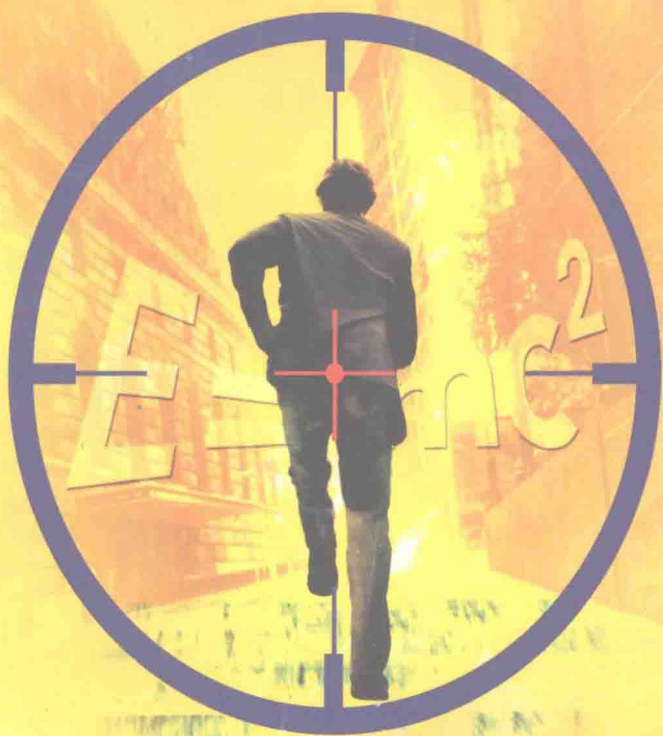


MARK ALPERT



# FINAL THEORY

A NOVEL

"A deliciously explosive premise and a breakneck plot."  
—Douglas Preston



# *Final Theory*

A N O V E L

*Mark Alpert*

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## Praise for Mark Alpert's *Final Theory*

"*Final Theory* is a stupendous read! Real characters, real science, a deliciously explosive premise, and a breakneck plot combine to make this one of the finest science-based thrillers to appear in a long time. *Final Theory* rules."

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"Wow! Einstein would have loved this book. It's a great thriller, it has a sure feel for politics, and the science is both fun and solid. He always dreamed that he would discover a unified theory that explained all of nature's forces. Now this book makes the quest come alive."

—Walter Isaacson, *New York Times* bestselling author of *Einstein*

"*Final Theory* has everything I love in a novel: heart-pounding tension, astonishing plot twists, and fascinating science. Mark Alpert manages to make physics more thrilling than I ever imagined!"

—Tess Gerritsen, *New York Times* bestselling author of *The Bone Garden*

"An ingenious twist on Einstein's genius."

—Thomas Greanias, *New York Times* bestselling author of *Atlantis Rising*

"Alpert has a rare gift for combining cutting-edge science with an unrelenting pace and edge-of-the-seat action. An impressive debut."

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"I have always been fascinated by the potential of science, the point where physics appears to defy its own laws and behave in uncertain ways. Thanks to this wonderful novel, I have reunited with an old passion and enjoyed a journey full of unexpected twists and drama."

—Javier Sierra, *New York Times* bestselling author of *The Secret Supper*

*For Lisa, who has filled my universe with wonders*

*The unleashed power of the atom has changed everything save  
our modes of thinking, and thus we drift toward unparalleled  
catastrophe.*

—ALBERT EINSTEIN

## Chapter One

HANS WALTHER KLEINMAN, ONE OF THE GREAT THEORETICAL physicists of our time, was drowning in his bathtub. A stranger with long, sinewy arms had pinned Hans's shoulders to the porcelain bottom.

Although the water was only thirty centimeters deep, the pinioning arms kept Hans from raising his face to the surface. He clawed at the stranger's hands, trying to loosen their grip, but the man was a *shtarker*, a young vicious brute, and Hans was a seventy-nine-year-old with arthritis and a weak heart. Flailing about, he kicked the sides of the tub, and the lukewarm water sloshed all around him. He couldn't get a good look at his attacker—the man's face was a shifting, watery blur. The *shtarker* must have slipped into the apartment through the open window by the fire escape, then rushed into the bathroom when he realized that Hans was inside.

As Hans struggled, he felt the pressure building in his chest. It started in the center, right under his sternum, and quickly filled his whole rib cage. A negative pressure, pushing inward from all sides, constricting his lungs. Within seconds it rose to his neck, a hot choking tightness, and Hans opened his mouth, gagging. Lukewarm water rushed down his throat, and now Hans devolved into a creature of pure panic, a twisting, squirming primitive animal going into its final convulsions. *No, no, no, no, no, no!* Then he lay still, and as his vision faded he saw only the wavelets at the surface, rippling just a few centimeters above him. A Fourier series, he thought. And so beautiful.

But it wasn't the end, not yet. When Hans regained consciousness he was lying facedown on the cold tiled floor, coughing up bathwater. His eyes ached and his stomach lurched and each breath

was an excruciating gasp. Coming back to life was actually more painful than dying. Then he felt a sharp blow to his back, right between his shoulder blades, and heard someone say in a jaunty voice, "Time to wake up!"

The stranger grabbed him by the elbows and rolled him over. The back of Hans's head banged against the wet tiles. Still breathing hard, he looked up at his attacker, who was kneeling on the bathroom rug. A huge man, a hundred kilograms at the least. Shoulder muscles bulging under his black T-shirt, camouflage pants tucked into black leather boots. A bald head, disproportionately small compared with his body, with black stubble on his cheeks and a gray scar on his jaw. Most likely a junkie, Hans guessed. After he kills me, he'll tear the place apart, hunting for my valuables. Only then will the stupid *putz* realize I don't have a goddamn cent.

The *shtarker* stretched his thin lips into a smile. "Now we'll have a little talk, yes? You can call me Simon, if you like."

The man's voice had an unusual accent that Hans couldn't place. His eyes were small and brown, his nose was crooked, and his skin was the color of a weathered brick. His features were ugly but indistinct—he could be Spanish, Russian, Turkish, almost anything. Hans tried to say, "What do you want?" but when he opened his mouth he only retched again.

Simon looked amused. "Yes, yes, I'm so sorry about that. But I needed to show you that I'm serious. And better to do that right away, eh?"

Oddly enough, Hans wasn't afraid now. He'd already accepted the fact that this stranger was going to kill him. What disturbed him was the sheer impudence of the man, who kept smiling as Hans lay naked on the floor. It seemed clear what would happen next: Simon was going to order him to reveal the number of his ATM card. The same thing had happened to one of Hans's neighbors, an eighty-two-year-old woman who'd been attacked in her apartment and beaten until she gave up the number. No, Hans wasn't afraid—he was furious! He coughed the last drops of bathwater out



of his throat and propped himself up on his elbows. "You made a mistake this time, you *ganef*. I have no money. I don't even have a bank card."

"I don't want your money, Dr. Kleinman. I'm interested in physics, not money. You're familiar with the subject, I assume?"

At first Hans simply grew more enraged. Was this *putz* making fun of him? Who did he think he was? After a moment, though, a more disturbing question occurred to him: How did this man find out my name? And how does he know I'm a physicist?

Simon seemed to guess what Hans was thinking. "Don't be so surprised, Professor. I'm not as ignorant as I look. I may not have any advanced degrees, but I'm a fast learner."

Hans had surmised by now that this man was no junkie. "Who are you? What are you doing here?"

"Think of it as a research project. On a very challenging and esoteric topic." His smile broadened. "I admit, some of the equations weren't easy to understand. But I have some friends, you see, and they explained it very well."

"Friends? What do you mean, friends?"

"Well, perhaps that's the wrong word. *Clients* would probably be better. I have some very knowledgeable and well-financed clients. And they hired me to get some information from you."

"What are you talking about? Are you some kind of spy?"

Simon chuckled. "No, no, nothing so grandiose. I'm an independent contractor. Let's just leave it at that."

Hans's mind was racing now. The *shtarker* was a spy, or maybe a terrorist. His exact affiliation was unclear—Iran? North Korea? Al-Qaeda?—but that didn't matter. They were all after the same thing. What Hans didn't understand was why the bastards had targeted him of all people. Like most nuclear physicists of his generation, Hans had done some classified work for the Defense Department in the fifties and sixties, but his specialty had been radioactivity studies. He'd never worked on bomb design or fabrication, and he'd spent most of his professional life doing theoretical research that

was strictly nonmilitary. "I have some bad news for your clients, whoever they are," Hans said. "They picked the wrong physicist."

Simon shook his head. "No, I don't think so."

"What kind of information do you think I can give you? Uranium enrichment? I know nothing about that! And nothing about warhead design either. My field is particle physics, not nuclear engineering. All my research papers are available on the Internet, there's nothing secret about them!"

The stranger shrugged, unperturbed. "You've jumped to the wrong conclusion, I'm afraid. I don't care about warheads and I don't care about your papers. I'm interested in someone else's work, not yours."

"Why are you in my apartment, then? Did you get the wrong address?"

Simon's face hardened. He pushed Hans down on his back and placed one hand flat on his rib cage, leaning forward so he could put his whole weight on it. "This person happens to be someone you knew. Your professor at Princeton fifty-five years ago? The wandering Jew from Bavaria? The man who wrote *Zur Elektrodynamik bewegter Körper*? Surely you haven't forgotten him?"

Hans struggled to breathe. The *shtarker's* hand felt impossibly heavy. *Mein Gott*, he thought. This can't be happening.

Simon leaned over some more, bringing his face so close that Hans could see the black hairs inside his nostrils. "He admired you, Dr. Kleinman. He thought you were one of his most promising assistants. You worked together quite closely in his last few years, didn't you?"

Hans couldn't have replied even if he'd wanted to. Simon was pushing down on him so hard he could feel his vertebrae grinding against the cold tiles.

"Yes, he admired you. But more than that, he trusted you. He conferred with you about everything he worked on during those years. Including his *Einheitliche Feldtheorie*."

At just that moment one of Hans's ribs snapped. On his left

side, on the outer curve, where the tensile strain was greatest. The pain knifed through his chest and Hans opened his mouth to scream, but he couldn't even draw enough breath to cry out. *Oh Gott, Gott im Himmel!* All at once his rational mind disintegrated, and he was afraid, he was terrified! Because he saw what this stranger wanted from him, and he knew that in the end he would be unable to resist.

Simon finally eased off and removed his hand from Hans's chest. Hans took a deep breath, and as the air whooshed in he felt the knife of pain again on his left side. His pleural membrane was torn, which meant that his left lung would soon collapse. He was weeping from the pain and shuddering with each breath. Simon stood over him with his hands on his hips, smiling contentedly, quite satisfied with his work. "So do we understand each other? Do you see what I'm looking for?"

Hans nodded, then closed his eyes. I'm sorry, *Herr Doktor*, he thought. I'm going to betray you now. And in his mind's eye he saw the professor again, saw him as clearly as if the great man were standing right there in the bathroom. But it was nothing like the pictures that everyone knew, the photographs of the unkempt genius with the wild white hair. What Hans remembered was the professor in the last months of his life. The drawn cheeks, the sunken eyes, the defeated grimace. The man who'd glimpsed the truth but, for the sake of the world, couldn't speak it out loud.

Hans felt a kick in his side, just below his broken rib. The pain ripped through his torso, and his eyes sprang open. One of Simon's leather boots rested on Hans's bare hip. "No time for sleeping," he said. "We have work to do. I'm going to get some paper from your desk and you're going to write everything down." He turned around and walked out of the bathroom. "If there's something I don't understand, you'll explain it to me. Like a seminar, yes? Who knows, you might even enjoy it."

Simon headed down the hallway toward Hans's bedroom. A moment later Hans heard rummaging noises. With the stranger

out of sight, some of Hans's fear lifted and he was able to think again, at least until the bastard came back. And what he thought about were the *shtarker's* boots, his shiny black storm-trooper boots. Hans felt a wave of disgust. The man was trying to look like a Nazi. In essence, that's what he was, a Nazi, no different from the thugs in brown uniforms that Hans had seen marching down the streets of Frankfurt when he was seven years old. And the people Simon worked for, those nameless "clients"? Who were they if not Nazis?

Simon returned holding a ballpoint pen in one hand and a legal pad in the other. "All right, from the beginning," he said. "I want you to write the revised field equation."

He bent over, offering the pen and pad, but Hans didn't take them. His lung was collapsing and each breath was a torture, but he wasn't going to help this Nazi. "Go to hell," he rasped.

Simon gave him a mildly scolding look, the kind you'd give to a misbehaving five-year-old. "You know what I think, Dr. Kleinman? I think you need another bath."

In one swift motion he picked Hans up and plunged him into the water again. Once more Hans struggled to raise his face to the surface, bashing himself against the sides of the tub as he clawed at the *shtarker's* arms. If anything, the second time was more terrifying than the first, because now Hans knew exactly what lay ahead—the tightening agony, the frantic twisting, the mindless descent into blackness.

Hans fell deeper into unconsciousness this time. It took a tremendous effort to emerge from the abyss, and even after Hans opened his eyes he felt like he hadn't fully awoken. His vision was fuzzy around the edges and he could take only shallow breaths.

"Are you there, Dr. Kleinman? Can you hear me?"

The voice sounded muffled now. When Hans looked up he saw the silhouette of the *shtarker*, but his body seemed to be surrounded by a penumbra of vibrating particles.

"I really wish you'd be more reasonable, Dr. Kleinman. If you

look at the situation in a logical way, you'll realize that all this subterfuge is absurd. You can't hide something like this forever."

Hans looked a little closer at the penumbra surrounding the man and saw that the particles weren't actually vibrating—they were popping in and out of existence, pairs of particles and anti-particles appearing like magic from the quantum vacuum and then disappearing just as quickly. This is amazing, Hans thought. If only I had a camera!

"Even if you don't help us, my clients will get what they want. Perhaps you didn't know this, but your professor had other confidants. He thought it would be clever to parcel the information among them. We've already contacted a few of these old gentlemen, and they've been most helpful. One way or another, we'll get what we need. So why make this hard on yourself?"

The evanescent particles seemed to grow larger as Hans stared at them. Upon closer inspection it became clear that they weren't particles at all but infinitely thin strings stretching from one curtain of space to another. The strings shivered between the undulating curtains, which curled into tubes and cones and manifolds. And the whole elaborate dance was proceeding exactly as predicted, exactly as *Herr Doktor* had described!

"I'm sorry, Dr. Kleinman, but my patience is wearing thin. I don't enjoy doing this, but you leave me no choice."

The man kicked him three times in the left side of his chest, but Hans didn't even feel it. The diaphanous curtains of space had folded around him. Hans could see them so clearly, like curving sheets of blown glass, brilliant and impenetrable, yet soft to the touch. *But the other man obviously couldn't see them. Who was this man, anyway? He looked so clownish standing there in his black leather boots. "Don't you see them?" Hans whispered. "They're right in front of your eyes!"*

The man let out a sigh. "I guess this will require a more vigorous kind of persuasion." He retreated to the hallway and opened the door to the linen closet. "Let's see what we have here." After

a moment he returned to the bathroom carrying a plastic bottle of rubbing alcohol and a steam iron. "Dr. Kleinman, could you tell me where the nearest electric outlet is?"

Hans forgot about the man. He saw nothing but the lacy folds of the universe, curving around him like an infinitely soft blanket.

## *Chapter Two*

DAVID SWIFT WAS IN AN UNUSUALLY GOOD MOOD. HE AND Jonah, his seven-year-old son, had just spent a marvelous afternoon in Central Park. To cap off the day, David had bought ice-cream cones from a pushcart at Seventy-second Street, and now father and son were strolling through the sultry June twilight toward David's ex-wife's apartment. Jonah was in a good mood, too, because in his right hand—his left hand held the ice-cream cone—he brandished a brand-new, triple-shot Super Soaker. As Jonah walked down the sidewalk he idly pointed the high-tech water gun at various random targets—windows, mailboxes, a few clusters of pigeons—but David wasn't concerned. He'd emptied the gun's reservoir before they'd left the park.

Jonah somehow managed to lick his ice cream while sighting down the barrel of the Super Soaker. "So how does it work again? Why does the water come out so fast?"

David had explained the process twice before, but he didn't mind repeating it. He loved having this kind of conversation with his son. "When you move that red thing, the pump handle? That pushes the water from the big reservoir to the smaller one."

"Wait, where's the smaller one?"

David pointed at the back of the gun. "It's right here. The smaller reservoir has some air in it, and when you pump water into the tank there's less room for the air. The air molecules get squeezed together and start pushing on the water."

"I don't get it. Why do they push the water?"

"Because air molecules are always bouncing around, see? And when you squeeze them together, they bounce against the water more."

"Can I bring the gun to school for show-and-tell?"

"Uh, I don't know . . ."

"Why not? It's science, right?"

"I don't think they allow water guns in school. But you're right, there's definitely science in this thing. The guy who invented the Super Soaker was a scientist. A nuclear engineer who worked for NASA."

A bus lunged down Columbus Avenue and Jonah tracked it with his water gun. He seemed to be losing interest in the physics of Super Soakers. "Why didn't *you* become a scientist, Dad?"

David thought for a second before answering. "Well, not everyone can be a scientist. But I write books about the history of science and that's also fun. I get to learn about famous people like Isaac Newton and Albert Einstein and teach courses about them."

"I don't want to do that. I'm gonna be a real scientist. I'm gonna invent a spaceship that can fly to Pluto in five seconds."

It would've been amusing to talk about the Pluto spaceship, but now David was uncomfortable. He felt a strong need to improve his standing in his son's eyes. "A long time ago, when I was in graduate school, I did some real science. And it was all about space."

Jonah turned away from the street and stared at him. "You mean spaceships?" he asked hopefully. "Spaceships that can go a billion miles per second?"

"No, it was about the shape of space. What space would look like if there were only two dimensions instead of three."

"I don't get it. What's a dimension?"

"A universe with two dimensions has length and width, but no depth. Like a giant sheet." David held out his hands, palms down, as if he were smoothing an infinite sheet. "I had this teacher, Professor Kleinman? He's one of the smartest scientists in the whole world. And we wrote a paper together about two-dimensional universes."

"A paper?" The excitement seemed to drain from Jonah's face.

"Yeah, that's what scientists do, they write papers about their discoveries. So their colleagues can see what they've done."



Jonah turned back to watch the traffic. He was so bored, he didn't even bother to ask what the word *colleagues* meant. "I'm gonna ask Mom if I can take the Super Soaker to show-and-tell."

A minute later they walked into the apartment building where Jonah and his mother lived. David had lived there, too, until two years ago, when he and Karen had separated. Now he had a small apartment of his own farther uptown, closer to his job at Columbia University. Every weekday he picked up Jonah from school at three o'clock and delivered him to his mother four hours later. The arrangement allowed them to avoid the considerable expense of hiring a nanny. But David's heart always sank as he walked through the lobby of his old building and entered the sluggish elevator. He felt like an exile.

When they finally reached the fourteenth floor, David saw Karen standing in the apartment's doorway. She hadn't changed out of her work clothes yet; she wore black pumps and a gray business suit, the standard uniform of a corporate lawyer. With her arms folded across her chest, she scrutinized her ex-husband, glancing with evident disapproval at the stubble on David's face and his mud-caked jeans and the T-shirt emblazoned with the name of his softball team, the Hitless Historians. Then her eyes fixed on the Super Soaker. Sensing trouble, Jonah handed the gun to David and slipped past his mother into the apartment. "Gotta pee," he yelled as he ran to the bathroom.

Karen shook her head as she stared at the water gun. A stray lock of blond hair dangled beside her left cheek. She was still beautiful, David thought, but it was a cold beauty, cold and unyielding. She raised her hand to her face and whisked the blond lock to the side. "What the hell were you thinking?"

David had prepared himself for this. "Look, I already told Jonah the rules. No shooting at people. We went to the park and shot at the rocks and trees. It was fun."

"You think a machine gun is an appropriate toy for a seven-year-old?"