Is Common Sense Science Needed? [CSS claims that] "The foundation of a rational theory is cause and effect. In a rational theory, everything happens for a reason and not just by chance." [I say] That is most certainly an unwarranted assumption, *i.e.* the square root of -1, and certainly no formal proof has been developed for causality.

[CSS wrote] "Why is Common Sense Science developing new models when Quantum Mechanics (QM) and the Standard Model (SM) of Elementary Particles have been so successful?" [and CSS answers] "The technology we presently enjoy throughout this area of science is not really due to the application of the SM or QM, but is the result of the foundational discoveries in classical electromagnetics by Faraday and the advances in technology that followed." [I say] Evidently no one in your organization has bothered to talk to those working in the field of nanotechnology or MEMS, let alone optics. —Ignacio Jesus Couce

CSS Response to Couce. It seems that you haven't noticed the widespread dissatisfaction among leading physicists when they comment on SM and QM: 1) "*To me, some of what passes for the most advanced theory in particle physics these days is not really science.* When I found myself on a panel recently with three distinguished theorists, I could not resist the opportunity to discuss what *I see as major problems in the philosophy behind theory, which seems to have gone off into a kind of metaphysical wonderland. Simply put, much of what currently passes as the most advance theory looks to be more theological speculation,* the development of models with no testable consequences…. [Burton Richer, former director of the Stanford Accelerator Center and former Paul Pigott Professor in the Physical Sciences at Stanford University, in Reference Frame, Physics Today, page 8, October 2006]. 2) "String theory promised what no other theory had before—a quantum theory of gravity that is also a genuine unification of forces and matter…. But when would it make good on that promise? …Today…the theory known as strings remains a seductive conjecture rather than an actual set of equations, and the non-uniqueness problem has grown to ridiculous proportions…" [Unstrung, Jim Holt, New Yorker, 2 October 2006].

The Standard Model (which insists on a *point-like* electron) cannot be considered successful when it makes incorrect predictions with respect to all four of the fundamental properties of electrons. 1) one unit of charge in a point-like electron would generate an infinite explosive force—not what really happens, 2) the electric fields from one unit of charge on a point-like electron would be *infinite* instead of the finite mass and energy that are measured, 3) the magnetic moment of a point-like particle must be zero instead of the finite moment that is measured, and 4) the angular momentum (spin) of a point-like particle must be zero instead of the finite spin that is measured. The Standard Model ignores these basic issues by assuming a point-like particle intrinsically possesses these properties. This is some of the "theological speculation" that Professor Richer rejects. In contrast, the CSS model of the electron is *a finite size object with properties that relate to its size.*

The most important principle of QM is the postulate of 'chance events' that randomly occur by the *power of nature* (attributed to power inherent in elementary particles and/or power inherent in space). Such an event is called a 'quantum fluctuation,' and examples asserted (unconvincingly) are the tunneling effect, wave-collapse, the lasers, the electron microscope, the Big Bang, and virtual particles that pop in and out of existence in space (where these effects are

real, they are explained by Classical Physics, not QM. The energy added during any quantum fluctuation is supposed to be described by the Heisenberg Uncertainty Principle (HUP) which asserts that $\Delta E \times \Delta t$ is about equal to h (a small number called Planck's Constant), where ΔE represents energy added and Δt represents elapsed time.

The corresponding scientific statement on energy is the 'law of conservation of energy,' which allows *zero* energy to be created by atoms or space and does *not* allow quantum fluctuations. Formal proof for *causality* exists as a consequence of the law of conservation of energy. Conservation of energy is firmly established by empirical evidence, and persistent efforts to make a perpetual motion machine in violation of the conservation law have all failed.

CSS notes that even those who support QM dare not call HUP a *law*, but have named it a *principle*. Empirical evidence for the causality and the conservation law is described and referenced at the CSS website. For example, see the article titled "The Law of Cause and Effect," FOUNDATIONS OF SCIENCE, Volume 7, Number 3, August 2004.

More from Ignacio Couce. For the "Common Sense Science" people I have five words: The Einstein-Podolsky-Rosen effect. Explain that without Niels Bohr.

Another CSS Response to Couce. This is absurd. Einstein, Podolsky, and Rosen were rejecting Copenhagen quantum mechanics, and CSS agrees with them! Paul Wesley found that in the failure of the HUP [see Chapter 6, Classical Quantum Theory, 1996] that "the EPR conclusion is confirmed. The Einstein-Podolsky-Rosen conclusion that the Copenhagen quantum mechanics is either "incomplete" or not "real" is confirmed by the failure of the "uncertainty principle." … If the empirical failure of the "uncertainty principle" had been recognized by EPR (as it should have been), their famous paper would have been quite unnecessary or superfluous" [Wesley].