

Sommerfeld's Munich Quantum School

Michael Eckert

Deutsches Museum

Abstract:

Although no history of quantum physics fails to mention Arnold Sommerfeld as one of its major architects (Bohr-Sommerfeld-model, Sommerfeld's fine-structure constant), Sommerfeld's role as founder of a quantum school is seldom treated more than in a cursory manner. In my presentation I will sketch the rise of this "nursery of theoretical physics"--as Sommerfeld himself called it, from a biographical perspective. Sommerfeld perceived theoretical physics rather late in his career as his true calling. His upbringing and early affiliation with mathematics rather than physics disposed him to embrace a broad range of research subjects from a variety of mathematical, physical and even engineering contexts. This is reflected also by Sommerfeld's pedagogical activity. His "nursery" did not start out as a quantum school. At the time of the First Solvay Congress in 1911, when Sommerfeld proclaimed Planck's quantum of action as the basis upon which atomic theory should be based, his school was not yet dedicated to particular specialties--not to speak about quantum or atomic theory. Even a decade later, when he spread the gospel of the quantum with his popular textbook *Atombau und Spektrallinien*, he covered the entire spectrum of theoretical physics. Although quantum theory assumed an ever growing importance, Sommerfeld did not subordinate his institute entirely under the primacy of the quantum.

By the same token it would be difficult to discern certain epistemological pillars as the fundament of Sommerfeld's quantum school. His early atomic theory may be characterized as deductive, but by the 1920s, with a host of spectroscopic material that awaited theoretical explanation, he advocated an inductive approach. Sommerfeld displayed an epistemic opportunism rather than one or another method of theorizing. It is also important to note that Sommerfeld's research goals, his academic posture and the pedagogy which he displayed in his institute were a matter of change throughout his career. The biographical perspective allows to account for such changes which are often subtle and might be ignored or misinterpreted without an in-depth view into Sommerfeld's life--private, intellectual and otherwise. Only from this biographical background will it become plausible how Sommerfeld could raise in his nursery such different quantum physicists like Peter Debye, Wolfgang Pauli, Werner Heisenberg and Hans Bethe--with subjects ranging from "purest" basic principles on the one extreme to "dirty effects" of solid state physics (to quote Pauli) on the other.