

Superstrings and Thelma

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Several years ago I was a graduate student at the University of Chicago. I was working on my doctorate in physics, about possible ways to test superstring theory, when my brother in Tulsa died suddenly from a heart attack. Both parents had earlier passed away. After the funeral I drove past my past, marveling at the enormous changes that had taken place since I grew up there. I drove by the red brick building, now an enormous warehouse, that had

once been Tulsa Central High. My grades in history, Latin, and English lit were low, but I was good in math and had a great physics teacher. He was mainly responsible for my majoring in physics after a scholarship took me to the University of Chicago.

While I was having dinner at a popular restaurant on the corner of Main and Sixth streets, the waitress stared at me with a look of surprise. “Are you Michael Brown?”

“That’s me,” I said.

She smiled and held out a hand. “I’m Thelma O’Keefe. We were in the same algebra 101 class.”

We shook hands.

“You won’t remember me,” she said. “I was fat in those days, and shy, and not very pretty.”

“That’s hard to believe,” I said. “You look gorgeous now.”

“Well, thank you, kind sir,” she said,

smiling. “You were a whiz at algebra. Do you remember when you caught Mr. Miller in a mistake he made on the blackboard, and how embarrassed he was?”

“I remember. He was a miserable teacher. I think he hated math.”

“I know / hated it,” Thelma said.

“I’m sorry to hear that. Math can be exciting and beautiful when it’s taught properly.”

After Thelma brought my receipt and credit card, I said, “Any chance I could see you after work? Maybe you could steer me to a late night bar where we could chat about old times?”

“I’m free at eleven,” she said.

I followed Thelma’s car to a pleasant little bar on the outskirts of town, near where she lived. She was divorced, she told me, and had a boy of ten who was probably asleep in her apartment. The bar served only beer. She said she didn’t drink anything with more alcohol than beer. Her ex, she added, had an alcohol problem. I didn’t press her for details. Instead, I fear I talked too much about myself, and mainly about superstrings.

I did my best to explain that strings were inconceivably tiny loops, like rubber bands, that vibrated at different rates. Their frequencies generated all the properties of the fundamental particles, such as electrons and quarks. The simplest string vibration produces gravitons, conjectured particles that carry gravity waves.

“You have nice dark eyes,” she interrupted.

“Thanks,” I said. “Your eyes aren’t so bad either.”

I tried hard to explain how a famous physicist named Ed Witten had generalized strings to what he called M-theory. The M stands for

membranes, or branes for short. A superstring is a brane of one dimension. Other branes have higher dimensions. Our universe, I said, has ten or eleven dimensions, of which six or seven are squeezed into compact tiny spheres that are attached to every point in our space-time.

“I didn’t understand a word you spoke,” Thelma said. “It sounds nutty to me. Do you believe all that?”

“Mostly. I think strings are for real, but I’m not so sure about Witten’s membranes.”

“Is everything made of strings?” Thelma asked.

“Everything.”

“And what are the strings made of?”

I was unable to get Thelma out of my head. I kept thinking of her wonderful smile, and how good she smelled.

“Nothing. They’re just pure mathematical structures.”

“If the universe isn’t made of anything,” she said, “how come it exists?”

“Good question. Nobody knows.”

“Well, maybe God knows,” she said.

Outside the bar, standing by our cars, Thelma invited me to her apartment for some coffee.

“No,” I said. “I really can’t stay another minute. I have to be up early to catch a plane to Chicago. It was great getting to know you.”

“Will I see you again?”

“It would be a pleasure,” I said.



Photograph courtesy of Adeline C., <http://www.flickr.com/photos/adollinn/>

Like a fool I failed to ask for her address and phone number. We shook hands. She said goodbye, then startled me with a quick kiss on the mouth.

Almost a year drifted by. My thesis was published as a book by the University of Chicago Press. My suggestions for test-

ing string theory were taken seriously by most stringers. There was hope that some of the tests might actually be made by a new atom cruncher under construction in Switzerland. There were vague rumors about a Nobel prize.

I was unable to get Thelma out of my head. I kept thinking of her wonderful smile, and how good she smelled. It wasn’t perfume. Was it her hair? I thought about her more than I thought about superstrings!

The University of Oklahoma, at Norman, hired me as an assistant professor. A suburb of Oklahoma City, Norman is only a few hours drive from Tulsa.

None of the waitresses at the restaurant where Thelma had worked knew what had happened to her. She left her job six months before, and they hadn't heard from her since.

No Thelma O'Keefe was in the Tulsa phone book. I drove back to Norman feeling sad and frustrated. Should I hire a detective? The Norman yellow book had a long list of "investigators" and two detective agencies.

I was planning to call one of the agencies when my telephone rang. It was Thelma!

"I heard you were asking about me," she said.

"Yes. How did you get my phone number?"

"It's on the Internet. How are strings?"

"Not so good. It didn't predict dark matter. It didn't predict dark energy. It even failed to pass one of my tests. Lots of stringers are starting to have doubts, including me."

"If we meet again," said Thelma, "don't tell me about it." ■

Further Reading

Two recent books attacking string/M theory as pseudoscience are *Not Even Wrong*, by mathematician Peter Woit (Basic Books, 2006), and *The Trouble with Physics*, by Lee Smolin (Mariner Books, 2007). See Chapter 18, "Is String Theory in Trouble?" in my book, *The Jinn from Hyperspace* (Prometheus Books, 2008).

Editor's note: A provocative and widely discussed article in which string theory is used to suggest that gravity is not a fundamental force, but is rather a consequence of entropy, is Erik Verlinde's "On the Origin of Gravity and the Laws of Newton" (2010), which can be found at <http://arxiv.org/abs/1001.0785>.

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