SCIENCE AND DIAMAT


The book by Hörz et al. is a translation of their *Philosophische Probleme der Physik* (VEB Deutscher Verlag der Wissenschaften, Berlin, GDR, 1978); that of Omelyanovsky is a translation of his *Dialektika v sovremennoi Fizike* (Izd. 'Progress', Moscow, 1977).

*Philosophical Problems in Physical Science* is the result of a collaboration of five East German philosophers of physics and pedagogues for a course for preparing scientific investigators and science teachers to understand the diamat foundations for scientific research methodology and the teaching and understanding of physics. It seeks specifically to elucidate the complex “relationship between Marxist—Leninist philosophy and the natural sciences in general and physics in particular”, while retaining sight of the “unity of the Marxist—Leninist world view” (p. 13).

The fundamental aim in the first part of this enterprise is to show how, on the one hand, the results of scientific discovery in twentieth century physics confirm the correctness of diamat, and, on the other hand, how application of the categories of diamat to the basic problems in physics leads to clarification and resolution of these problems. The discussions here tend to be both highly technical and methodological. Considerable space is devoted to problems arising towards the end of the nineteenth century, with the collapse of mechanistic materialism as an explanation for micro-physical phenomena, and in the early years of the twentieth century, with the rise of the statistical interpretation of quantum phenomena. There are two things happening that helped produce this change.
The discovery of microphysical entities, which could not be explained in mechanical terms, naturally led to the slow demise of mechanistic materialism. While Newtonian mechanics produced a clear growth in maturity of the physical sciences and, incorporating the Galilean laws of motion, unified terrestrial and celestial mechanics into one system, it depended upon a classificatory system of physical properties adequate for explanations of the [gross] behavior of solid bodies in the universe. Among the categories that belonged to the classificatory system given by physics in its mechanistic stage, was the *impenetrability* of solids. The discovery of X-rays was a crucial challenge to this understanding of matter. Let us remember that, in the days of Engels and Lenin, the electron was the only element of the structure of matter known; the atomic theory of Rutherford was closer to that of Dalton than to that of Bohr. That is, the structure of the atom, in all its complexity, was as yet unknown. Hence, it was still reasonable to assume the category of *impenetrability*. Both Engels and, later, Lenin, while not rejecting specifically any one particular category among the list of categories belonging to mechanistic materialism, already cautioned against confusing metaphysical categories or properties with the dialectical categories of the behavior of matter. Thus, the authors suggest that, while Engels and Lenin were tied into the concrete stage of physical knowledge of their own day, they, unlike the mechanistic materialists among the physicists (and philosophers) of their day, could provide explanations, or better, philosophical generalizations, to serve as the foundation of an increasingly refined — dialectical — materialism. The dialectics of nature and cognition are such that dialectical materialism, as the philosophical foundation of scientific knowledge, could dialectically grow along with the dialectical growth of nature and cognition. Thus, when the challenge of scientific discoveries, such as the discovery of X-rays, led to a crisis in physics as a result of the understanding of its philosophical foundation in mechanistic materialism, the dialectical materialists were not forced, like some mechanists, into an idealism such as Machian positivism. The diamat theoretician, rather than worry about the mechanistic or metaphysical properties of matter, properties adequate for description presumably of solid bodies but not for atomic structures, could instead employ the dialectical property of *interactions*, or the *relationships* among material objects. If “in physics it is not objects as such, but objects in their relationship to other objects, that is, in their law-governed connections, that are the subject of investigation” (p. 73), then the problem which the discovery of