

## EDUCATION

**More Than E=MC2****Top Physicists Combine Science With Natural Philosophy**

BY PAUL A. BARRA

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A world-class physicist is proposing a new way for Catholic colleges to teach science.

Murray Daw is a faculty member of the Institute for Advanced Physics, an organization dedicated to science education and research that integrates natural philosophy and modern science. Daw says such integration is essential. He says this integration needs deep intellectual study and that scientists should be trained in an integrated way so as to comprehend the full reality investigated by the base science of physics. Otherwise, he said, they will increasingly be divorced from the very starting points of knowledge upon which modern physics depends.

To understand the profound truths of their science, they need to have a firmly anchored base that forms every aspect of their thinking, including the most esoteric math.

"Catholic colleges currently do not have the tools to teach science in a way that builds and supports the foundation, the *preambula fidei*, needed for the Catholic faith," said Daw. "Scientists understand the math but could be embarrassed because they do not understand the deep-seated principles of reality."

Daw is a fellow of the American Physical Society (only 1/2 of 1% of members are fellows) and the American Academy of Arts and Sciences. As professor of physics at Clemson University in South Carolina, he teaches one upper-level course each semester. This year he also taught freshmen physics for the first time in his career. His textbook of choice: a new book called *Physics for Realists*.

"Now I have something to offer them that I didn't have before. Deeper understanding leads to a new and much better way of teaching physics; it makes it more digestible," Daw said.

"Digestible" to this physicist means that students learn the fundamental principles behind the science. Physics majors are usually taught what he calls the "chug and plug" method of memorizing formulas and plugging in values. In Daw's class, they learn that in the physical world there is a cause for every change.

As student Carl Eichert of Maryland said: "This is a lot different from my other physics classes. He explains the math well, but I have to know what the math means."

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**The Search for Truth**

St. Thomas Aquinas taught a robust commonsense approach to truth based in the real world, but he did not have the modern scientific method with its symbols and systemized axioms in the 13th century. This evolved slowly, appearing robustly in the 17th century. The secret to re-establishing science as "a certain knowledge of things in terms of proper causes," as Aristotle expounded, is to integrate Thomistic natural philosophy with modern physics. This means starting with the first principles that every child sees with his five senses. Physicists have essential insights into the nature of things, but they usually cannot express them except in terms of symbolized mathematics.

That is the thinking of Anthony Rizzi, an expert in the field of relativity theory who wrote the textbook Daw uses in his freshman classes.

"Physicists understand what others don't, but can't make it clear and explicit in terms of true first principles," Rizzi said by phone from his director's office at the Institute for Advanced Physics in Baton Rouge, La., which he founded seven years ago.

## Holistic Thinking

Because we do not have first-principle thinking integrated into our way of knowing, we have lost the ground needed for proper thinking, including proper moral thinking. This is the essential cause of our “decaying culture.” This, in turn, can be traced to the failure of modern science, our default way of knowing, to integrate natural philosophy by starting with the generic first principles every child sees, Rizzi said.

“Common sense has been divorced from scientific precision,” he claimed, “and scientific precision has been divorced from common sense.”

Aristotle and Aquinas got these fundamentals right, according to Daw and Rizzi, but nowadays even philosophers don’t always study those two giants of thought.

This lack of an integrated science has serious repercussions for the layperson.

“The public is willing to suspend common sense when listening to scientists because they’re so smart, but the arrogance of scientists is that philosophy has nothing to do with their work, and they think they already know all they need to know. It’s all measurement and mathematics,” Daw said.

Rizzi thinks that as long as science pays off in practical dividends, most non-scientists are willing to follow that thinking without calling into question the implicit worldview that it currently entails.

Because of the lack of integration, most top scientists become atheists. A 1998 study reported by the journal *Nature* found that only 7% of top scientists believed in God, a drop from 1914, when 28% did. Scientism is the belief that the modern scientific method is the first and only method of knowing.

“The modern scientific method cannot answer simple questions such as whether two men should get married, though science in its full sense can answer such questions with certainty. Since scientism is the default mode of thought of our culture, this, for example, explains our lack of agreement in moral matters. To have again at our disposal such broad thinking, we need to again fill out the base science of physics,” Rizzi said.

## Orthodoxy in Science

Daw and Rizzi, who are Catholic, hold that the first-principles approach is essential for secular schools as well as for Catholic colleges. Orthodox Catholic institutions typically conduct strenuous, worldwide searches for the right philosophy and theology faculties, Daw said, but often accept any qualified science teacher they can get.

With the rampant secularization of large and well-known Catholic universities, orthodox schools must become a venue for scientifically bright Catholic students who also value their faith, Daw says. Right now, in his opinion, there is no institution of higher learning in America that offers high-end science training that integrates the first principles that provide the necessary ground for a truly Catholic worldview.

The Institute for Advanced Physics is hard at work to make this integration happen.

*Paul A. Barra writes from Reidville, South Carolina.*

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