

RECIPROCITY

Published By:
The New Science Advocates
P.O. Box 223
Watervliet, N. Y. 12189

Number 4

December 1972

PALOMAR ASTRONOMER SEES EVIDENCE OF NEW STATE OF MATTER

One of the "startling new conclusions" reached by Dr. Halton Arp of the Hale Observatories (Mount Wilson and Palomar) as a result of his studies of "peculiar" galaxies and galactic associations, and presented at the Seattle meeting of the American Astronomical Society, is that the matter in some galaxies recently formed by explosive processes is in a state that is different from anything that is now known. According to a report of the meeting by Paul W. Hodge, published in the July 1972 issue of Sky and Telescope, Dr. Arp expressed the view that "certain large, massive spirals act as parents of other galaxies, ejecting their offspring periodically in opposite directions, thus forming lines and chains. The new galaxies are born with matter in a state unfamiliar to us, so that all spectral lines are variously shifted to the red by amounts depending on age".

Here we see that a leading astronomer, observing the galaxies through the world's most powerful telescope, has arrived at the same conclusions that were reached more than a dozen years ago by application of a powerful new system of physical theory: D. B. Larson's Reciprocal System. Theory and observation have now converged on an answer to the great problems that confront those who are investigating galactic behavior. What we must do, they both say, is to recognize the existence of a hitherto unknown state of matter.

Unquestionably, the observational evidence adduced by Arp and the theory developed by Larson furnish strong support for each other. A theory which predicts the existence of hitherto unknown phenomena is greatly strengthened when observational evidence of such phenomena is actually discovered. The detection of evidence of the occurrence of galactic explosions was, in itself, a significant victory for a theory that had deduced the existence of these explosions, and had defined their nature and characteristics several years in advance of the discoveries. Now, almost a decade later, the theoretical assertions as to the nature of the explosions and their principal products are confirmed by the observational evidence cited by Dr. Arp.

On the other side of the picture, it is equally obvious that a conclusion from observation which involves the existence of previously unknown physical states or processes is greatly strengthened when the existence of such states or processes has already been deduced from basic premises of a very general nature, especially when, as in this case, the theoretical development completes and amplifies the view that is derived from observation. While the observations are only able to demonstrate the existence of relations that are incompatible with known states of matter, and therefore require the existence of a hitherto unknown state, the theory goes on to identify the nature

of this new state and to explain the operation of the mechanisms whereby the distinctive effects that characterize this state are produced. Similarly, the observations only tell us that there must be some feature of this "unfamiliar" state, as a result of which "all spectral lines are variously shifted to the red by amounts depending on age", but the theory gives a full explanation of the origin of this redshift and its relation both to the age of the ejected galaxy and to the normal recession redshift.

Inasmuch as Dr. Arp's most drastic departure from conventional thinking lies in this conclusion that the matter in the newly ejected galaxies is in "a state unfamiliar to us", it should be somewhat reassuring to find that the theory does not identify this state with anything strange or incomprehensible. On the contrary, the theoretical development reveals that this matter is normal in every respect except that the particles of which it is composed are moving at speeds in excess of that of light. Although this finding conflicts with the current belief that the speed of light is a limiting value, it cannot be regarded as a radical idea. Indeed, the existence of speeds exceeding that of light is today being freely postulated by many physicists who are investigating the possibility of the existence of "tachyons".

These investigators point out that the experimental evidence that is now being used in support of the assertion that the speed of light is a limiting value does not actually support such a conclusion. They contend that the experiments only show that material objects cannot be accelerated to any greater speed. But, in fact, the conclusion that can legitimately be drawn from the experiments, in which particles were accelerated by electrical forces, is still more limited. In reality, the experiments merely show that these particles cannot be accelerated to higher speeds by a particular kind of a process. They do not preclude the possibility that other processes, such as the release of immense quantities of energy in stellar or galactic explosions may accelerate matter to speeds far in excess of that of light. Larson's theoretical development demonstrates that this is the kind of a process that Arp is observing when he finds that the matter in the products of a galactic explosion exists in an "unfamiliar" state. As indicated in Quasars and Pulsars, a detailed analysis of the behavior of this fast-moving matter provides the key to a full understanding of the quasars and associated phenomena: the current "mysteries" of astronomy.

Furthermore, all of the theoretical conclusions that are reached, not only with respect to the galactic explosions and the quasars, but also with respect to all other physical and astronomical phenomena, are derived entirely from a logical and mathematical development of the necessary consequences of certain basic postulates as to the nature of space and time -- postulates which define the status of these entities in a universe of motion -- and they are independent of information from observation. The theory thus gives us a purely physical view of astronomical phenomena: a view from outside the astronomical field. Under these circumstances, the increasing amount of observational confirmation is highly significant.

THE CHANGING OF THE GUARD

Even a very informal organization such as ours must have a certain amount of direction, and must therefore have some individuals who function as officers: a fact that has made itself evident gradually as time has passed. The only requirement that was obvious initially was an editor of Reciprocity, and Dr. Douglas S. Cramer undertook this task. Then we found that we needed a headquarters and a secretary to look after our correspondence. Ronald W. Satz acquired this responsibility. Later it became advisable to form an Executive Committee, and Dr. Paul F. deLespinasse accepted the position as Chairman. These officers have kept the organization alive and operating for two years, but the time has now come when Dr. Cramer and Dr. deLespinasse feel that they should pass their responsibilities into new hands. Both men will, however, continue as members of the Executive Committee. The new roster of officers is as follows:

Chairman, Executive Committee

Todd Kelso
901 E. 55th St.
Kansas City, Mo. 64110

Secretary

Ronald W. Satz
P. O. Box 223
Watervliet, N. Y. 12189

Editor, Reciprocity

Frank H. Meyer
Depts. of Physics and Philosophy
University of Wisconsin
Superior, Wis. 54880

THOSE WAYWARD PARTICLES

What the quasars and associated phenomena are to the astronomers, the sub-atomic particles are to the physicists. Like the quasars, the particles stubbornly refuse to be fitted into any of the niches that conventional theory has available for them, and, as in the case of the quasar phenomena, each new discovery raises new problems rather than solving the old ones. The opening of the latest chapter in this record of continuing frustration is reported in an article in the Oct. 28, 1972 issue of Science News, which describes the early results of the application of greatly increased energies to particle interactions. Instead of conforming to expectations, the results of the initial experiments were so contrary to those that were anticipated that the principal need at the moment, according to the report, appears to be a "new language" in which to talk about them. High energy collisions between protons, which were expected to reveal something about the

structure of these units, have produced a bewildering variety of secondary particles, as many as twenty from a single interaction.

There are still many die-hard supporters of the traditional view that "if it comes out, it must have been inside to begin with", but other physicists are recognizing that the multiplicity of particles emanating from the experimental events is making a shambles of this hypothesis, and they are conceding that some of the particles, perhaps most of them, are produced in the disintegration process itself. But once this concession is made, the contention that what comes out must have been present originally is automatically invalidated, and this cuts the ground out from under the current theory of the structure of the atom. As the article in Science News admits, it is now "difficult to say that anything was inside anything else". But without some sound basis for insisting that the protons and neutrons that emerge from the disintegrating atom must have been present in the atom there is no adequate justification for the far-reaching ad hoc assumptions that have to be made in order to reconcile the observed properties of these particles with the quite different properties that they require if they are to play the role of constituents of the atom.

All of the manifold difficulties that plague the conventional theories of the structure of the atom and the role of the sub-atomic particles are cleared up by the development of the Reciprocal System of theory, which finds that the atom is not a composite of material particles; it is a complex system of rotational and vibrational motions. The particles are similar, but less complex, combinations of motions. They are not constituents of atoms, but incomplete atoms. On this basis, the general nature of the products of the disintegration of an atom is easily explained. By the application of sufficient force, the atom (a complex system of motions) may be broken down into smaller atoms (lesser systems of the same kind), sub-atomic particles (systems of less complexity), photons (vibrational motion), translational motion of any of the atoms or particles that are present, or any mixture of the foregoing. Obviously, the stronger the force that is applied to the disintegration, the greater the degree of fragmentation. The reverse operation, the production of atoms or particles from smaller units or from translational motion is just as readily understandable. It is merely a building up of more complex systems of motion from simpler ones by appropriate processes.

While this clearly constitutes a major change in physical theory, it is nevertheless true that scientific thought has been moving in the direction of such a change. Many prominent physicists have realized that the smallest particle of matter cannot be the ultimate entity of the universe. Heisenberg, for instance, visualizes the ultimate entity as energy. "Elementary particles", he tells us, "are the various forms that energy must assume in order to become matter". But he is vague as to the details. He is only able to say that "these basic forms must in some way be determined by a fundamental law". What the Reciprocal System has done is to crystallize this vague idea into a definite and specific form. It identifies the "fundamental law"; it specifies that the ultimate entity is motion rather than energy, which is merely an aspect of motion; and it identifies both atoms and particles as basic units of matter.

LARSON'S LECTURE PROGRAM

Mr. Larson's next speaking trip into the eastern half of the United States is scheduled for April 1973. Anyone who wishes to inquire as to the possibility of adding another stop to the schedule should get in touch either with Mr. Larson at 755 N. E. Royal Court, Portland, Oregon 97232, or with our headquarters at P. O. Box 223, Watervliet, N. Y. 12189.

THE TEST OF TIME

It cannot be denied that the mental reorientation which anyone accustomed to present-day physical thought must undergo in order to gain a full understanding of the Reciprocal System of theory is a rather formidable task. The underlying basis of the theory is simple enough. Instead of the concept of a universe of matter, upon which all current theory is based, but which is no longer tenable in view of modern experimental discoveries, the new theory substitutes the concept of a universe of motion: a universe in which the basic entities are units of motion rather than elementary units of matter. There can be no question as to the status of this basic concept; it has been recognized for centuries as a reasonable and rational basic hypothesis. Furthermore, there is no doubt but that Larson's explanation of the inability of previous investigators to construct a theory on the "motion" basis is correct. As he brings out in his publications, the fact which previous investigators failed to recognize is that acceptance of the concept of a universe of motion requires a redefinition of space and time.

Up to this point everything is clear and simple. A change in the existing concept of the basic nature of the universe is obviously necessary; the only alternative in sight is the concept of a universe of motion; in order to construct a theory on the basis of this concept we must redefine space and time. But the new definition that is required -- the definition that is implicit in the definition of motion itself -- involves a general reciprocal relation between space and time, and this relation has some consequences that are so foreign to present-day thinking that they are difficult to grasp, however logical and rational they may actually be. It is quite understandable, therefore, that many persons feel that they should have some kind of assurance that the new system of theory is a sound scientific product before they spend the time and effort that are necessary in order to arrive at their own appraisal of its merits.

The point that we now wish to emphasize is that this assurance is provided by the fact that the new theoretical system has met the test of time. First, we note that serious criticism during the dozen years since first publication has been practically non-existent. Neither the many reviews of Larson's books that have been published, particularly in foreign countries, nor the large number of letters of comment that have been received by our organization, have criticized the theory on any substantive issues, nor has anything of more than a minor and incidental character been brought up at the numerous lectures that Larson has given to college audiences. It is particularly

significant that no one has challenged the rigor of the deductive chain of reasoning, inasmuch as the ability of the theory to arrive at conclusions in all major fields of physical science -- all the way from the particles to the quasars -- from the same basic premises is, in itself, almost conclusive evidence of the validity of the theoretical system. Wherever criticisms have been offered, they have almost invariably been confined to two points: (1) that the new theoretical system conflicts with existing thought in some areas (which, of course, is not a valid argument. A new theory must be consistent with established knowledge, but it need not be consistent with current beliefs), and (2) that the probability of a far-reaching new physical theory being correct is remote (which, again, is not an argument against the validity of the theory. Indeed, if it were applied generally, it would eliminate all possibility of major theoretical advances).

Another result of the passage of time is that if a theory is sound and logical it inspires some additional work of an interpretive or explanatory character. Obviously, ability to extend, amplify, or explain the original presentation is contingent on understanding the author's line of thought, and the appearance of a work of this nature is therefore, in a sense, a guarantee that the original arguments are comprehensible and reasonable.

For this reason we are pleased to be able to call attention to the availability of a book by Ronald W. Satz entitled The Unmysterious Universe. Inasmuch as many of the recipients of this issue of our newsletter did not see the earlier issue that carried an announcement of this book, we are reproducing it herewith.

Announcing: *The Unmysterious Universe*, An Introduction to D. B. Larson's New Unified General Theory, by Ronald W. Satz. This book is meant as an introduction and a supplement to Larson's work in which the author presents his understanding of the theory. The author does use quotations from Larson's books and letters and relies on them for a more complete discussion in some areas. However, one does benefit from *The Unmysterious Universe* in its independent discussion of many of the difficult concepts unique to Larson's theory, for example the relationship between clock space and co-ordinate space and their dimensionality. Using many diagrams to assist the reader, Mr. Satz has included the completed periodic chart of the material elements, chart of the theoretically allowable matter and anti-matter, the astrophysical consequences of the reciprocity between space and time as manifested in the cycle of the universe, and others. *The Unmysterious Universe* is a concise introduction to Larson's work and as such is ideal to lend friends who wish to know something about Larson's innovation. The 75 page book has an attractive paperback cover and easy to read print. It is available from The New Science Advocates for \$2.25 (includes postage).

To: The New Science Advocates
P. O. Box 223
Watervliet, N. Y. 12189

Please send me a copy of The Unmysterious Universe, by Ronald W. Satz, for which I enclose \$2.25.

Name _____

Address _____