



Paul Ehrenfest

1880 - 1933

Paul Ehrenfest was a famous Austrian physicist who contributed greatly to the development of statistical mechanics and quantum theory.

In 1905, Ehrenfest, together with his wife, Tatyana Ehrenfest-Afanasyeva, published their famous theoretical papers written for a mathematical encyclopedia. In their monograph, the Ehrenfests brought out the new statistical treatment of gas molecules, and they emphasised the importance of the *ergodic* hypothesis (in which a portion of a process represents the whole) for understanding how the disequilibrium of microscopic particle dynamics may account for the equilibrium of matter on a big scale.

Ehrenfest was one of the first to try to understand the quantum theory that Max Planck had introduced, and explain its significance.

Paul Ehrenfest was born in Vienna in 1880. His father had a successful grocery business and that permitted him to give a good education to his sons. There were five sons in the family. Paul was the youngest. His elder brother, Arthur, had exceptional skills in engineering and he introduced the subject of electronics to Paul. His mother was quite indifferent to her youngest son but his father doted on him and called him 'Meitzerl' (kitten). Paul did not have good health. He grew up at the time of anti-Semitism and very often he was reminded that he was a Jew.

After completing his primary education with excellent marks in 1890, Ehrenfest entered the Akademischen Gymnasium, one of the best in town. In 1899, he enrolled at Vienna Technische Hochschule, where he chose chemistry as his major subject. Soon, after attending lectures by the famous theoretician Ludwig Boltzmann, he became fascinated by mathematics and physics and moved first to the University of Vienna and then to Göttingen. He received his doctorate in 1904 for a thesis on Hertzian mechanics and hydrodynamics.



Alas, as a Jew he suffered persecution



Einstein gave him a fine piano

In 1904 Ehrenfest married Tatyana Alekseyevna Afanasyeva, a Russian student whom he met at Göttingen. Before marriage they both officially renounced their religions. At first they lived in Vienna and Göttingen studying together statistical mechanics. Hoping to find a permanent job, they moved to St. Petersburg, Russia. There, the Ehrenfests founded the theoretical physics seminar which was to provide such a good training for young physicists. In spite of the fact that Ehrenfest was very well regarded by Russian scientists he had no regular employment and he began to look for work in Europe. As a result he was appointed to the chair of theoretical physics in the University of Leiden as the successor to Lorentz, to whom he became deeply attached.

In Leiden he organized a theoretical colloquium which attracted physicists from all over the world. As a lecturer, Ehrenfest was unique. He devoted himself to his students. They called him 'Uncle Socrates'.

Ehrenfest was quite a good pianist and very often accompanied Einstein who played the violin. In his office stood a piano presented by Einstein. He was happily married. He loved his two daughters and admired his eldest son who showed unusual ability in physics, but he worried very much about his youngest son who was incurably ill.

In spite of success in research and teaching Ehrenfest suffered from depression because he felt his work did not rise to the required standard. Nothing helped him, neither music nor travelling.

Tragically, in 1933 he killed himself.

S.E.



St. Petersburg.