BASIC ASSUMPTION IN PHYSICS

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Abstract: Lack of a fundamental set of assumptions in physics encourages or often compels physicists to conceive different sets of assumptions (often unrelated) for different phenomena. When taken together, they often contradict each other. Because of numerous contemporary assumptions, physics is no longer an exact science. This affair can be remedied only by sorting existing assumptions out and tabulating one basic set of fundamental assumptions, on which explanations of every physical phenomenon should depend. If any assumption in physics is ripe for rethinking, I will suggest 'actions at a distance through empty space' as the first candidate.

All real entities are made of matter. The existence of matter is the solitary phenomenon without prior cause. Therefore, the original set of assumptions should be only with respect to matter. Further development of physics, in all spheres, should be based on this original set of assumptions. To add to or modify original assumptions whenever a certain phenomenon is not readily explainable is incorrect practice. A multitude of assumptions, currently used in physics, may be substituted by a single and basic assumption that 'substance is fundamental and matter alone provides substance to all physical entities'. Although conclusions may diverge from current beliefs, reasoning based on this single fundamental assumption can logically explain all physical phenomena.

Keywords: Assumptions, matter.

Assumptions in Physics:

Fundamental aspects of all contemporary laws and theories in physics are that they are based on one or more assumptions (and postulations) about the nature of the real world. However, omitting to state these assumptions along with physical laws (or theories) every time they are used often misguides a student and causes erroneous beliefs. Different sets of assumptions, used with different theories, aggravate confusion and deprive physics of its status as a comprehensive branch of science. Therefore, all attempts to rethink diverse physical laws and related assumptions should be appreciated. Scrutinising fundamental assumptions and compiling them into a single set, on which all physical theories are based, will help to remove current perplexity in physics.

A living being perceives its surroundings or parts of its own body by identifying them. Perception is accomplished by analysing information gained through sense organs and comparing it with preconceived ideas stored in his mind. Preconceived ideas may be in the form of images observed directly by an individual or in the form of assumptions, which are believed to be true. Hence, fundamental assumptions are essential to perceive and understand physical phenomena about which an observer has no preconceived idea by direct experience. As physics is not restricted to certain individuals, basic ideas used

in physical theories have to be supported and accepted widely. Assumptions, stated in conjunction with a theory, help to broaden the basis of preconceived ideas for all students with respect to a theory.

Generally, it is considered that the assumptions and postulations need not be logical or based on prior reason. No questions on their creation or reason for their existence arise. They are to be recognised as true for purposes for which they are intended. However, all further developments from the basic assumptions or postulations need to have logical continuity. Once certain fundamental assumptions are made, it is incorrect to add to it or modify the same during every step of further development of a theory. Additions or modifications break logical continuity. Contemporary physics has no single set of basic assumptions. Current practice is to formulate suitable assumptions as and when a new theory is formulated for a phenomenon that cannot be explained on the basis of a prior set of assumptions used elsewhere. Another practice is to borrow assumptions used for certain phenomena to explain apparently similar phenomena. This may cause gross error in the chain of reasoning. As a result, currently we use far too many unrelated assumptions in physics. Imaginary thought experiments also contributed to a growing number of assumptions.

Assumptions are often cast in mathematical form for logical analysis to determine consequences of physical laws and to check if results concur with real-world actions. If they do, the assumptions are judged true. Mathematical analysis of these assumptions provides a logical description, without any particular reason, of how certain phenomena work in the real world. If results do not concur with real-world actions, assumptions are judged wrong and different or modified assumptions substituted for the original. The process is repeated until current assumptions are proved true in a mathematical aspect. This sort of conclusion needs not always be correct. Mathematics is a self-contained logical system whose conclusions are true independently of what happens in the real world. If conclusions, based on a certain set of assumptions, agree with a particular real-world phenomenon, blindly using the same set of assumptions for all other seemingly similar phenomena to derive further consequences may not assure correct conclusions. As a result, a flaw at any step is carried forward in newer theories, and errors in reasoning multiply in geometrical progression. Over-emphasising mathematical analyses without conceptual reasoning is bound to increase the number of baseless assumptions.

There are many assumptions without which no scientific (or even other rational) thoughts are possible. For example: The physical universe is real; physical entities have objective reality in space; space contains real entities; humans are rational beings with the ability to observe, analyse and understand physical phenomena; human rationalisation itself is based on fundamental assumptions; etc. These assumptions are better discussed at a metaphysical level.

In addition to metaphysical conjectures, currently we have too many assumptions in physical theories. Many theories use different sets of assumptions which often contradict when taken together. This is neither desirable nor helpful in the search for true explanations of physical phenomena. Fundamental assumptions should be as few as possible, and they should be applicable identically in cases of all physical phenomena. There is nothing special about any physical phenomenon. They should all be explained on the same basis. Theories and explanations (at all levels) should be based on original assumption(s) for their logical continuity. Original assumption(s) should be logical, consistent and without contradictions. They would require no change, addition or modification as our knowledge increases. Original assumption(s) should be the only supposition(s), which requires no logical basis or prior cause. This being the case, they cannot be questioned, except for contradictions in their formulations. All other assumptions will be secondary in nature, and they will be derived as conclusions from original assumptions.

Analysing different phenomena separately causes proliferation of assumptions in physics. This is an easy and convenient method used by physicists. As assumptions are not questioned, a physicist is at liberty to prescribe a special set of assumptions for the analysis of each phenomenon to suit desired results,

without considering existing assumptions. Every phenomenon is a result of prior causes. Neglecting assumptions used for prior causes while formulating new assumptions is not correct. Analysing a phenomenon, in isolation, is like creating a new branch of science. To make physics a comprehensive science, analyses of all physical phenomena should be based on the same set of fundamental assumptions.

Although physics is the science of matter and its (apparent) actions and interactions, modern theories neglect matter altogether in mathematical analysis and use one of its attributes – mass – for theoretical analysis. This method shifts the focus of physics from matter to one of its qualities. Assumptions used for matter are not valid for mass and vice versa. Although matter is the basis of everything in the universe, it is hardly discussed as an entity. Use of its qualities, instead of matter itself, leads to many misconceptions in modern physics.

It is equally important to define basic terms used in physics. Most of the fundamental terms are not defined at all. Lack of proper definitions causes them to mean differently in different theories and often encourage their misuse. Although colloquial but undefined meanings are alright for general purposes, when used in physical theories they should have properly defined meanings. This will help the uniformity and consistency of explanations of various phenomena.

Few of the assumptions, used in contemporary physics, are contrary to scientific wisdom and common sense. Irrespective of their absurdity, they are widely used without questions. Wherever they fail, due to their irrationality, equally bizarre assumptions are substituted. ‘Actions at a distance through empty space’ is one of them. Many ad-hoc explanations to make ‘actions at a distance through empty space’ possible have failed for good reasons. Media like various types of fields, imaginary particles, abstract entities, etc. are often used unsuccessfully to overcome the irrationality of this assumption. If any assumption is ripe for rethinking, I will suggest ‘actions at a distance through empty space’ as the first candidate. A rational mechanism of actions can help to make physics more realistic and rectify most of present misconceptions.

Single fundamental assumption:

The universe and all its constituents are materialistic. All real entities, including rational beings, are made of matter. Therefore, the ‘existence of matter’ can be considered as the single phenomenon without prior cause. Consequently, the original set of assumptions in physics should be related only to matter. All other phenomena occur to, on or about material bodies. They have to have prior causes, derived from the fact of ‘existence of matter’. No further assumptions or modifications of the original set of assumptions should be required to explain them. Logical continuity of explanations on all other physical phenomena has to be based on the original set of assumption(s) on the ‘existence of matter’.

‘Substance’ is the thing which is the foundational or fundamental entity of reality. It is the basic stuff from which everything else is constructed. One common way to identify a substance is through its physical properties. In its physical sense, substance is that which exists in itself and does not depend upon anything else for its existence. Attributes or characteristic properties are inherent in (and about) substances and depend on the substance for their existence. The term 'matter' traditionally refers to the substance that all objects are made of. All real entities are materialistic. They are material objects made out of matter. Matter is the stuff (substance) that gives real entities their materialistic existence. Matter is a physical substance that occupies space and can be perceived by one or more senses. Matter is distinct from qualities, properties, thoughts, mind and spirit. Only matter is real. All others are functional and man-made. Having matter as its content (substance) makes an entity a real object that can be perceived by sensory organs. Matter is in itself undifferentiated and formless and, when subjected to change and development, receives form and becomes the substance of an object. Hence, matter is the substance any physical object consists of or is composed of, or, simply, matter is something that exists in space.

Rational beings are constantly trained to relate cause-and-effect relations in all physical actions. For every action, there has to be a prior cause, and every cause is followed by a subsequent action. If the cause of an action is known (even if it is based on some assumptions), no further assumptions are required to understand subsequent action. If the cause of an action is unknown, a rational being supposes certain assumptions in place of the unknown cause. Since 'existence of matter' is the lone phenomenon without prior cause, that is the only phenomenon which requires assumption(s). The original reason or cause for all other phenomena is the existence of matter. Without matter, none of these phenomena would exist. It should be possible to explain all other physical phenomena on the basis of assumptions about matter.

All assumptions used in contemporary physics may be substituted by a single essential and basic assumption, viz., 'Substance is fundamental, and matter alone provides substance to all physical entities'. Explanations to every other physical phenomenon can be developed from this single fundamental assumption. As there is only one assumption, there is no possibility of contradiction at any stage of development of theories on any physical phenomenon. All characteristic properties of diverse material bodies and their (apparent) actions or interactions will be continuations of the (identical) inherent property of infinitesimal matter particles.

This fundamental assumption is only about the positive existence of matter in the universe. Matter exists in its purest form. In order to avoid self-dispersal and to exist as an integral object, pure matter has to have a certain affinity (similar to attraction) between adjacent points within the matter content of a matter particle. This is an essential requirement for the existence of matter. No other parameters or properties of matter are assumed. Secondary assumptions (wherever required), with respect to matter, are conclusions logically derived with the help of simple questions from the essential property of matter to exist in space. They will be logical extensions of and inferior to the fundamental assumption, without contradictions. As the existence of matter is an assumption, the question 'Why?' does not arise. The question 'What?' is answered by the assumption itself – matter is substance. Other questions help to derive logical explanations (answers) to all characteristic properties, actions and interactions of/by material bodies in nature.

Conclusion:

Only one fundamental assumption, that 'substance is fundamental and matter alone provides substance (stuff) to all physical entities', can provide a basis for logical explanations to all physical phenomena in the universe. Although conclusions may differ from contemporary theories, they will be logical and comprehensive.

Reference: 'MATTER (Re-examined)' http://matterdoc.in

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