

REPLY TO A PARTICLE PHYSICIST
(Respuesta a un Físico de Partículas)

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ABSTRACT

This note to the editor discusses a reply made by S.L. Glashow to the author's letter concerning the proposed superconducting Super Collider (SSC), that appeared in Physics Today, February 1986. The philosophical viewpoint of particle physicists is contrasted with that of the author. This puts in perspective the long term implications of building larger and larger particle accelerators.

RESUMEN

En esta nota al editor se discute la respuesta de S.L. Glashow a la carta del autor sobre el acelerador de partículas propuesto y denominado Superconducting Super Collider (SSC). La carta se publicó en Physics Today, Febrero 1986. Se contrasta el punto de vista de los físicos de partículas con el del autor. Esto pone en perspectiva las implicaciones a largo plazo de la construcción de aceleradores de partículas de tamaño cada vez mayor.

REPLY

In reply to my letter (1) on the proposed Superconducting Super Collider (SSC) in Physics Today (February 1986; p. 11), Sheldon L. Glashow conceded that important new theories do emerge in sciences other than particle physics and cosmology, but he questioned how truly fundamental they really are. The problem lies in his choices of what he calls new theories. Superconductivity, for example, is an observable phenomenon: certain substances lose their electrical resistance at low temperature. One may choose to interpret this phenomenon in terms of a complex interplay among many atoms. Such a "theory" of superconductivity can obviously not be a fundamentally new theory. The fundamental theory is the Atomic Theory of Matter, which reflects a particular philosophical viewpoint. There always remains the possibility of some alternative inter-

pretation in terms of some other fundamental theory (one that reflects some other philosophical viewpoint and/or involves some other set of basic assumptions). This other fundamental theory may either already exist or may await postulation in the future. Thus Heisenberg and his friends (Einstein was obviously not one of those friends!) gave a particular interpretation of a set of observable phenomena, based on certain assumptions. This interpretation led to quantum mechanics and eventually to the quantum theories of particle physics. Is science then to be forever held ransom to this particular interpretation? Is this all we need to know? Have all the eminent scientists of our day come to accept this defeatist's attitude?

Perhaps scientists today need to be reminded that the Atomic Theory of Matter is still only a theory even though it may have been around, in one form or another, for about 3000 years. In fact, it is all too evident what the rules of the game are for the particle physicists. Their philosophical viewpoint (essentially identical to that of the Atomic Theory of Matter) is that matter is discontinuous; that some day they will find the fundamental particle(s) with which to construct an overall structure of matter. In my opinion, they have merely proven with each additional step of division, that matter is composed of matter, each new particle is composed of newer and smaller particles. This became inevitable with the postulation of the electron, since the original fundamental particles - atoms - then lost that property which is indispensable for a discontinuous matter, that of indivisibility. Of course no material particle can now ever possess this property because of the experimentally proven interconvertibility of matter and energy. What has been forgotten is the other side of the ancient Greek debate on the nature of matter i.e. matter may be continuous. It is indeed very instructive to study the arguments of Zeno of Elea (2) in support of a continuous matter.

In my letter, it may have been noted that I spoke about the "nature of matter" whereas S.L. Glashow in his reply was always concerned with the "structure of matter". The relationship between matter and energy ($E = mc^2$) was derived from Einstein's Special Theory of Relativity. This is an example of a fundamentally new theory concerning the nature of matter. It provides very important knowledge about matter without reference to any possible structure of matter. This theory does not

depend in any way on the philosophical viewpoint of discontinuous matter. I wish to refer any interested readers to my book (3), "Matter, Gravity and Spin", in which I have developed (among other things) a possible approach to the treatment of continuous matter, and in which I have also derived important information concerning the nature of matter, again without any reference to a structure of matter.

I have endeavoured to show that particle physicists, despite their insistence, have no greater claim to truly fundamental research than most scientists. Yet S.L. Glashow says " Unlike other

scientists, we yearn for experimental data that will knock our theory down, so that our next one can be better yet". He thus appears to express a total contempt for other scientists who supposedly do not follow the tenets of the Scientific Method. He then adds "We don't quite know what we are doing nor where it will lead". My letter has explained where it will lead - to accelerators girdling the earth. When such an eminent particle physicist admits that he does not quite know what he is doing, then I would suggest that it is time to examine the philosophical foundations of our science and consider alternative viewpoints rather than continue this blind, ever more costly search for newer and smaller particles.

REFERENCES

- 1) GALL, C.A. : "Physics Today", February 1986, p.11 (See Physics Today, March 1985, p. 28-37 for the original article by S.L. Glashow and L.M. Lederman that prompted this letter.)
- 2) KIRK, G.S. and RAVEN, J.E. : " The Presocratic
- Philosophers", Cmbridge Univ. Press, Cambridge (1957), p. 286-291.
- 3) GALL, C.A. : "Matter, Gravity and Spin", Vantage Press, New York (1987), Chap. 1,2 and 5.

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