

# Particle Physics : Its Dimensions

## Abstract

Particle physics is high energy branch of action research. It throws light on the exact nature of particles which constitute ultimately matter and radiation in universe. There are various types of objects like protons, gas particles, or even household dust. In this present day understanding of each one of elementary particles explains the scope of particle research. These fundamental particles are usually studies as standard model.

**Keywords:** Matter, Radiation, Objects, Nuclear Fusion.

## Introduction

The history of elementary particles studies goes back to 6<sup>th</sup> century BC. During 19<sup>th</sup> century, John Dalton studies on stoichiometry. He had concluded that each one of elements of nature was composition of a single, unique type of particle. The Greek word *atomos* means "indivisible", has been denoting the smallest particle of a chemical element. The letter studies on atom revealed that the fundamental particles of nature, are conglomerates of even smaller particles, like such as the electron. In the 20<sup>th</sup> century explorations of nuclear physics and quantum physics described that to proofs of nuclear fission in 1939. Lise Meitner (based on experiments by Otto Hahn), and nuclear fusion by Hans Bethe in that same year; brought discoveries which also led to the development of nuclear weapons. During the 1950s and 1960s, a variety of particles were discovered in relation of particles from increasingly high-energy beams. It was cord as the "particle zoo". The term was advanced after the formulation of the Standard Model during the 1970s, in which the large number of particles were discovered as combinations of a (relatively) small number of more fundamental particles.

The modern studies on particle physics has focused on subatomic particles, which includes atomic constituents such like electrons, protons, and neutrons (protons and neutrons are composite particles called baryons, made of quarks), produced by radioactive and scattering processes, such as photons, neutrinos, and muons, as well as a wide range of exotic particles. It is found that the nature of particle is also governed by quantum mechanics. Resulting into exhibit wave-particle duality, displaying particle-like behaviour under certain experimental conditions and wave-like behaviour is change in others. In the technical terms, these are called by quantum state vectors in a Hilbert space. It is also treated in quantum field theory.

In the present day applied and action researches particle physics tries to develop the models, theoretical framework, and mathematical tools to understand current experiments and make predictions for future experiments. In this research there are other major interrelated efforts being made in theoretical particle physics today. This branch attempts to better understand the Standard Model and its tests. The extracting the Standard Model, from experiments with less uncertainty, this work probes the limits of the Standard Model and so helps our understanding of nature's building blocks. This type of efforts are made challenging by the difficulty of calculating quantities in quantum chromo dynamics.

Model building where model is an area of researches it brings ideas for what physics may lie beyond the Standard Model. This research work is often motivated by no. of problem and is restricted by existing experimental data. This work involves work on super symmetry, alternatives to the Higgs mechanism, extra spatial dimensions.

The next major effort in theoretical particle researches is called as string theory. *String theorists* attempt to construct a unified description of quantum mechanics. It is generally relativity by building a theory based on small strings. In the present day research there are also other areas of work in theory particle physics which is upto from particle cosmology to loop quantum gravity.

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As a matter of fact. The studies of all areas of physics are based on the study of fundamental particle. The high every physics has great role to play in various aspects of research. Particle accelerators are being used to induce medical isotopes which are useful on research and treatment. Isotopes used in PET imaging or being used directly in radiotherapy. The advance researchers in the area of superconductors has pushed forward their use in particle physics for example. The World Wide Web and touch screen technology were initially developed at CERN in Geneva. There are other areas where it is being used such as medicine, national security, industry, computing, science etc. It has long list of beneficial practical applications. So, particle physics has great role to play in society in research.

The basic aim of this particle is to help in several different ways. This branch highlights its uses. There is need to study further the nearest branches of applied physics like particle physics. The further studies on dark matter in universe. Standard model is the beginning of particles physics. Beyond that is area of studies neutrino masses. The cosmology throws light of study of dark matters of universe without collieders.

#### **Aim of the study**

1. To study all the four laws of thermodynamics.
2. To study the impact in each of four laws in a given system.
3. To investigate relationship among temperature energy and work in a system.

#### **Conclusion**

The particle physics is new branch of studies. It has many role to play in society whether in applied research in medical treatments such as radiotherapy.

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