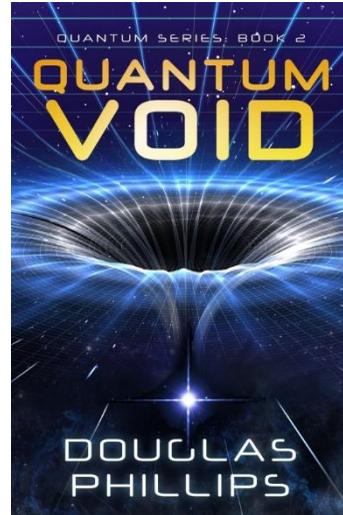


# Quantum Void



Book Two in the Quantum Series

By Douglas Phillips

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This is a work of fiction. References to actual places assist in setting a level of realism, however all characters, businesses and events portrayed in the book are products of the author's imagination. Any resemblance to actual persons, living or dead, businesses or actual events is purely coincidental.

## Table of Contents

- 1 Ripples
- 2 PVC
- 3 Briefing
- 4 Katanauts
- 5 Murphy's Law
- 6 Bosons
- 7 Caps
- 8 Gateway
- 9 Dancers
- 10 Beextu
- 11 Decoherence
- 12 Workers
- 13 Brainwaves
- 14 Singularity
- 15 Electricity
- 16 Regulators
- 17 Fermilab

- 18 Isolation
- 19 Thoughts
- 20 Void
- 21 Florida
- 22 Core
- 23 Eigenstates
- 24 Messages
- 25 Partners
- 26 Visualization
- 27 Duty
- 28 Huddle
- 29 Flickers
- 30 Apparition
- 31 Austin
- 32 Interdimensional
- 33 Particles
- 34 Bluebonnets
- 35 Resolve

- 36 Rabbit Hole
- 37 Probabilities
- 38 Ratios
- 39 Evacuation
- 40 Density
- 41 Non Sequitur
- 42 Intersection
- 43 Rupture
- 44 Passageway
- 45 Kata Zero
- 46 External Observer

Afterword

Acknowledgments

Quantum Time

**The science presented in this story is real.**

**Mostly.**

# 1 Ripples

**Friday, May 20**

Nala Pasquier slid the bangle bracelet off her wrist and placed it on the security table. The metal detector at the entrance to Wilson Hall was a new addition, a sign of changing times. Fermi National Accelerator Laboratory was once a place known only to the locals of Chicago, but its relative anonymity had disappeared eight months ago. First contact. Life beyond Earth. These days everyone knew about Fermilab and the secrets of the universe uncovered there.

Nala waved to the security guard. "What's my new word today, Angel?" She correctly pronounced his Spanish name, *An-hel*.

"*Descubrir*," the guard answered with a tight smile.

A particle physicist is not easily stumped, but Nala was forced to pause as she gathered her belongings. "Use it in a sentence."

"*Él descubrió una mosca en la sopa.*" Angel crossed his arms, challenging her capacity to learn the language one word at a time. With dark brown skin and a last name that was often confused as Hispanic, most people were surprised when Nala told them she was half Haitian and that French was the language of Haiti, not Spanish.

"Discover?" she asked tentatively. "He discovered a fly in the soup?"

The guard nodded with approval. "*Está bien*. You got it."

Nala laughed. "*Descubrir*. Discover. That's a good word to know in my business. Thanks Angel. *Yo quiero descubrir algo nuevo hoy.*"

“You want to discover something new today,” Angel echoed in English. “Your Spanish is getting better, Nala.” His pride was obvious.

“I have a good teacher.” She waved once more and continued into the building’s interior atrium, an open space that soared to skylights far above, mirroring the expansive ambitions of the scientists who worked here.

Perhaps she would discover something today. Her work in the new science of quantum space had advanced by leaps and bounds thanks to a few tips from an alien source. It was an exciting time in particle physics, in part because there was still much more to learn. At their heart, all scientists are lifelong students of nature.

Nala took the elevator to basement level three and then descended two flights of stairs even deeper into the Earth. She walked a long concrete hallway and rounded a corner. The sign on the door hadn’t changed—*Diastasi Lab, Authorized Personnel Only*—but it no longer took a top-secret security clearance to become one of the authorized few.

Their work with extra dimensions of space was now public knowledge. Government classification had finally been lifted, and Nala was back in touch with colleagues at other labs, former friends who’d thought she’d disappeared off the face of the earth. Her stunned friends, even her mother, had been kept in the dark for years. *Um, yeah, Mom, we figured out how to reach into a fourth dimension and compress distances by a factor of a billion.*

Spatial compression had already made unmanned spaceflight obsolete. The stars were now within easy reach for any probe, camera or radio link. Interstellar travel for humans was not yet possible, but one step at a time. Earth was now connected into a vast web of alien civilizations. The future was wide open.

Nala tapped her badge on the security pad and pushed open the door. “Morning, Thomas. Sorry I’m late,” she said to the stout red-haired young man at the lab’s workbench. Thomas, her lab assistant, was hunched over a signal generator, one of a hundred electronic components that covered the bench and filled every available shelf and niche in the overcrowded lab.

Thomas looked up with a grin on his bearded face. “Och, you’re a wee scunner, you are.” The accent was fake, but it was also pretty good.

She pulled a chair close to the workbench and turned on a computer. “That’s a new one. Are we Scottish today?”

“For a wee spell, lassie. Perhaps ’til midday lunch,” Thomas replied.

“Or as long as you can keep the Sean Connery accent going?”

“Possibly ’til then, aye.”

Thomas wasn’t Scottish. Or Irish. Or German. He was Russian on most Wednesdays. And every Monday, he became a strange cross between Ricardo Montalbán and the swashbuckling Spanish cat from *Shrek*. A bit wacky, most definitely an oddball, but mostly Thomas was fun. Anyone with a rebellious streak and a touch of drama was okay in Nala’s book.

“We’ll amp it up a wee bit today, my friend.” She settled into her normal position in front of a set of three large computer displays at one end of the workbench. She tapped the keyboard, a panel with gauges appeared on one display and she moved a slider labeled tau to her chosen value. It was a simple command, but potent, backed by the largest particle accelerator in the United States.

Four floors above in the Fermilab main control room, colleagues who operated the accelerator would be at this very moment awakening the giant machine, inserting protons into its heart, and initializing the powerful magnets that formed the two-mile ring of the Main Injector loop. Soon, those protons would be screaming down a curved pipe at close to the speed of light—eighty thousand laps every second. Most people had a hard time wrapping their head around that kind of speed, so someone had installed a digital counter on the Main Injector tunnel wall, a sort of odometer that ticked once for every thousand laps. As the protons reached full speed, the counter’s digits became a blur.

One hundred twenty-five gigaelectron volts. A beam of protons with that kind of power could burn a hole through your head. It had happened once before in Russia—to a visitor who'd accidentally peered into an opening with a live beam. The results were not pretty.

Nala and Thomas ran down an operational checklist together, validating system status and checking their lab equipment. Thomas adjusted the alignment of a pink pipe that pointed straight into a clear plexiglass box above the workbench. The box was ground zero for the neutrino beam that would shoot through their lab at near light speed. Thomas placed a compact webcam inside the box and inserted a rubber tube through a hole, the other end of the tube connected to a large tank of nitrogen.

Finishing her checklist, Nala looked up. "Shall we?"

"All systems are go for launch," Thomas said, temporarily lapsing into his NASA ground controller's voice.

Nala picked up a handheld radio from its cradle. "Is Cody working today?"

Thomas nodded. "Aye. That he is."

She keyed the transmit button. "Cody, Nala. Got anything flying around the loop yet?" The question was purely a courtesy. She could feel a slight vibration in the floor, which meant the accelerator was already spinning particles around its racetrack.

The radio hissed, followed by a man's voice. "Where've you been, Nala? Hell, we've been on standby pretty much forever."

Five minutes late to the lab today. Taunts were just part of the game with these guys. "Okay, that's enough, smart-ass. We're ready down here when you are."

“Stand by.” A few seconds later, a high-pitched hum reverberated from the overhead pipes—the sound of protons, ramping up to obscene energy levels. “One-twenty-five gig,” Cody said. “We’re up to full speed. You’ve got targeting control, but I’ll manage the neutrino oscillation.”

“Gotcha.” She clicked a few times on her computer. “Let ‘em fly.”

“Protons away.”

Somewhere behind a thick concrete wall, a magnetic gate opened and a stream of fast-moving protons blasted through. The particles smashed into their target—a disc of graphite no bigger than a coin. A stream of pions ripped out the other side, decaying in picoseconds to neutrinos and headed straight into Nala’s lab.

The background hum increased dramatically to a loud buzz that filled the room. Thomas put on sunglasses and focused on the webcam inside the plexiglass box. As the pitch of the buzzing reached an irritating level, a brilliant blue flash blasted from the box, accompanied by a loud pop. Thomas didn’t flinch.

When the flash dissipated, the box was empty, and the nitrogen tube had been cleanly sliced where it entered the box. Even after hundreds of launches, the disappearing act never failed to impress.

“Tau is perfect,” Nala said, her eyes glued not to the plexiglass box but to her computer screen. A window popped up showing a live image returned by the webcam, now positioned in another dimension of space.

As it had done a hundred times before, the magic of expanding a quantum-sized dimension forced a corresponding compression of ordinary space. From the perspective of the camera, five hundred million kilometers had just compressed to almost nothing and the planet Jupiter was suddenly within camera distance. The giant planet appeared on cue, beautiful in its color but oddly flat in shape. More like a disc than a sphere, but any three-dimensional object looked that way from quantum space. Compressed, flattened.

“’Tis near enough to spit upon,” Thomas said, his Scottish accent returning. He checked another computer screen. “The 4-D volume looks right. Nitrogen density is 1.24 kilograms per cubic meter—plus the camera. About 10 percent higher than yesterday.” A silly grin appeared on his face. “No sign of any *Pasquier* waves.”

“Fuck off,” she said with a glare. “You know my opinion on that arrogant bullshit.” Using her last name was another part of the game. They were monitoring for gravitational waves, but Thomas was intent on renaming everything. Last week he’d threatened to submit the *Nala boson* to a certification board. The week before, the whole Standard Model would be renamed to the *Donut Box*, with each type of quark and lepton changing to Glazed, Sprinkles, Choco, and so on. Actually, she had kind of liked that one.

Her fake-glare morphed into a smile and she turned to her computer. “Be ready to monitor, my friend. Initiating collapse.”

She pressed a key, and within seconds the surrounding air wavered like heat waves coming from an oven. Her computer screen wavered too, even the surface of the workbench.

*That’s not right*, she thought. The gravitational waves they sought were so weak as to be nearly undetectable. A slight tremor. A wiggle. This was a sloshing bucket of water.

Ripples propagated through the air and within seconds had permeated the room. The walls, floor and ceiling pulsed in a slow oscillation. Waves penetrated her body, making her own bones feel as pliable as everything else. On an intellectual level the unnatural panorama was eye opening but there was no denying a far more primitive reaction—the feeling of slipping off the edge of a cliff. Both her mind and her heart raced.

“Anomaly!” Nala’s voice sounded like she was at the bottom of a well. She grabbed the handheld radio from its recharger and pressed the transmit button. “Cody, shut it down!”

The edge of the workbench pushed into her hip in rhythmic surges as if it were trying to get her attention. The computer monitors hanging on the wall above the workbench deformed like they were sheets of rubber. Then, as quickly as they had started, the waves dampened.

The air calmed, the floor and the workbench resuming their previously solid existence. On the other side of the lab wall, the enormous particle accelerator spun down until the loudest thing left in the room was Nala's heart, pounding inside her once-again-solid chest. She leaned against the workbench and took a deep breath.

"Whoa. What the hell?" Any particle physicist routinely dwells in the realm of the bizarre; quantum physics is not for lightweights. But over weeks of experiments, she'd seen no precedent for today's gymnastics.

Thomas stepped toward her keeping both hands on the workbench. "You okay?" he asked.

"Sure, you?"

"A bit queasy."

"Yeah, me too."

They stood in silence for a time. Anomalies are expected in groundbreaking science, even welcomed as opportunities for discovery. But lack of control was always disturbing.

Nala plopped into her chair and turned to the computer display. It showed a line graph that looked like it had just been through an earthquake. "Wow. Tau went crazy there for a minute, even sinusoidal."

Thomas peered over her shoulder. "And here I thought you smarty-pants physicists had this four-dimensional stuff all figured out."

Nala took another deep breath, her heart calming. She glanced back at her lab partner. "Yeah... I thought we did too."

A loud cracking sound caused them both to jump. It came from the plexiglass test box at the other end of the workbench. A tiny light hovered in the center of the box. The light hadn't been there at the beginning of the test.

It was a pinprick, nothing more, but far more brilliant than any dot ought to be. Nala shielded her eyes and drew closer. A fine mist slowly circled the point of light, forming a disc shape that spiraled inward. It gave the appearance of a miniature galaxy only a few inches across.

"Fascinating," she said.

As they watched, there was another crack, and a bit of the plexiglass case broke away. The chip joined the mist to be drawn into the point of light. Yet another crack followed, splitting the far side of the box.

"Holy shit," Nala said, stepping back. "Whatever it is, for such a little thing it's got some punch."

And then, as quickly as it appeared, the light silently faded away. The mist twisted delicately for another turn and then evaporated, leaving the box empty once more.

Thomas stood behind, watching the last wisp of the gracefully pirouetting mist. "Kind of pretty," Thomas said. "But unexpected."

Nala concentrated her stare into the test box, searching for answers. Both the waves and the pinprick of light were anomalies, no question, unseen in any previous test. Were they related? Could they be re-created? The effect would need more study. They could be on the brink of a landmark discovery. A breakthrough.

Of course, it could be dangerous too.

## 2 PVC

### One month before...

Davis Garrity ran a hand through his wavy gray hair and checked that his tie was straight. There wasn't enough time to stop by the men's room before the meeting, but his reflection in the polished metal of the elevator doors was sufficient. There was no point in achieving grooming perfection anyway—salesmen did that, and he was certainly no salesman. Davis made deals. Nobody was better.

The elevator doors opened at the twenty-fourth floor of the office building, one of many gleaming glass towers of the downtown core of Austin, Texas. Davis strode down the hallway, briefcase in hand, and pushed open one of the double glass doors etched with a stylized logo featuring a lightbulb and the company name, ElecTrek.

“Davis Garrity for Stan Wasserman,” he told the receptionist.

“Welcome to ElecTrek, Mr. Garrity. Mr. Wasserman would like you to join his team in the east conference room.” Davis signed in and the receptionist pointed the way.

The conference room was directly across from reception, a space designed to be more public than the interior hallways and offices behind secured doors. It was also designed with visitors in mind. Photographs straight out of a shareholders' annual report adorned the walls. One provided a view of scenic rolling hills with an occasional wind turbine dotting the idyllic scene, almost like an industrial decoration. Another showed a sea of solar panels glinting in the sun. A third displayed a modern power plant with a young family strategically positioned in the foreground, apparently ready for a tour from a smiling guide wearing a hard hat.

Davis set his briefcase on the table, took a seat and waited. He knew it wouldn't be long. The client was aware he'd already signed one of their competitors. Naturally, their interest was piqued.

A few minutes later, two men and a woman walked in. The taller man reached out with a hand. “Davis, glad you could make it. Stan Wasserman, nice to meet you in person.” Wasserman introduced the others, Teri Barker, chief environmental engineer, and Jake Schroeder, ElecTrek’s vice president for Texas Power Operations.

“Thanks for your time today,” Davis said with an elegant bow of the head. “I can assure you, it’s going to be the best meeting you’ll have all week.” Lesser dealmakers might set expectations low to give the appearance of delivering high, but Davis could afford to start high and stay there. Final delivery would be stratospheric.

Wasserman responded with his own play. “Let’s hope so. Things are getting tight around here, and we’ll need to find cost savings in every process. You said on the phone you could give us more than just nickels and dimes.”

Davis was impressed with the I’m-just-a-poor-man counterplay, but of course, it was all an act. With electricity rates fixed by friendly Texas commissioners and with oil, gas and coal prices still depressed, ElecTrek’s financial position was rosy for the foreseeable future. Still, a good dealmaker doesn’t embarrass his client with facts. If Wasserman said things were tight, they were tight. The meeting would require the full pitch, and Davis was prepared.

“Ladies and gentlemen, I’m going to save you a billion dollars, maybe more... right now, right here in this meeting.”

He waited a few seconds for the words to sink in and then pointed to the pictures on the wall. “As a side benefit, by next week, I’ll hand over a new crowd-pleasing photograph you can hang on this wall that will change your company’s image forever.”

Their skeptical looks were standard and expected. Davis had no PowerPoint slides and no glossy brochures to hand out; those were bits and pieces that amateurs used. Much better to go straight for gold. He opened his briefcase, withdrew a small white plastic pipe and set it on the table. Eyes around the room squinted.

The pipe was open at one end and closed on the other by a rounded top, painted blue and orange. It looked like a short piece of irrigation pipe commonly found at any home improvement store.

“I give you the Garrity Cap,” Davis said with a flourish of his hand.

Wasserman picked up the plastic tube and held it close to his face, turning it in his hand. The others looked on with interest. It was the critical turning point of the meeting, where he’d either walk out with a contract or be thrown out as a con man.

Davis continued, cranking his pitch a notch higher. “This simple device—backed up by Garrity nanotechnology—will literally save the world. I kid you not. Once its larger cousin is installed at your power plants, operating costs will plummet, and profits will soar.”

Wasserman handed the plastic pipe to Teri Barker, who peered inside, looking for working parts. “You said on the phone you had a carbon-capture device. This is PVC pipe.”

“Funny, isn’t it?” Davis asked. “That sometimes the most innovative technology comes in such a simple package.” He pointed to the pipe. “With the Garrity Cap installed on each of your stacks, you can turn off your billion-dollar carbon-capture system; you won’t need it. And forget about building any more of these money-sucking showpieces. Let’s be real. A 6 percent reduction isn’t a realistic carbon-capture program—it’s just a very expensive public relations campaign. Are we in agreement on that?”

Their shrugs gave him the answer he had expected. Carbon capture at any coal-fired power plant had never made it past the demonstration phase, even with heavy government subsidies. Power plants across the US, even those that had converted to natural gas, continued to discharge large quantities of carbon dioxide daily.

Davis knew the industry well, including how their bottom line was calculated. “With the Garrity Cap on every stack, you’ll capture exactly 100 percent of the carbon and everything else you currently send into the air. By the way, you can turn off your sulfur dioxide scrubbers. You won’t need them either. Go ahead and burn local Texas coal instead of importing that

expensive stuff from Wyoming. Hell, burn garbage, burn old tires, burn whatever you like—it won't matter in the slightest. Your emissions will still be precisely zero."

He pointed to Jake Schroeder. "By next week, you'll be running the greenest electric power facility on the planet. Your EPA permit? Tear it up. Global warming? Climate change? Gone. Mr. Schroeder, you're going to be a hero."

Wasserman was shaking his head, but in a good way, more puzzled than negative. "Nice pitch. But empty claims aren't worth much. Tell me again how all this magic is supposed to work?"

Davis reached out, and Teri handed him the plastic pipe. "I lied," he said. "What I hold in my hand is a bit more than just your ordinary PVC pipe." He held it out for their inspection, pointing the open side toward them and then turning it over to show the closed top. "This closed end is not closed at all." He pulled a pen from his pocket and pushed it inside the tube. He tapped the pen on the cap's top like a magician would knock inside a trick box. "We hear the pen tapping. Our eyes see this as a sealed end... but it's not. This tube twists into another dimension, a place we can't see, a place not even in this world."

Davis's grin broadened to a smile. "Yes, we're using dimensional technology, the same technology you've heard on the news when they told us about all this crazy business with aliens."

Schroeder contorted one side of his face. "That pipe is an alien device?"

Davis shook his head. "Nope. Not alien. Built right here in America. So is the dimensional technology. But instead of using this technology to find aliens, we're taking the same idea to save money... and save the planet."

Davis held the pipe in one hand, his other hand a few inches away. "This pipe is really twice as long as it looks. We can't see the rest of it because it makes a right-angled turn into a fourth dimension. My company created both the pipe and the space that it's plugged into." He waved his arms in the air. "That new space is right here, right in this room."

“We’ve all heard the news stories,” Schroeder said. “Talking to cyborgs a million miles away? Pretty fantastic stuff, and I’m not sure I believe it all. But you’re saying the technology is real? How do we know this isn’t just a PVC pipe you bought at the hardware store?”

Schroeder was turning out to be a good straight man. Davis pulled out a pack of cigarettes from his coat pocket. “Mind if I light up?” he asked with a smile. Of course, the answer was predetermined.

“Sorry, Davis, we’re a no-smoking workplace,” Wasserman said. “Maybe you could just answer Jake’s question.”

Davis pulled out a lighter. “I intend to. With visual proof, if you’ll allow a one-time exception to your smoking policy.” Davis lifted his eyebrows and waited for the next response.

“You’re going to show us how this works, but you need a lit cigarette?”

“Yes, I do. It’s quite an intriguing demonstration.”

“Okay, whatever,” Wasserman answered. “Do what you need to do.”

Davis nodded, lit the cigarette and took a long drag. He blew smoke into the air, away from where the others sat. “My apologies for the smoke, but you did want proof.”

Wasserman pulled his chair closer and the others leaned forward with elbows on the table. “Okay, same draw, same amount of smoke.” He took another long drag on the cigarette, its tip burning bright red. He picked up the plastic tube and held its opening to his lips.

His audience drew in closer still. He puckered his lips and gently blew. The sound of his exhale was the same as before, but nothing came out of the pipe, not even traces of smoke around its edges.

Schroeder reached out with an incredulous look on his face. “Wait a second, that’s got to be a trick. You didn’t really take a draw the second time.” He took the cap from Davis’s hand and examined it once more.

Davis held out the cigarette. "Try it yourself."

Schroeder looked at him and then Wasserman. He took the cigarette, sucked on it and immediately expelled the smoke in a fit of coughing. "Okay, the smoke is real," he said when he'd regained his composure.

Schroeder took a second draw and blew directly into the short pipe, his lips not quite touching. Smoke came out of his puckered lips, but it quickly disappeared into the pipe and didn't come out.

Schroeder held the pipe up to the light and peered inside. "There's got to be something absorptive in there."

Davis tilted back in his chair and looked up at the ceiling. "Do you see anything except the inside of an empty plastic pipe?"

"No," Schroeder admitted. "I don't. What the hell are you doing here?" He tapped on the very solid-looking rounded cap at the closed end. "Where'd the smoke go?"

Davis laughed. "Gone. No longer in our plane of existence, my friend. Permanently eliminated, just like your power plant emissions will be."

Schroeder looked at the pipe in one hand and back to the cigarette in the other. He started laughing. "Well, I'll be damned."

The ElecTrek lawyers would be next, waving a memorandum of understanding and a joint nondisclosure agreement. The documents would clear the way for a full-scale demonstration at their Bastrop plant, which would then lead to a signed contract, renewed annually... and, of course, many millions of dollars flowing into Davis's bank account.

The amazing thing about it all was this deal was just one power company in one state. Many more would follow, and Davis was quite sure he would soon become very rich.

### 3 Briefing

Daniel Rice sat in the *hot seat* in a stuffy committee room deep in the bowels of the US Capitol building. A row of stern-faced representatives faced him. Daniel had been here before. It wasn't testimony. He wasn't under oath; there were no cameras and only one microphone. A congressional briefing, conducted behind closed doors to maximize candor. He enjoyed this newest part of his job about as much as a visit to the dentist.

The weathered man at the center of the dais was the chairman of the House Committee on Science, Space and Technology. He had asked questions that were vaguely science-oriented, but the follow-on conversation made it abundantly clear that his scientific knowledge was modest. Still, he was an improvement on the previous committee chairman. The years of prominent politicians openly hostile to science were thankfully over.

"Dr. Rice, let's shift the conversation to Core," the chairman croaked.

Core was, of course, the extraterrestrial cybernetic organism occupying an alien megastructure in four-dimensional space near the star VY Canis Majoris. Everyone on Earth knew that much. Core self-described as part biology, part quantum computer, and served as a central communications hub to a collection of alien civilizations. A gatekeeper.

Over the past eight months, Core had revealed bits and pieces of the alien civilizations that it represented: a web of interconnected planets previously unknown and invisible to curious human eyes spread across several thousand light-years of space in one corner of the Milky Way galaxy. Each planet connected to the central hub through the newly discovered technology that compressed space.

The chairman continued. "You and others have met with this entity Core eight times now. Beyond the revelation of this new *boson* it doesn't appear that we've gathered much in the way of new science. Would you agree?"

The hyperbolic paraboloid boson was the newest addition to the Standard Model of physics, responsible for the shape of space itself. Once Core had revealed the fingerprint of the new particle, ecstatic physicists around the world had quickly confirmed its existence and spun off multiple studies to examine its properties.

“I’m not sure I would agree, Mr. Chairman. While it may be true that Core reveals only what it wants us to know—and by the way, I completely agree that this perceived caginess can be frustrating to scientists—”

“Not to mention the military,” the chairman added.

“Yes, our military and security organizations are fully justified in their cautious approach toward Core. But that said, I would argue that Core has at least hinted at additional science that will be disclosed at future dates. For example, it has alluded to an entirely new branch of physics that describes the quantum nature of time. We are only in the beginning stages of this exploration but the yin-yang device that was left in the Russian Soyuz capsule is a prime example of technology that uses this new science.”

The chairman looked up from a paper on his desk. “I understand this device was turned over to the Russians along with their capsule.”

Daniel shrugged. “Yes sir, an obligation of the international space treaty. But we had a good look at it before it was passed along to the Russians. I believe the device itself is not as important as the science behind it.”

“Which Core continues to withhold.”

“Technically true.” Daniel seemed to be constantly defending Core though he felt the frustration as much as anyone. *Too soon*, Core often said. *You will learn*. Daniel had become the de facto representative, the scientist who had made first contact with an alien intelligence and often the central figure in subsequent conversations.

Each session was much like the first, a radio link via compressed space that allowed for voice and data transmission. A live video link showed the exterior of Core's structure—the *hand grenade*, they had joked. Although its surface never changed, a mesmerizing parade of alien devices orbited, each apparently functioning as a communication link back to a home planet. A joint effort among Earth's space agencies was working to build a similar communications relay that would eventually replace the flimsy duct-tape-and-baling-wire electronics package cobbled together at Fermilab.

"I believe some topics are left for future conversations," Daniel continued. "The current focus is on the newly announced mission to the Dancer's planet, Ixtlub, and on the portal technology that will take us there. In this area, Core has demonstrated a level of openness that has elevated the fledgling science of exobiology to a major branch of study. We have received a detailed map of the self-replicating molecule that powers all life on their planet, similar to our DNA. Needless to say, biologists are having a field day comparing the two molecules. This information will certainly be of use when we make physical contact with the species of this planet and dramatically advances our understanding of what it means to be alive."

Several members of the committee nodded their heads. Biology was one of the sciences that seemed to be poised for explosive growth and the politicians were eager to capitalize on funding for studies in their home states.

"We've also received considerable information on the two intelligent species who inhabit the planet. I've read some of the documentation myself and I envy those who will be selected for the mission. Assuming we get a video feed, it's going to be quite the show."

One of the minority party members perked up at this comment. "Dr. Rice, you've been on television and at other public appearances so I'm sure you're aware that many people don't trust these aliens and have grave concerns about the announced mission. What assurances do we have that it will be a friendly meeting and what safeguards are we establishing in case it is not?"

It was an age-old question, and eight months without any aggression hadn't dimmed raging fears in the slightest. That the aliens hadn't "shown themselves" was a common rallying cry among critics even though Daniel had pointed out that the

viral video of the beautiful and delicate creatures they'd called the *Dancers* had more than five billion views on social media platforms.

"I am aware of public concerns," Daniel answered. He could have pointed the congressman to one of several children's science programs in which Daniel had appeared, including a fun *Sesame Street* bit designed to provide comfort to preschoolers about alien life. He decided against it.

"As you know, Congressman, NASA has joined with ESA to plan the mission in tight alliance with our national security agencies. I'm confident they will produce a plan that will both be diplomatic and ensure global security. In addition, Core revealed in our last session that it will provide an emissary to Earth, an android in humanoid form who will prepare us for our first encounter with another civilization and act as our guide on the mission. I believe this is a positive indicator that demonstrates Core is primarily focused on diplomacy, not security.

And lastly, the new transfer portal that is under construction at Kennedy Space Center will give us physical access to any other location in the galaxy with a corresponding portal. It's important to note that this technology, like any network protocol, requires a handshake from both sides. That is, our portal is open only when we permit it to be open and the same is true for the destination portal."

The congressman grunted. "We may have built this portal, but the design was alien. Who's to say what it will do when they turn it on?"

It was true that none of the engineers involved in the portal assembly understood exactly how it would work. Most expected it would be one of the first actions taken by the android, who was due to arrive on Earth within days.

## 4 Katanauts

Marie Kendrick could almost sense the ghosts of the past walking the halls of this historic place. The Neil Armstrong Operations and Checkout Building at Kennedy Space Center in Florida went all the way back to the 1960s Mercury program. Interior spaces had been upgraded over the years to support the changing needs of each spaceflight era, but the exterior of the building was still vintage 1960s. She could easily imagine Ford Falcons and Chevrolet Impalas, tail fins and all, scattered across the parking lot.

She stood alone at the center of the O&C clean room, as they called it, a cavernous space long enough to hold two Airbus 380s end to end. The Apollo Lunar Excursion Module had been assembled here in the 1960s, as well as most of the sections of the International Space Station in the 1990s. The overhead cranes used for these historic projects still hung from the high ceiling, but now idle.

The O&C clean room was no longer used to assemble spacecraft and no longer quite as clean. It had been repurposed as a gateway to other worlds. Alien worlds.

Marie brushed back a strand of hair and stared up at the large banner that spanned one wall, imprinted with NASA and ESA logos and the words *Mission to the Stars*. She marveled at the circumstances that had brought her here. It had been a roller coaster of emotions over the past several weeks.

It had started with the announcement of the first mission to an inhabited alien world and the selection process for the lucky few who would go. They would visit a watery planet more than three hundred light-years from Earth, inhabited by creatures that appeared as delicate wisps swaying in ocean currents—intelligent creatures known as the Dancers.

*I was so close, she thought.*

The right education, the right background. Years of NASA experience, including eighteen months working directly for Augustin Ibarra, the administrator of human spaceflight. She'd been a key player in the mysterious disappearance, and recovery, of the Soyuz capsule and its three astronauts, and a partner to Daniel Rice, a science guy straight out of the White House. She even had a presidential commendation.

In the end, her sparkling CV hadn't been enough to grab one of only two slots allocated to NASA. Two others had been selected, both with spaceflight experience, a skillset missing from Marie's resume.

As she stood in the O&C clean room, that particular job qualification now seemed entirely unjustified. A large white oval doorway dominated the center of the room. For this mission, no one would be flying. They'd simply pass through a portal.

It had been erected on a raised platform—literally a doorway about eight feet tall made of polished white metal, looking not much different from an airport metal detector. For now, it was a portal to nowhere. Step through it and you'd still be standing on the platform inside the clean room. But that would all change once four-dimensional docking technology was initiated. The big event was less than a week away.

*Administrative coordinator.* That was the response to her application. It wasn't a rejection, of course. She would still be involved in the details of the mission. She'd even be managing much of the training and preparation process. But she wouldn't be going anywhere, at least not now. There would be future missions to the Dancers' planet, assuming this one went well.

The Dancers. Just a funny name that someone had made up—was it Daniel? Possibly, but that was eight months ago, and a lot had happened since then. The lone video of the aquatic species from the planet Ixtlub, a name few could properly pronounce, had gone viral worldwide. A new NatGeo series featured jellyfish-like creatures, and a summer blockbuster movie was in the works, already cross-marketing a line of toys featuring squishy sponge creatures. Of course, no one had yet met them in person. But four intrepid explorers soon would.

The lucky team members formed a tight group on the raised platform, standing alongside racks of electronics equipment and computer displays—the Transfer Command Station. Two men and two women dressed in blue jumpsuits listened to a NASA engineer who provided a briefing of the systems that would assist in their upcoming journey. Marie checked the training task off from a long list on her tablet computer.

They'd been labeled *katanauts*. In the days of extra dimensions and compressed space, explorers to new planets now traveled by way of the *ana* or *kata* directions, the fourth-dimensional equivalents of *up* and *down*. The days of rockets flying through outer space were over, a mental image now as quaint as a 1950s sci-fi movie.

The key player in the construction and operation of this new technology was not even from Earth. The alien android called himself Aastazin, but nearly everyone shortened it to Zin, a change he didn't seem to mind. He stood behind the katanauts on two shiny metallic legs. Officially, Zin was Core's emissary to Earth and would guide the team once they passed through the gateway. Rumor had it that Core's brain was a quantum computer and that Zin's intelligence was derived from a quantum entanglement with his maker.

He was mostly copper in color, though his exterior was said to be a mix of high-performance metals and carbon fibers. He had a head and two arms ending in hands, which he often rested on metal hips, giving him a very humanlike stance. Most people agreed there was nothing coincidental about the human form or his apparent male gender. The robot's internal intelligence had occupied bodies of many types. His current incarnation was merely this month's shell. When on Earth, assume a human form so as not to scare the locals, or something like that.

Their systems briefing complete, the group moved to a set of four reclined seats, each supported by a pedestal that disappeared into a slot in the raised floor. They looked like a row of dentist chairs, but they were far more than that. The mission documentation described the chairs as critical safety equipment that would keep humans alive during the dimensional transfer.

As the engineer pointed out the various features of the chairs, Zin stepped off the platform and sauntered over to where Marie stood as if he recognized her at a cocktail party. His smooth motion and amiable demeanor were remarkably human.

Marie removed her glasses. “Hi, Zin, um, what’s up?” she stuttered. The android had never been threatening or even aggressive, but it still took some adjustment to think of him as a colleague.

Like his body, Zin’s face was humanoid too. His flat eyes, spaced wider than most, were able to pivot slightly out of their sockets in a quick snap to glance left or right. The move was mesmerizing and probably gave him excellent peripheral vision. He had no ears and not much of a nose either. It was hard to find an audio input site anywhere on his head, but he seemed to hear everything that anyone said.

His mouth worked very much like any human’s, including a flexible tongue and lips. Marie figured the combination was probably required equipment if you wanted to speak a human language. The head itself stood on a narrower mount than a human neck, and he could turn it three hundred and sixty degrees. He’d stopped performing this feat once someone had told him it looked like a bit from a horror movie.

“What do you think so far, Marie?” Zin said in flawless English. “Is the training going as you expected?” Strangely, he had an American accent when speaking to the Americans but sounded British when speaking to the Europeans. His mannerisms and hand motions changed as well to match each person. He spoke French from time to time with the sole katanaut from France, but English had been selected as the mission language, and he stuck to it for all but the most informal communications.

“We’re right on schedule,” Marie told him. “And everyone seems to be clear on procedures so far.”

Zin had no eyebrows, but a thick ridge above his flat eyes was adjustable. He pushed it down, remarkably mimicking a look of concern. “That’s good to hear, but not exactly what I wanted to talk about. Do you mind if I ask a more personal question?”

“Um, sure.” It would be interesting to learn what Zin considered personal.

His forehead ridge moderated. “Learning your languages and mannerisms has been relatively easy, but a true understanding of human nature is more difficult. My job as your guide and liaison, is complex, and first contact between any two civilizations is significant. If, for whatever reason, I was *not* meeting your expectations, would you tell me?”

*An interesting question. Very deep.*

“I’ll answer, but first a question back to you.” Marie smiled. “How would you react if we were dissatisfied?” Thoughts of crazed robots attacking helpless citizens weren’t easy to sweep from her mind.

“It depends entirely on the person,” Zin said with a flick of one of his flat eyes. “Criticism from some members of this team could be dismissed as inconsequential. But if the criticism came from you, I would be deeply humbled and highly motivated to improve.”

*What a gentleman. Better than most guys I’ve dated.*

Marie put a hand on his cold metal arm. Could he feel her touch? “Zin, you’re doing just fine. No complaints. If you get the feeling we’re not completely on board, just remember, we’re new to this. We thought we were still fifty years away from having conversations with androids.”

Zin’s mouth turned up at the ends—more than needed for a smile, but if she castigated him, it would ruin all the fun. Zin might be a bit quirky, but so were some of Marie’s best friends.

One of his eyes performed a gymnastic maneuver that would have won a gold medal, apparently picking up activity almost behind him. “It looks like they’re almost done. Join us for the next session? I think you’ll find it interesting.” He motioned to the platform, and she followed.

Tim Tannenbaum, a top American astronaut with beefy arms and buzz-cut hair, sat in one of the reclining dentist chairs, strapped in with a seat harness that looked like it had been borrowed from a high-performance military jet. The NASA engineer pointed at several buttons on the armrest. “If anything goes wrong, just hit Reset,” he said.

Tim casually looked up from his reclined position like he might ask someone to bring him a beer. “What, no control stick for manual override?”

“No need to fly at all,” the engineer replied. “The Reset button automatically recycles to baseline, returning you home.”

“Pretty simple,” Tim replied. He unlatched his seat harness, swiveled off the chair and stood up. He patted the engineer on the shoulder. “Good job, man. Works for me.”

Zin motioned to the engineer. “Finished?”

The engineer nodded. “Yeah, I think so. Any questions about transfer preparation?” He looked around at the silent group. “Okay, back to you, Zin.”

Zin positioned himself to the center of the group. “Thank you. I’m sure everyone is fully enlightened on both suit-up and pretransfer procedures.” Zin scanned the faces, his average height allowing for easy eye contact with the team. “Next, I want to explain exactly what will happen to you during the transfer. I’ll also touch on why it works just this way, but I promise I won’t bore you with the details.”

As far as Marie knew, *the details* had never been shared for most of the new technologies Zin and Core had brought to Earth. Any of the NASA engineers would jump at the chance to be bored by those details if Zin ever decided to share them.

Zin waved to the row of dentist chairs. “As soon as you are comfortably seated in your transfer stations, the retracted hood will extend, covering your face. A yellow light will flash, but you may not even notice it. The flash initiates a spatial transformation that will reposition your transfer station—and you, of course—both dimensionally and temporally. That is to say, you will shift slightly out of normal 3-D space, but you will also shift slightly away from the normal direction of time.”

“Shifted in time?” Wesley asked. With sandy hair and freckles, he seemed to match his Yorkshire home. “Forward or backward?”

“Actually... neither,” Zin said, his English accent exactly matching Wesley’s. “I won’t go into it just now, but suffice it to say that forward and backward are not the only directions of time. There are others.”

“And this yellow light can really control time?” Jessica Boyce asked. Jessica was the only professor in the group. Marie had never had the opportunity to work with her, but Jessica was the star of several NASA videos beamed down from the International Space Station as part of a science program for high school students.

“Unquestionably so,” Zin responded. “Time is no different from space. Both are quantized dimensions of our universe. Both are managed by means of coherent neutrinos, as your scientists have already learned for quantum space.”

*Time control?* Marie thought. *Hoo, boy. It might be best if they don’t give us the details.*

Eight months prior, the missing Soyuz astronauts had somehow been frozen in time by the same alien technology before being returned to Earth. It was hard to believe that Zin, or anyone, could wield such power in a flash of yellow light.

Zin walked over to the portal, and the group followed him. He pointed to the oval doorway. “The portal is nothing more than a four-dimensional path from Earth to Ixtlub, with the three-dimensional distance between these two planets

highly compressed. It's a common method of transfer used widely around the galaxy. But for humans or any biological organism, it requires a temporal offset to avoid death."

Tim crossed his arms, a smirk on his face. "Thanks for not killing us, Zinny old boy."

Zin swiveled his head rapidly. "I hope you don't think—" He stopped, and his metal eyes made a clicking sound as they turned upward. "Ah, yes. Sarcasm, I believe? A uniquely human style of speech, utterly unknown elsewhere in the galaxy."

Tim shifted on his feet and said nothing.

"Continuing," Zin said. "Once the portal is activated, I will step through to the anchor point at Ixtlub and verify that it is positioned correctly. Each of you will enter the portal seated in your transfer stations, which will slide along this track." A single slot in the flooring led from the four chairs directly through the portal.

Stephanie Perrin raised a hand. The second woman on the katanaut team, Stephanie was a French television reporter. Her position at a twenty-four-hour French news channel, along with her popularity across most of Europe, had made her selection almost inevitable. Like most of the others, she'd been to the ISS and had provided a remarkably poetic and very personal description of spaceflight to viewers back home. With her glossy black hair, a heart-shaped face and dark eyes, the average Frenchman—in fact, most European men—put her at the top of their list of beautiful women. She flashed her gorgeous smile regularly, both on TV and in person.

"So, as an artificial life form—" she started. "I'm sorry, Zin, I hope that's not offensive." Zin shook his head no, but Stephanie seemed to adjust anyway. "As a *nonbiological person*, you don't need the time offset like we do to survive the trip?"

Zin shook his head again, turning it farther left and right than any human would. The move was vaguely creepy, but at least he wasn't spinning his head in full circles. "No, Stephanie." His English words took on a slight French accent that

matched Stephanie's. "I have personally completed more than seventy dimensional transfers with no ill effects. The danger is only to cellular biology, not to any electric brain function."

Stephanie pursued her line of questioning. "The astronauts from last year's Soyuz incident reported that they did not remember returning to Earth from their 4-D orbit. Will we remember the transfer?"

"No again, Stephanie," Zin said. "But never fear, the time you lose will be short, just a minute or two." He lifted his flexible lips into a smile that looked forced but was probably the best he could do. "You'll see the light flash, and then... Ixtlub. Honestly, I think you'll enjoy the experience."

Stephanie didn't look too sure. "I read that we're each going to wear an audio-video headset. Will it be a live feed? I'm sure viewers around the world will want to see what happens during the transfer."

"Live streaming is not supported by this particular portal technology," Zin said. "But never fear, you will each wear a recording device that is switched on by your command. By all means, turn your camera on during the transfer. Viewers will see the same thing that I do when stepping through a portal. Except, of course, that they'll miss the ultraviolet experience, always where the real action is."

Tim and Wesley chuckled. Zin acted like he didn't understand what was funny.

"Sorry, Zin, it's not you," said Wesley. "It's just that sometimes you say things just like we would... a little too much like us."

"Should I back off?" Zin asked.

Tim laughed again.

Zin's mechanical eyes flitted to the left side of his head, where Tim stood. "English expressions and human mannerisms are designed into my language module, but I can alter my style, if it would make our conversation more natural."

"No, no. Don't change a thing," Tim said. "All the wacky robot stuff is the most entertainment I've had in years."

Zin held his angled eyes on Tim and provided no further facial expression, at least none that humans might notice. But Marie imagined an irritation from his silence. She had worked with Tim before, and the English expression *jerk* came to mind.

## Thanks for reading!

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