THE GENESIS OF A NEW THEORY OF MATTER

By Dr Percy Seymour

In 1985 I formulated a new theory of matter. In this article I will outline my reasons for doing so, and I will discuss the positive consequences of the theory for sub-atomic physics, for dark matter and for dark energy.

I have always been proud of the fact that I studied physics at Manchester University. The physics, mathematics and astronomy departments of the university had a character that was very much in keeping with the character of science and technology of the city of Manchester itself. Science was not theoretical science for its own sake; initially the purpose of science was to serve the industrial revolution, so it was practical and focussed on useful results.

Manchester was the place where the industrial revolution started. It was also the world's first atomic city. It was here that John Dalton (1766-1844), a chemist, turned the Greek idea about atoms into a full scientific theory that was to form a new basis for chemistry. It was here that James Joule (1818-1889) established relationships between electrical current, mechanical energy and heat. It was here that Ernest Rutherford (1871-1937) supervised experiments that established that the atom consisted of a dense central nucleus surrounded by orbiting electrons. Niels Bohr (1885-1962), the Danish physicist, came to England to work under J J Thomson, Cavendish Professor at Cambridge University, but the two men had a personality clash, so he went to Manchester to work with Rutherford. It was here that the Rutherford-Bohr model of the atom was first conceived. As an undergraduate at Manchester University I work at the very bench that Geiger and Marsden, two students of Rutherford, carried out the experiment which Rutherford used to establish the existence of the atomic nucleus.

It was not only in the physics department where experiment and practical considerations formed the basis of the theories that were developed. Even the mathematics department concentrated largely on problems in engineering, fluid mechanics and aerodynamics.

In my undergraduate course in physics I was introduced to the mathematical precision of the theories of relativity and quantum mechanics, including the initial stages of relativistic quantum mechanics. However, for my post-graduate studies in astronomy I worked on the role of magnetic fields in astronomical objects. The contrast between the two areas of research was vast. The problems concerning the

interactions between magnetic fields and gas motions in cosmic situations were so complex that the majority of them did not lend themselves to rigorous mathematical solutions. Although applied mathematicians had given substance to the pressures and tensions that Michael Faraday had conceived to be associated with magnetic lines of force, most of the problems encountered when working on magnetic fields in a cosmic context could only be dealt with by approximate methods. This was not just due to academic or technical difficulties; it was inherent in the very nature of the problems.

In physics such problems were called non-linear. The general area of astronomical research, which involves the linking up of the mathematical equations of electromagnetism with those of gas dynamics or hydrodynamics, is called cosmic electrodynamics. This area of research tells us that the flow of the fluids alters the structure of the magnetic fields and this in turn alters the flow of the fluids, so we can only proceed by successive approximation.

Although most of my research and teaching since I left Manchester in 1972 has been concerned with astronomy and astrophysics, I still tried to keep abreast with developments in other areas of physics. However, I was uneasy about the way sub-atomic physics was going. I was uncomfortable with the quark theory of matter, and when string theory came along I was even more uncomfortable, especially as it involved spaces of more than four dimensions.

Ever since my first introduction to neutrons, protons and electrons I was struck by the fact that although the proton was almost 2 000 times more massive than the electron, the electric charge on the two were exactly equal in magnitude, but opposite in sign! While, as a post-graduate, in was attending lectures on cosmic electrodynamics in the department of mathematics at Manchester University (given by Professor Leon Mestel, who is a world authority magnetic stars) and lectures on magnetic fields in astronomy (given by the late Professor Franz Kahn, a world authority on the interstellar medium) I had an idea about how the neutron might decay to give a proton, an electron and a anti-neutrino. The image that I conceived was that this neutron decay was similar, in some respects, to the formation of a loop prominence and a sunspot pair on the Sun. It was several years before I could take this idea further.

The central feature of my theory is the concept of lines of force. In this theory there are no particles, only three kinds of space and electric lines of force. What we normally call particles are “compactified” bundles of lines of force wound up in the form of ‘yarns of wool’. The electrical energy in these ‘balls of yarn’ give the particles their masses according to Einstein’s formula $E = mc^2$. In *ordinary space* these lines will go from a proton to an electron, but in *plasma space* the lines of force

go back from the electron to the proton in very thin braided ropes that are encased in sheaths of *insulating space*. The sheaths of insulating space are elasticated, so they behave like stretched elastic tubes or like spiral springs. Their stretching means that they have energy stored in them. At the atomic and sub-atomic level the main consequence of these encased ropes of electric lines of force give rise, when we are dealing with large numbers of protons, neutron and electrons, to a criss-crossing web which can push particles around, thus giving rise to the 'quantum noise' of the universe. On the scale of galaxies and clusters of galaxies the many billions upon billions of these ropes, and the tension in the sheaths surrounding them, give rise to an additional attraction between vast masses of particles. It is this additional attraction which we call 'Dark Matter'. The energy contained in the web itself gives rise to additional mass which is another component of dark matter. On the cosmological scale the braiding begins to 'unbraid' as the cosmic net expands and the lines of force within the sheaths of insulating space become more and more parallel to each other. The tension, or negative pressure, in the elasticated sheaths will increase as the universe expands and this, in the context of the General Theory of Relativity, will give rise to the accelerating expansion of the universe. This is what we call 'Dark Energy.'

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