

Faculty Facets

David Mermin's whimsical 'boojums' win global approval in physics

BY ALEX KWAN

Lewis Carroll created the boojum in a famous nonsense poem. A century later, Cornell theoretical physicist David Mermin decided that "boojum" was the perfect name for a new phenomenon in low temperature physics. So instead of "softly and suddenly vanishing away," as Carroll described it in "The Hunting of the Snark," the boojum has stuck around in scientific language, thanks to Mermin, who likes to put fun into expositions of physics for scientists and nonscientists alike.

"What first drew me to physics was magic. It came in two varieties: relativity and quantum mechanics," said Mermin, thinking back to age 16 when he first read about relativity and figured out that if you could travel at 99.98 percent of the speed of light, in about four years, you would reach Alpha Centauri, the closest stellar system to the sun.

"But – here was the magic part – you would be only a month older when you got there," mused Mermin.

Joining the Cornell faculty in 1964, Mermin, the Horace White Professor of Physics, was trained in the theory of liquids. Over the years, his academic interests shifted to solid state physics, statistical physics, low temperature physics, mathematical crystallography and quantum computation, but his zeal for trying to explain complex science persisted. His book "Solid State Physics," co-authored with Cornell colleague Neil Ashcroft in 1976 and now a standard textbook, was immediately translated into Polish, Russian and Japanese, and was recently translated into German and French, even though it is now almost 30 years old.

"I wrote the book because Cornell had hired me in the Laboratory of Atomic



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As well as being a physicist, David Mermin is also an accomplished pianist.

and Solid State Physics, and I thought I had better learn something about the field before they discovered I didn't know anything. I always write about physics to make myself understand better, because equations, in a sense, free one from the burden of thinking about the subject," said Mermin, who served as the director of the lab from 1984 to 1990 and was elected to the National Academy of Sciences in 1991.

His fourth book, "It's About Time: Understanding Einstein's Relativity," will appear in bookstores this Fall. Intended to introduce relativity to readers with minimal mathematics backgrounds, the book grew out of a course he taught at Cornell to nonscientists for many years.

But it was the boojum that drew attention to Mermin as a science writer. The story began in 1976, when Mermin was thinking about how so-called anisotropy lines would arrange themselves in a spherical droplet of superfluid helium-3, an unusual phase of matter attained by cooling the rare isotope of helium to near absolute zero. It turned out that a symmetrical pattern of lines, although geometrically simple, is not stable and collapses to form a new pattern. Mermin realized this new pattern could be called a boojum, since it can enable the otherwise stable flow of the superfluid to "softly and suddenly vanish away," just as Carroll described it in the final stanza of his poem:

In the midst of the word he was trying to say,

In the midst of his laughter and glee,

He had softly and suddenly vanished away –

For the Snark was a boojum, you see.

Inspired by the aptness of the name, Mermin had a mission: to make the nonsense word boojum an internationally accepted technical term. Initially, he loaded his conference articles with boojums and hoped others would follow suit. Although some scientists took notice, general acceptance was slow. To make matters worse, there were competing names, such as flower and fountain. Soon Mermin knew it was essential for the boojum to appear in Physical Review Letters, considered the world's most prestigious physics journal. However, the editors were split on publishing the term in their journal. After "lengthy and hilarious exchanges," the word finally was approved, and it became official.

Boojums appeared for the first time in a major scientific journal in 1977 in the context of a superfluid. Several years later, boojums could be found in many other fields of science. The magazine published an article in which Mermin described at

length this adventure in nomenclature. Physics Today then invited him to contribute to the column Reference Frame.

"The columns have to be offbeat, funny and also have to be relevant to physics," said Mermin, who admits it is often difficult to find appropriate topics. "But these columns have made me well known in all fields of physics throughout the world."

His columns mix serious and lighthearted topics and range from criticizing scientific publishing to questioning the origin of the phrase "shut up and calculate" to characterize a certain attitude toward the quantum theory.

After more than 40 years of science writing, Mermin says that a good way to reveal the most interesting facet of a complex piece of physics is to pick a special case and explain it in plain language. "Instead of stating a result in technical terms like spin angular momentum, use a black box that flashes a red or green light," said

Mermin. Among his many awards is the inaugural American Physics Society Julius Edgar Lilienfeld Prize in 1989, which lauded "his remarkable clarity and wit as a lecturer to nonspecialists on difficult subjects."

The physics professor is also a pianist. Two years ago Mermin volunteered to perform in the Cornell concert series Musicians Manqués. "The new director of the Society for the Humanities thought it would be fun to sponsor a series by Cornell amateur musicians, and my teacher has always said I needed this type of experience. So I said, put me in the last concert of the season, so I can have lots of time to practice," said Mermin, who finished his recital with Beethoven's Sonata in F minor, Op. 57. His passion for the piano has encouraged other faculty members and even some of his graduate students to take piano lessons with his teacher, Alton Heinz.

Mermin came to Cornell with his wife, Dorothy, a former chair of Cornell's English department and now emerita. After retiring next July, he looks forward to working harder on the piano and helping out in the garden. He also plans to write a book on quantum computing for computer scientists – yet another attempt to take on the challenge of explaining a field of physics to readers with no training whatsoever in the discipline.

Alex Kwan is a writer intern with the Cornell News Service.

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– David Mermin