; it should still be attracted due to its ferromagnetic properties.
- Quickly immerse the hot nickel plate into a water bath containing 1 kg of water
at $30^\circ$C (303.15 K).
- Measure the final temperature of the water after thermal equilibrium is reached.

2.Heating to 250◦C:

- Heat the nickel plate to 250◦C (523.15 K).
- Test with the magnet; the plate remains ferromagnetic.
- Immerse the plate in the same water bath and measure the new equilibrium temperature.

3.Heating to 360◦C:

- Heat the nickel plate to 360◦C (633.15 K), above its Curie temperature (~358◦C or 631.15 K).
- Test with the magnet; the plate will now be paramagnetic and not attracted.
- Immerse the plate in the water bath and measure the final temperature.

Observations and Calculations:

1. Heating to 110◦C:

| **EXPERIMENT 1** | | |
|---|---|---|
| **Testing Temperature 110 $^{O}$C** | | |
| | **Nickel Plate** | **Water** |
| **Dimension** | **100mm*100mm*3mm** | **NA** |
| **Mass (m)** | **0.2666 kg** | **1 kg** |
| **Initial Temp ($T_i$)** | **25 $^{o}$ C** | **30 $^{O}$ C** |
| **Final Temp ( $T_f$)** | **110 $^{O}$ C** | |
| **Energy Spend to heat Nickel Plate ( joules J)** | **10079.34** | |
| **Final Temp of Mixing ( $T_f$ )** | **32.15$^{O}$ C** | **32.15 $^{O}$ C** |
| **Energy Gain or loss in Mixing ( joule J)** | **838.72** | **8987** |
| **Energy loss to Atmosphere** | **253.62** | |
| **Magnetic property of Ni plate Before Heating** | **Ferro Magnet** | |
| **Magnetic property of Ni Plate After Heating** | **Ferro magnet** | |

2. Heating to 250◦C:

| EXPERIMENT 2 | | |
|---|---|---|
| Testing Temperature 250 °C | | |
| | Nickel Plate | Water |
| Dimension | 100mm*100mm*3mm | NA |
| Mass (m) | 0.2666 | 1 |
| Initial Temp (Ti) | 25 °C | 30 °C |
| Final Temp ( Tf) | 250 °C | |
| Energy Spend to heat Nickel Plate ( joules J) | 26393.4 | |
| Final Temp of Mixing ( Tf ) | 35.95 °C | 35.95 °C |
| Energy Gain or loss in Mixing ( joule J) | 1284.47 | 24871 |
| Energy loss to Atmosphere | 237.93 | |
| Magnetic property of Ni plate Before Heating | Ferro Magnet | |
| Magnetic property of Ni Plate After Heating | Ferro magnet | |

3.Heating to 360◦C:

| EXPERIMENT 3 | | |
|---|---|---|
| Testing Temperature 360 °C | | |
| | Nickel Plate | Water |
| Dimension | 100mm*100mm*3mm | NA |
| Mass (m) | 0.2666 | 1 |
| Initial Temp (Ti) | 25 °C | 30 °C |
| Final Temp ( Tf) | 360 °C | |
| Energy Spend to heat Nickel Plate ( joules J) | 39296.84 | |
| Final Temp of Mixing ( Tf ) | 38.95 °C | 38.95 °C |
| Energy Gain or loss in Mixing ( joule J) | 1636.39 | 37411 |
| Energy loss to Atmosphere | 249.45 | |
| Magnetic property of Ni plate Before Heating | Ferro Magnet | |
| Magnetic property of Ni Plate After Heating | Dia Magnet | |

# 7.Analysis According to Bhaskara Law:

**Additional Effects Observed:**
**Magnetic Property Changes:**

Below Curie Temperature (110$^{\circ}$C and 250$^{\circ}$C): Nickel remains ferromagnetic and is attracted to the magnet.

Above Curie Temperature (360$^{\circ}$C): Nickel becomes paramagnetic and is not attracted to the magnet.

Thermal Energy Transfer:

The energy transferred to the water increases the water temperature.
Despite the magnetic property change at the Curie point, the thermal energy transfer process remains consistent, demonstrating an additional effect without disturbing the initial energy transfer process.

Potential Creation/Destruction of Energy:

According to Bhaskara Law, the magnetic property change (an additional effect) occurs along with the thermal energy input, aligning with the law's statement that changes in fundamental properties (magnetism) accompany the direct effect (heating). By examining the magnetic property changes and the consistent thermal energy transfer before and after the Curie temperature, we see a practical illustration of Bhaskara Law in action, highlighting how additional effects (magnetism change) occur alongside the direct effect (heat energy input) without altering the initial energy interaction process.

## 8.Unraveling Mysteries in Physics with Bhaskara Law :



The enigmatic nature of physical phenomena has captivated the minds of scientists for centuries, prompting relentless inquiry into the underlying principles that govern the universe. Among the myriad mysteries that persist in the realm of physics, few are as perplexing as the dual nature of the electron – a fundamental particle that exhibits both wave-like and particle-like behaviour. While this duality has been a cornerstone of quantum mechanics since its inception, the underlying mechanisms that give rise to it have remained elusive. However, with the advent of Bhaskara Law, a novel theoretical framework that emphasizes the interconnectedness of fundamental forces and properties associated with matter, we are poised to unlock the secrets of electron's dual nature and shed light on other enigmatic phenomena that have long perplexed physicists.

At the heart of the electron's dual nature lies a fundamental tension between its wave-like and particle-like properties. On one hand, experiments such as the double- slit experiment demonstrate the wave-like nature of electrons, where they exhibit interference patterns akin to waves. On the other hand, observations such as the photoelectric effect underscore the particle-like behaviour of electrons, where they exhibit discrete energy levels and exhibit momentum conservation. This dichotomy has puzzled scientists for decades, giving rise to various interpretations and theoretical frameworks. However, Bhaskara Law offers a fresh perspective on this conundrum by positing that the manifestation of electron's dual nature is a consequence of the intricate interplay between its fundamental properties and the forces that govern its behaviour. According to Bhaskara Law, when an external force acts upon an electron, inducing changes in its properties or interacting with fundamental forces, it results not only in a direct effect but also in alterations in other fundamental forces or properties associated with the electron. This ripple effect, in turn, gives rise to emergent phenomena, such as the dual nature of the electron, which defy classical intuitions and necessitate a quantum mechanical framework for understanding.

To illustrate the applicability of Bhaskara Law in elucidating the dual nature of the electron, let us consider the phenomenon of electron diffraction. In experiments where electrons are fired at a crystalline lattice, they exhibit diffraction patterns reminiscent of waves diffracting through a slit. This wave-like behaviour arises from the interaction between the electron's intrinsic properties, such as its momentum and wavelength, and the periodic structure of the crystal lattice. By accounting for the interconnectedness between these properties and the forces that govern electron dynamics, Bhaskara Law provides a unified framework for understanding electron diffraction as a manifestation of its dual nature.

Furthermore, Bhaskara Law sheds light on other mysterious phenomena in physics, such as quantum entanglement and the uncertainty principle. Quantum entanglement, wherein the states of two or more particles become correlated in such a way that the state of one particle instantaneously influences the state of another, can be conceptualized within the framework of Bhaskara Law as an emergent phenomenon arising from the interconnectedness between the particles' fundamental properties and the forces that bind them together. Similarly, the uncertainty principle, which asserts a fundamental limit to the precision with which certain pairs of properties, such as position and momentum, can be simultaneously measured, finds a natural explanation within Bhaskara Law as a consequence of the inherent uncertainty introduced by the interconnectedness between these properties and the forces that govern them.In conclusion, Bhaskara Law represents a paradigm-shifting proposition that not only offers a unified framework for understanding the dual nature of the electron but also sheds light on other mysterious phenomena in physics. By emphasizing the interconnectedness between fundamental forces and properties associated with matter, Bhaskara Law provides a novel perspective on the underlying mechanisms that govern the universe, paving the way for transformative discoveries and insights that transcend disciplinary boundaries. As we continue to explore the implications of Bhaskara Law, we embark on a journey towards a deeper understanding of the fundamental principles that shape the fabric of reality and the limitless possibilities they entail.

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