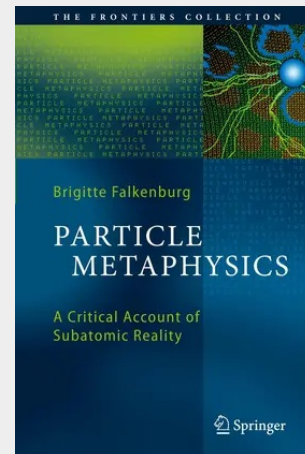


Particle Metaphysics

A Critical Account of Subatomic Reality

The successes of atomic, nuclear and particle physics have not banished controversy regarding the constitution of matter. This book analyzes the debates by exploring the particle concept in physics. Are the particles of modern physics "real" or "virtual," their existence conjured through the careless application of abstract theories? Are philosophers who debate "scientific realism" clinging to a problem long ago solved by physicists? These questions are far from settled, because, with the introduction of quantum theory, physical science no longer possesses a reliable particle concept. Scientists and philosophers interested in the "true meaning" of physical concepts will find this book informative and thought provoking.

Metaphysics, with which, as fate would have it, I have fallen in love but from which I can boast of only a few favours, offers two kinds of advantage. The first is this: it can solve the problems thrown up by the enquiry of mind, when it uses reason to spy after the more hidden properties of things. But hope is here all too often disappointed by the outcome. And, on this occasion, too, satisfaction has escaped our eager grasp. [...] The second advantage of metaphysics is more consonant with the nature of the human understanding. It consists [...] in knowing what relation the question has to empirical concepts, upon which all our judgements must at all times be based. To that extent metaphysics is a science of the limits of human reason.[...] Thus, the second advantage of metaphysics is at once the least known and the most important, although it is also an advantage which is only attained at a fairly late stage and after long experience. 1 Immanuel Kant The tradition of the particle concept goes back to traditional metaphysics and ancient philosophy. The idea that matter is made up of microscopic constituent parts stems from ancient atomism. At the very beginnings of modern physics, it was taken up by Galileo, Descartes, and Newton. Newton thought that there are atoms of matter and light, but with the methods of Newtonian mechanics and optics they were beyond the reach of experiments.



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