

BIBLIOGRAPHY

PACS number: 01.30.Vv

The Theory of Physical Vacuum. Theory, Experiments, and Technologies by G I Shipov

DOI: 10.1070/PU2000v043n03ABEH000758

Shipov G I *The Theory of Physical Vacuum. Theory, Experiments, and Technologies* (Moscow: Nauka, 1997) 450 pp.

Studies on the structure and properties of physical vacuum are certainly a key issue of fundamental physics. The vacuum structure is in many respects responsible for the properties of elementary particles and their interactions; its understanding is indispensable for the description of such phenomena as radiation effects in quantum electrodynamics (the Lamb shift, the anomalous magnetic moments of the electron and muon), colour confinement in quantum chromodynamics, spontaneous symmetry breaking in the physics of electroweak interactions, the massiveness of W- and Z-bozons, etc. No wonder, problems related to physical vacuum structure attract the attention of many serious theoretical physicists interested in field theory and particle physics.

Regretfully, the complexity of these problems provokes publications which are claimed by their authors to contain epoch-making ideas but are actually filled with speculative conclusions which have nothing to do with reality. To make things worse, they teem with blunders and ignorant allegations and are of no scientific value whatever.

The book by G I Shipov is announced as a ''detailed exposition of ideas and principles underlying the theory of physical vacuum'' suggested by the author. Apart from other things, this 'theory' constitutes the basis for notorious activities in support of the torsion field and torsion interaction concepts. At first sight, the book looks like a fundamental volume. It has been published by the Nauka Publishing House, Moscow for which the manuscript was reviewed by R N Kuz'min and A A Rukhadze, both doctors of physico-mathematical sciences; the book contains a dedication, foreword, a long list of bibliographical records, and other outward attributes of a serious monograph. Equally misleading are the pseudoscientific terminology (the 'principle of overall relativity' — is this not fascinating?), the use of geometric constructions known from the literature, and a large number of formulas. G I Shipov is anything but modest when he states in the Introduction that, in his opinion, ''the problem of constructing a unified field theory has been resolved in the theory of physical vacuum''. Another show of exorbitant pretensions by the author is the list of fundamental equations of physics on p. 25 which includes, alongside the Newton, Maxwell, Einstein, Shrödinger and Dirac equations, the new Shipov – Einstein (!) equations and three more equations derived by G I Shipov.

What is behind all this? The real value of the book is best of all illustrated by the following example. In Section 3.8.1, the author says that torsion interactions take place even in classical mechanics, while Section 3.12 describes a mechanism called a 'four-dimensional gyroscope with self-interaction' which imparts acceleration to the centre of mass by the action of internal (!) forces. In other words, G I Shipov, like baron Münchhausen, has found a means to draw himself from the bog. Only he proposes to accomplish this task by swinging his arms in a peculiar way instead of pulling himself by the hair. Most surprisingly, he arrived at this possibility in the framework of Newtonian mechanics where the momentum conservation law for closed systems is invariably and exactly fulfilled, as is known from the school physics course. However, this does not seem to confuse the author. Far from suspecting an error in his arguments [1], he first (Section 4.6) presents 'experimental evidence' of momentum non-conservation in mechanics and then (pp. 295, 296) draws a glowing picture of travelling by a new type of conveyance equipped with a 'torsion propelling device': such a vehicle ''will have no wheels, wings, propellers, jets, screws, or any other devices'' and thus will need no ''engine starters, runways, airports''. Hence, there appears ''a theory-experiment-technology-commercial product chain'' with one of the branches of ''torsion technologies'' based on ''a new phenomenon unknown to orthodox science'' (the quotations are from the Introduction).

Unfortunately, this is not the sole example. According to G I Shipov, the neutron is the bound (of course, by torsion forces) state of a proton and electron (p. 184). He seems to be totally ignorant of the fact that physicists have been convinced of the impracticability of such a model for more than half a century now.

There is one more example. Following Ya P Terletskiĭ, G I Shipov states on pp. 149 and 150 that for each positive mass particle, e.g. an electron, there is a particle with negative mass and opposite sign, and that quadruplets of particles (electron, positron, and their partners with negative masses) can be created from vacuum in the absence of external impacts. Setting aside inner contradictions in such a 'theory', the existence of electrons with negative mass would be in conflict with the results of direct experiments and measurements of radiation effects in quantum electrodynamics.

Here is a 'proof' that a change of space geometry in the case of rotational motion (''unlike Lorentz shrinkage'') 'is observed' at low rotational velocities (!): ''Let us imagine a rubber disk with a Cartesian coordinate grid. Let the disk now rotate about the axis through its center. In consequence of disk rotation, the grid will look distorted'' (p. 93). G I Shipov uses this argument to show that ''A Einstein's approach to the

Uspekhi Fizicheskikh Nauk **170** (3) 351 – 352 (2000)
Translated by Yu V Morozov

[1] That there is an error is easy to see. I asked a few tenth-year schoolchildren at one of the physico-mathematical schools in Moscow to find the error and they quickly coped with the task.

space geometry of events associated with rotational motion is unacceptable''. Do you need any comments?

More examples of this sort are ready at hand: in fact, the book abounds with them. Therefore, the reader of this review can easily form an opinion of what kind of contribution 'the fundamental equations of physics' discovered by G I Shipov make to science. Nevertheless, let us turn to the very first of these 'discoveries', viz. 'the equations of geometrized electrodynamics'. Outwardly, they resemble the Einstein equations in the general theory of relativity, but G I Shipov considers the new metric tensor (to be precise, its deviation from the Minkowski tensor) as 'the potential of the electromagnetic field' which, naturally, 'turns out to be a rank II symmetric tensor' (rather than a vector, as in conventional electrodynamics). The author shuts his eyes to the facts that in such a theory the photon has the wrong spin 2, charges of the same sign are attracted, etc. True, he recognizes that the equations of electrodynamics must coincide with the Maxwell equations, at least in a certain limit. Therefore, he tries to show on pp. 169 – 174 that the conventional formulas of electrodynamics are restored in the limit of weak fields and nonrelativistic speeds of charged particles. However, it is easy to see that his line of reasoning is simply erroneous.

I think there is no need to discuss the remaining three systems of 'fundamental equations of physics'. Indeed, they are the products of the author's fantasy having nothing to do with reality.

Looking through the volume, I failed to find any sound statement or formula belonging to G I Shipov. The results of other authors are not infrequently misrepresented [e.g. the allegation of antiparticle (positron) negative energy in the Dirac theory on p. 288, to cite but one of the many examples]. The book can by no means be considered as targeted ''at specialists in theoretical physics, higher school teachers, undergraduate and post-graduate students, and all those interested in new physical theories, experiments, and technologies''.

The book by G I Shipov would possibly deserve no review in *Uspekhi Fizicheskikh Nauk* if it were not for one attendant circumstance. He and his followers actively popularize his 'theory'. It is not infrequent that students (including those studying mathematics and physics) of respectable universities ask questions like ''Do torsion fields really exist? Why are they not described in textbooks?''. This 'theory' and experiments which allegedly confirm it find supporters probably tempted by promises of 'supermodern and highly effective technologies' (see p. 26). From time to time, they are mentioned as such in the mass media, to the detriment of science and education.

To conclude, here are a few words about torsion fields. The possibility for massless or light torsion fields to exist in nature has long been discussed in the scientific literature [2]. However, their interaction with matter must be extremely weak if they exist at all. This inference is confirmed by the results of direct experiments designed in the quest for potential effects attributable to torsion fields (to date, they have yielded no positive evidence), by indirect evidence (e.g. comparison of measured anomalous magnetic moments of the electron and muon with those predicted by quantum electrodynamics), and by astrophysical limitations. Specifically, the available experimental findings totally exclude the possibility of interaction between torsion fields and electrons with an intensity equalling $10^{-2} - 10^{-3}$ of that of the electromagnetic interaction (such an intensity is 'predicted' by G I Shipov on p. 194 of his book). It is also easy to see that the existing experimental and astrophysical limitations exclude the possibility of generation and detection of torsion fields with instruments like 'Akimov's torsion generators' and similar apparatuses described in Section 4.4. of the book. Certainly, 'orthodox science' is not to blame for that. The thing is that any hypothesis of new fields and interactions must take into consideration the entire collection of available experimental facts. This sole approach to be used by serious physicists is totally neglected by G I Shipov and his associates.

V A Rubakov

[2] Anticipating unfair citation, I request that this paragraph be quoted only in full.