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Nobel winners overlooked results that break rules of particle physics

by Giuseppe Filipponi

If any merit is to be attributed to the Italian physicist Carlo Rubbia and the Dutchman Van der Meer, who recently were awarded the Nobel Prize, it is for initiating and developing the equipment and laboratories suited to study anti-matter physics, using the relatively scarce resources and obsolete machines at Geneva's CERN (Centre Européen de Recherches Nucléaires).

At CERN, in fact, the two physicists were able to put together a series of accelerators and accumulation rings for anti-protons which are quite efficient, partially using machines that were built at the end of the 1960s and are therefore today obsolete.

Antiprotons at CERN are created by colliding beams of protons at modest energies (10 GeV); they are then channeled into an accumulation ring and their trajectories moved closer and "cooled" to form a thin and coherent beam that is then accelerated at the very high energies of the Super Proton Synchroton (SPS), adapted to the job, and frontally collided (still in the SPS), with a similar such beam of protons rotating in the opposite direction.

The idea of the two, Rubbia and Van der Meer, is in itself simple: "The two beams running at almost the speed of light in the SPS, by frontally colliding create the conditions by which protons and antiprotons arrest and annihilate themselves, and therefore the kinetic energy of particles is added to the trasformation of mass into energy. In very small spaces (dimensions of a nucleus) a large amount of energy is made available, equivalent to several hundred times the mass of a proton, and the transformation of this energy into heavy particles of equivalent mass can be proved."

Of a total of billions of collisions, only some seem to have produced evidence of the ephemeral presence of such particles, called W (+), W (−) and Z (zero).

It seems, however, that there has been no reticence in revealing to the scientific community such a "discovery." Physicists Glaschow, Salam, and Weinberg had already been awarded the Nobel Prize several years ago because of the formulation of the so-called "electro-weak" theory, tending to the "great unification" of the forces of nature, predicting the existence of such particles. The experiments at CERN therefore were immediately considered as proving the correctness of that theory. We ask ourselves: If such experiments had been considered as negative, could we today take back the Nobel Prize wrongly awarded to Salam and his colleagues?

Knowing how things go in such circles, we can say that the results of Rubbia's experiment had already been decided in advance.

Challenge to so-called laws

It is anyway interesting to observe that in such kinds of experiments, where very high and very dense energies are involved, several so-called fundamental laws of physics, in particular the law of conservation of energy, are challenged. That is what happened once again in Rubbia's experiment.

We think that this fact, judged as secondary in the experiment, is in reality much more important than the ephemeral appearance of particles W and Z out of millions and millions of collisions.

In the area of collision of the two beams, in fact, on one side a cone of very dense particles is created, while on the other side nothing comes out, although according to the principle of conservation of energy something should be found.

Phenomena in which the laws of conservation are not respected are not new in the field of nuclear physics and particle physics. Suffice it to mention the "beta decay" phenomenon of the nuclei, associated with weak interaction and therefore with the so-called megaparticles of CERN, according to Salam's theory.

As is known, the balance of the beta decay is not respected, and therefore the existence of a particle called "neutrino" has been introduced, to even out accounts. Even the neutrino, later, many claimed of having found evidence of. At present, it seems that a name has already been found for the missing particle in the collision between the two beams of protons and antiprotons: the so-called "mystery" particle.

The present scalar conception of energy used in physics is evidently not adequate to deal with phenomena occurring at high energy densities. These phenomena are characterized

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by nonlinear processes that we can define as generation and self-organization, forming stable and more complex systems, able to use and transform the energy flux at their disposal.

The beta decay, for instance, is today considered in a very reductive way: Practically the thinking is that a neutron, emitting an electron, turns into a proton, and in addition, gamma radiation and other things are produced. In reality, Enrico Fermi, the Italian scientist who first built the atomic pile in 1946, had much more advanced ideas, not based on the concept of a simple "division" of the neutron into a proton and an electron. He assumed an action carried out by the neutron on itself to transform itself, producing such a concentrated energy, beyond the gamma rays, as to generate an electron. In other words, the electron does not decouple from the neutron but is produced by the work done by the neutron to turn into a proton.

So-called elementary particles, too, therefore, seem not to be at all elementary, but turn out to be complex systems able to transform themselves and do work.

Instead of trying to rationalize physical processes where, as we have seen, the laws of conservation of energy are not respected, by inventing "ephemeral" particles, it would be much more useful to start from the acquired fact that such a law is no longer respected and revise therefore the concepts of energy and work used in physics, reformulating them in such a way that they are coherent with the evolution and self-organization aspects, more and more evident in such processes.

It is worth recalling, in this context, that the Italian school of physics, developed in the middle of the last century at Pisa University by figures like Prof. Enrico Betti and Felice Beltrami with the contribution of the great German physicist Bernhard Riemann, developed the fundamental principles of electrodynamics exactly from this standpoint, in an overt polemic against Maxwell's mechanistic conceptions.

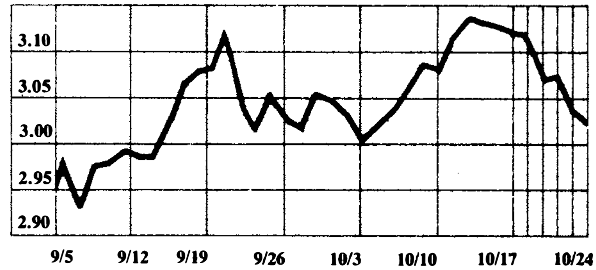
Betti and Beltrami in particular concentrated their attention on those anomalous, non-linear "phenomena" of physical processes, describing thus in an accurate way the generation, in an electrodynamic fluid, of helix-like movements that locally increase the flux-density of the system. These self-organizing processes were then revealed and studied in the second half of the present century by Winston Bostick and other scientists in high-temperature plasma physics, and represent an interesting line of research to achieve thermonuclear fusion.

The teaching of those great scientists is clear: We must not be afraid of opening a crisis in theoretical physics, rather the opposite: Science progresses exactly through such revolutions. We have everything to gain from dumping inadequate theories, and if there is today a field of physics where theories cannot hold, this is the field of particle physics.

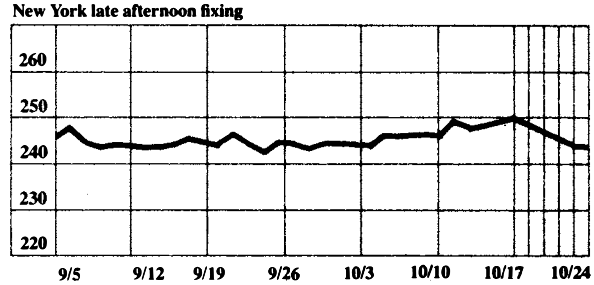
The author is the director of the Italian Fusion Energy Foundation.

Currency Rates

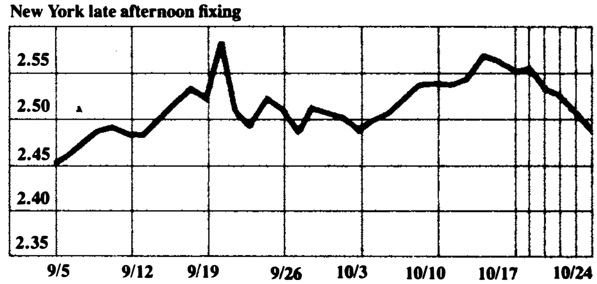
The dollar in deutschemarks
New York late afternoon fixing



The dollar in yen
New York late afternoon fixing



The dollar in Swiss francs
New York late afternoon fixing



The British pound in dollars
New York late afternoon fixing