THREE THREADS
FOR THE COSMIC CPU

Nature uses only the longest threads to weave her patterns.

Richard Feynman (1965)

Often in history, breakthroughs in physics are made by people at a tender age.

Michio Kaku (1987)

The total energy of the universe is neither conserved nor lost—it is just undefinable.

Tamara Davis (2010)

In computer science, a thread of execution is the smallest unit of processing that can be scheduled by an operating system. It generally results from a fork of a computer program into two or more concurrently running tasks.

Princeton University (2012)

Nothing said about it but today he is not feeling friendly. Not to me. Not that friendly's something that he ever is. I go through motions with the coffee maker. Apropos of nothing and not for the first time Kaku has me thinking. This time it's of him. Would Kaku say his age is tender? But then Kaku would say this isn't physics.

Three Threads is a late addition to my topic list and of course the UC has no CPU. It has no central processing because it has no center. Quite the opposite: His universe exhibits the epitome of what the trade knows as distributed computing. Concurrent execution is another catchphrase that one might apply. The reason for the late addition is an insight while I'm sitting on the beach. Suddenly I see how three is where these things converge—his ideas, I mean, and B-T's. Back home I jot two series:

Manifold

6-D

Move

Fleck

Window

2-D Tweedle Link

Twist Three = 6/2	Three
Thread	Ribbon
	Braid
	Preon
	Particle

The seeds of this insight were sown this morning.

"The threads connect it."

He says this first thing, even before I sit with my coffee. I suppress the thought this is already obvious; at least, I try. He's sounding sulky.

"Can you follow all the twists?"

Well, of course not. After a half dozen Moves there's a mind-boggling maze of Flecks with three pairs of dimensions Linking through their Windows. No one could keep track of twists.

"The Threads keep track of them."

It's just like it is with her: I can hear him give a word a capital. He makes a Word of it. What his Word means is quite another matter. Even with a capital there *are* no threads; there is no room for any extras in his tidy universe of packed, Linked, 6-D, screwed-up, multiplying Manifolds.

"Recall the ring, the least of rings?"

He says it smoothly but I think he means to be sarcastic. He sounds smart-ass instead. He's needling me about the Move that wasn't missed. We just did this. The least ring is Move 1. There are two Flecks in existence at the time. Each has two Windows. Two dimensions run right through them. Two Links through two Windows linking two Flecks in a ring.

"When the ring gets bigger is it ever broken?"

It's made of dimensions. They don't break. We figured this already.

"Does it ever lose a twist?"

It's like my mental rubber band. The twists just move around. They can't get lost. Which gives me an idea. Could space's shared and paired dimensions prevent B-T's braids unraveling because the ring is always closed? No. That might work with three rings, I think, not just one. But now I'm thinking . . . Three? B-T?

"How long must the ring become before it needs another name?"

I begin to see where he is going. A simple spreadsheet calculation tells me that the distance round the ring today is at least 10^{150} miles—a length so inconceivable it is no longer long.

"And yet this Thread keeps track of all its twists."

Practice doesn't make me better at the gracious-in-defeat bit. And his voice

has that sarcastic overtone.

"So what about the next ring?"

Caffeine's kicking in. Or is it consternation? Next ring? He can't mean, next Move, the ring he calls the Thread is that much longer. He must mean another ring. He is back at his old question: What about the other Windows?

The question, front and center, really is: What happens to the other four dimensions in the first few Moves? My first thought is that, at Move 2, with four Flecks, two of *them* begin to Link from Fleck to Fleck. The reason for the Links to form at Move 1 is they *must* Link. More precisely, Link is just a name for Fleck-to-Fleck relationship across a Window.

Seen through a glass darkly, shades of Bergman, my new Thread unfolds through the eight Move-2 Windows. One new ring? Or are there two? Eight Windows? Is this my think-in-3-D-space hang-up again? No, I think there are eight.

At Move 3, I vaguely see the third pair of dimensions follow suit. Could there be four new rings? Whatever. One thing though is clear to me: Each Fleck is now strung bead-like on three Threads. It seems it should be simple. Back home I try to mock it up. It turns into a mess of Styrofoam and color-coded toothpicks. Three-ring circus comes to mind; I put it down. It's not that I can't make the mock-up. It's just too hard to figure how the rings begin. And difficult to track the Threads; I'm almost sure that I can't track them. But remembering his scornful tone ensures that I keep at it, mental mantra chanting Three Threads . . . Three Threads . . . Three Threads . . . even when I sit beside the sea.