## Schrödinger's Equation

In 1926, Schrödinger published an equation that would alter the path of the development of science. Schrödinger introduced a quantum wave function $\psi(r,t)$ and his equation that deterministically predicts the time evolution of $\psi(r,t)$ from the Hamiltonian of the system in the following manner:

$$i\hbar\frac{\partial}{\partial t}\psi(\mathrm{r},\mathrm{t}) = \mathrm{H}\,\psi(\mathrm{r},\mathrm{t}). \tag{1.1}$$

Schrödinger's equation would be used to help visualize physics by utilizing the wave function, $\psi(\mathrm{r},\mathrm{t})$. The equation was quickly applied to the hydrogen atom and found to successfully represent the atomic orbitals, and the energy differences corresponded to the energy of the photon emitted or absorbed when an atom made a transition between orbitals.

Schrödinger visited Bohr and Heisenberg in Copenhagen in 1926. Bohr and Schrödinger argued over whether or not Schrödinger's equation could be used alone to explain all phenomena. Bohr believed that ultimately such a deterministic and causal equation could not account for black body radiation, which historically utilized a nondeterministic or statistical approach in order to take into account individual quantum events. These issues are further elaborated in Chapter 5.