The Schrödinger Equation

Devised by physicist Erwin Schrödinger in 1926, the Schrödinger equation is at the heart of quantum physics. Among the profound implications of quantum theory is that you can never simultaneously know both the exact location and the exact velocity of a particle. Instead, it turns out, you can only know the *probability* that a particle is somewhere—a probability defined by what is called the particle's wavefunction, symbolized by the Greek letter psi (ψ). The Schrödinger equation describes how such a wavefunction changes over time—thereby describing the behavior of that particle.

Quantum mechanics may not seem to apply to our macroscopic world; you don't need a wavefunction to represent the location of the magazine you're holding, for instance. But quantum effects can still manifest themselves in our everyday lives. For example, it is thanks to the properties of quantum mechanics that certain materials act as superconductors (which are useful for things like MRI machines and particle accelerators) and other materials act as semiconductors (on which nearly all of our electronics are based). Physicists are even trying to exploit quantum mechanics to create new types of superfast computers. (See "What Is a Quantum Computer?" on page 20.) —*MW*