

What Is "Fundamental"?

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Abstract: Only an entity that provides substance to all real entities can be the most fundamental. All others are derived from it. In the material world, the existence of matter is absolute truth. Therefore, matter qualifies as the most fundamental, and it provides substance to all real entities.

Literarily, 'fundamental' means an essential phenomenon, principle, or entity that forms the base or core of central importance for all subsequent arguments. It provides a basis for all further development of a theme. Depending on the topic, it may indicate different aspects of human thinking on various subjects. We have fundamental rights, duties, relations, forces, analyses, tone, sense, information, particles, and a great many others. All of these fundamentals are derived from the existence and interactions of physical objects. Hence, physical objects are more fundamental than any other. In this essay, I intend to discuss the most fundamental entity that forms the basis for all physical phenomena in the universe.

As intelligent beings, we notice the infinite variety of entities and their apparent interactions in the universe. Depending on our previous experience, we assign different names, meanings, and properties to them. The diversity of entities and corresponding properties is often very complex and sometimes contrary. It is illogical to consider each entity as individually fundamental. As there cannot be as many types of constituents as there are different types of entities with diverse properties, it is essential that all entities are developed from one type of fundamental constituent that has no definite property except its ability to exist. Various properties of different entities would be the result of the relative arrangements of fundamental constituents in them.

Most of the contemporary physical theories are developed from the observation of three-dimensional material bodies and their apparent interactions. These theories attempt to construe and explain observed phenomena on the basis of various assumptions, regardless of their logic. Discrepancies develop when many of these theories are considered together. In order to have fundamental laws of physics hold true under all conditions, they should all be based on a single fundamental entity. All logical theories in physics should be based on a single assumption.

Entities in the universe may be broadly divided into two distinct categories – functional entities and real entities.

Functional entities:

Functional entities fulfil all functions assigned to them by rational beings, even if these functions are illogical and irrational. They are created by thought processes in the minds of rational beings (which may be defined as intelligence), which is itself a result of relative changes in living cells of our brain or other organs. Distinct changes in the cells are also stored as memory of experience. Comparisons between experiences create functional entities, which live only in our minds. They have neither objective reality nor positive existence in space and time. They are neither independent nor individual. Since functional entities do not have positive existence, they cannot create or develop physical entities. Therefore, they cannot be fundamental. However, these mental exercises are useful in explaining various apparent functions and in extending or improving thought-processes towards better theories.

Relative states of constituent particles, in an object or objects, give rise to information which may be stored as data for future reference. Storage space may be the brains of rational beings or other mechanical devices, where similar changes of states of fundamental particles may occur. This information may be retrieved

and processed by the same devices or our minds. Even in these cases, the information or data is not fundamental but they are products of changes in states of more fundamental real entities in or about the objects. All entities derived from thought processes and data analyses are functional entities. They have no real existence but are derived from actions of or in real entities. All functional entities are creations by real entities. Creators are more fundamental than the functional entities they create. Therefore, none of the functional entities qualify as fundamental.

We often consider some phenomena, theories, physical laws, physical constants, forces, states, information, data, etc. as fundamental, which in turn are derived from one or more of functional entities with the help of mathematical analyses. Some of the functional entities play a crucial role in such analyses and the development of corresponding physical theories. Energy is an example. Physics has no concrete definition for energy. It is generally understood as the ability to do work. Ability is a quality of a certain entity to perform (work). Ability, itself, has no independent existence, but it is merely an impression created on rational minds that observe certain states or actions of or on real entities. Yet, energy is considered by many as a real entity that exists in various forms, that can act and be acted upon, that can transform and transfer, or in any other form that suits the theorists. Energy, although a functional entity, is generally accorded the status of a real entity that acts as the cause of an action, where no logical cause is obvious. Many other functional entities are also used in a similar manner to justify illogical explanations. However, on further analyses, it can be found that all these 'fundamentals' are derived ultimately from the most fundamental real entity.

Real entities:

Physical existence is something that everyone will agree as truth. Every physical entity, including us, exists in space and time. The existence of real entities is the foundation of the universe. Without real entities, there is no universe. Hence, 'existence' can be used as a basis for a foundational assumption. To exist is to have objective reality in space and time. To have objective reality, an entity should have substance (stuff). Substance makes an entity real. Hence, substance is more fundamental than observable real entities.

Real entities are those that have existence in the real world, regardless of the presence of rational beings, who are also real entities. They have objective reality and positive existence in space and time. In order to have objectivity and existence in space, real entities are made of substance (stuff). As there cannot be too many types of substances, it is logical to consider that there is only one fundamental entity that provides substance to all real entities. In order to provide diverse properties, substance that forms real entities should be inert, and their relative arrangements within an object should account for differences in properties of various types of real entities.

Matter as the most fundamental:

Matter is often defined by its apparent properties. For example, matter is the "*material substance that constitutes the observable universe and, together with energy, forms the basis of all objective phenomena*" and the energy is "*the capacity for doing work*" (Encyclopaedia Britannica). Matter is a specialized entity associated with energy and has attributes of mass and real existence in space and time. It gives existence a sense of reality. Here we have two different entities, one real and another one functional, which are considered fundamental to the existence of the universe.

Matter, as we know it today, is a fact of our observation. It is the real substance that we actually come across in everyday life. There is nothing virtual or imaginary about matter. It cannot exhibit different fundamental properties under different conditions. In fact, pure (unstructured) matter cannot exhibit any particular property, except its ability to exist. Fundamental properties of structured matter (three-dimensional matter-bodies) should be logically derived from properties of matter in its unstructured state (in lower spatial systems).

In the material world, the existence of matter is nearest to absolute truth. As far as we know, only matter provides substance to all real entities in the materialistic universe. Therefore, we can consider that matter exists and matter alone provides substance to all real entities in the universe. Hence, matter becomes the most fundamental of all entities (including functional entities) in the universe. As it is most fundamental and everything else develops from it, matter is beyond definition. It has neither constituents nor origin/creation. It simply exists. Matter is inert except for its ability to exist. Its sole objective is to provide substance to real entities. Diverse properties of various material objects are results of relative arrangements of constituent matter-particles in superior objects.

Matter is understood in various concepts as a substance that constitutes physical objects, occupies volumetric space, has mass, has inertia, and is perceptible by the senses. These descriptions suit how matter appears to us in everyday life. As three-dimensional beings, all of our sensory organs and instruments are compatible only with entities in a three-dimensional spatial system. That is to say, matter can be observed by our senses or detected by our instruments only when it is in three-dimensional spatial status. However, large and small gaps can be observed between even the smallest three-dimensional matter-particles. Currently, these gaps are considered empty.

Space is an imaginary container of infinite extent, envisaged by rational beings whenever they think of real objects. Space has neither form nor structure. It is the imaginary place where real entities exist. The most convenient (currently adopted) spatial system is that of three-dimensional space. In this system, space is divided into eight parts by three mutually perpendicular imaginary planes through the origin. Any point in space may be accurately located by measuring distances from corresponding planes (axes).

As per contemporary considerations, to exist in space, a real object should occupy volumetric space (it should have a certain size) in a three-dimensional spatial system. Only when the object has volumetric size do we recognize its existence and objective reality. An object that has too small measurements in one or two spatial dimensions and cannot be perceived by our sense organs or measured by the scales used by us will obviously be misjudged by us as non-existent. This mistake is not due to the non-existence of matter but due to our inability to detect or measure matter in its lower spatial states.

Two three-dimensional entities, away from each other and without physical contact, may appear to interact on various occasions. Usually, the mechanism for such interactions is ignored, or it is assigned to imaginary entities, or to divine intervention. Primarily, it is assigned to 'action at a distance through empty space', which is the worst assumption in physics. Various types of media, some structure-less and others with dubious structures, were suggested (in the past) to justify these apparent interactions. However, none of them has so far succeeded in overcoming all objections raised by physicists.

If matter-particles, in their lower spatial dimensions, can structure a medium to fill gaps between three-dimensional matter-particles, we would not be able to appreciate the presence of matter in these regions. At the same time, this medium can act as a direct physical link between (apparently) interacting three-dimensional bodies, which are placed apart. This medium would be simultaneously particulate & continuous and simultaneously isotropic & anisotropic. It may appear solid, but it will act like a perfect fluid. It will not resist motion, but it will cause motion. This medium would be the cause and actuator of all actions, including creation, sustenance, and destruction of three-dimensional world. This medium, together with three-dimensional material bodies, would fill the entire space with matter that is the most fundamental of all.

Conclusion:

Matter is the most fundamental of all in the universe. The entire universe is filled with matter (without voids) in various spatial forms. A concept that logically explains all physical phenomena can be derived from a single assumption on the existence of matter as the most fundamental and only one type of substance for all real entities.

Reference:

References are self-published by the author. They are neither reviewed nor edited.

- [1]. Nainan K. Varghese, *MATTER (Re-examined)*, <https://www.matterdoc.in>

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