

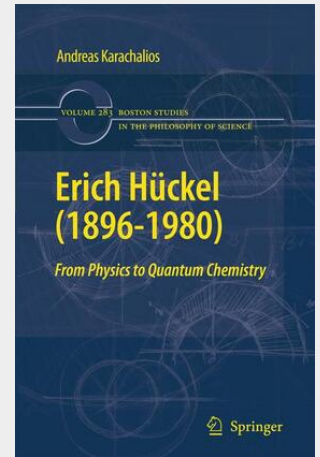
Karachalios

Erich Hückel (1896-1980)

From Physics to Quantum Chemistry

Emerging disciplines in the border zone between physics and chemistry have attracted the attention of historians of science particularly in the last 20 years. Quantum chemistry, as an offshoot of theoretical chemistry, has recently acquired some importance in the history of chemistry. It is the product of close cooperation. Cf. Hiebert, E.: Discipline Identification in Chemistry and Physics, in: *Science in Context*, 9(2) (1996), 93–119; Nye, M. J.: *Physics and Chemistry: Commensurate or Incommensurate Sciences?* in: *The Invention of Physical Science, Intersections of Mathematics, Theology and Natural Philosophy since the Seventeenth Century – Essays in Honor of Erwin N. Hiebert*. Kluwer Academic Publishers, Dordrecht 1992; *From Chemical Philosophy to Theoretical Chemistry: Dynamics of Matter and Dynamics of Disciplines, 1800–1950*. University of California Press, Berkeley 1994; Servos, J. W.: *Physical Chemistry from Ostwald to Pauling, the Making of a Science in America*. Princeton University Press, New Jersey 1990; *Chemical Sciences in the 20th Century: Bridging Boundaries*, edited by Carsten Reinhard. Wiley-VCH, Weinheim 2001 (incl. a comprehensive bibliography). In an earlier article I point out that the term “quantum chemistry” [Quantenchemie] first appeared in 1929. To my knowledge it was coined by the physicist Arthur Haas. Talks he had delivered before the Viennese Chemico-Physical Society in the spring of 1929 are assembled in his book: *Die Grundlagen der Quantenchemie: Eine Einleitung in vier Vorträge*. It was published by the Akademische Verlagsgesellschaft in Leipzig.

This study, the first comprehensive account of Erich Hückel's career, examines his scientific work as well as his importance for the emergence of quantum chemistry as an independent discipline in Germany during the 1930s. Hückel began his career by studying quantum physics in Göttingen, but his background in chemistry led him to take up pioneering research on the physics of chemical bonding. Drawing on a variety of sources, Andreas Karachalios offers a probing account of fast-breaking developments in quantum theory that paved the way for Hückel's research. In Göttingen and later in Leipzig, Hückel interacted with leading figures not only in quantum physics and physical chemistry but also with others in nearby fields, including organic chemistry and mathematics. During his later career in Marburg, Hückel clashed with Linus Pauling over the properties of the benzene molecule. In order to appreciate this controversy, Karachalios gives a brief account of the mathematical formalism of spin invariants, with both Hückel and Pauling used in their analyses, though with different interpretations. This serves not only to clarify their differences but also to illustrate the importance of the quantum-mechanical theory of resonance for chemistry at this time.



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