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### **Einstein's Revolutionary Light-Quantum Hypothesis**

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The paper in which Albert Einstein proposed his light-quantum hypothesis was the only one of his great papers of 1905 that he himself termed “revolutionary.” Contrary to widespread belief, Einstein did not propose his light-quantum hypothesis “to explain the photoelectric effect.” Instead, he based his argument for light quanta on the statistical interpretation of the second law of thermodynamics, with the photoelectric effect being only one of three phenomena that he offered as possible experimental support for it. I will discuss Einstein's light-quantum hypothesis of 1905 and his introduction of the wave-particle duality in 1909 and then turn to the reception of his work on light quanta by his contemporaries. We will examine the reasons that prominent physicists advanced to reject Einstein's light-quantum hypothesis in succeeding years. Those physicists included Robert A. Millikan, even though he provided convincing experimental proof of the validity of Einstein's equation of the photoelectric effect in 1915. The turning point came after Arthur Holly Compton discovered the Compton effect in late 1922, but even then Compton's discovery was contested both on experimental and on theoretical grounds. Niels Bohr, in particular, had never accepted the reality of light quanta and now, in 1924, proposed a theory, the Bohr-Kramers-Slater theory, which assumed that energy and momentum were conserved only statistically in microscopic interactions. Only after that theory was disproved experimentally in 1925 was Einstein's revolutionary light-quantum hypothesis generally accepted by physicists—a full two decades after Einstein had proposed it.