

Allgemeines Physikalisches Kolloquium

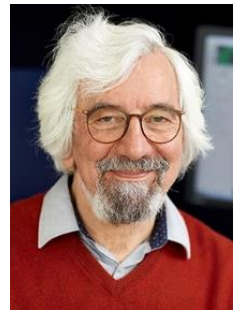
Donnerstag, 14.11.2019 um 16 Uhr c.t.



Hittorf Lecture

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Development of novel electron optical systems for the Advancement of Electron Microscopy

Already 1868 Hittorf reported the observation of the effect of a magnetic field on an electron beam – at his time the so-called “negative light” of a discharging tube. About 50 years later Louis de Broglie stated in his PhD-Thesis in 1924 the dualism of waves and particles and, hence, in 1931 the electron microscope was invented by Ernst Ruska. With the development of the electron microscope a new field in physics was born: electron optics. The first book on Electron Optics was already published by Brüche and Scherzer in 1934 (Geometrische Elektronenoptik) and since this time this field has seen many exciting developments and a dramatic evolution of advancements in Electron Microscopy.

In this time, the resolution improved from sub-micrometer to sub-Ångstrom. Accompanied with these developments were the theoretical and experimental achievements. For example, already in 1936 Scherzer published the impossibility of compensating the most dominating aberrations in electron microscopy, the spherical and chromatic aberration, by a combination of round lenses. It took again about 60 years to overcome these limitations. In the talk it will be explained how these achievements over the last decades could be attained and examples of the current state of instrumentation for high resolution electron microscopy will be shown.