

Susanne Paola Antonetta

entangled  
objects



A Novel in  
Quantum Parts

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*A Novel in Quantum Parts*

SUSANNE PAOLA ANTONETTA

S L A N T



ENTANGLED OBJECTS  
A Novel in Quantum Parts

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For Bruce and Jin, my dearest entanglements



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# PART I



## Fan: Spooky Action at a Distance

Paul traveled to Korea in order to make a woman.

Or at least that's how Fan put it to people who'd asked her. Sometimes, to punctuate the joke, she called him "Dr. Frankenstein" or "Victor." Or "Pygmalion," after the Greek sculptor who fell in love with his statue, then petitioned Aphrodite to bring her to life. Paul's new partner, In-Su, had successfully cloned a human female for the stem cells and planned to do it again. South Korea was particularly interested in therapeutic cloning, cloning humans for stem cells which, ideally, could be made pluripotent, or able to form duplicates of any cell in the body. There were good research funds.

The female would just be an embryo, but the cells came from women, so it would be, technically, a woman. A lame joke, really, but Fan kept making it.

Now she sat in her apartment in Hongdae, a few weeks after their return to Korea. It was a two-bedroom, a large apartment in cramped Seoul, in a kind of building Koreans called officetels—skyscraper-y office-like buildings that had short- and long-term housing, gyms, and some businesses. It was an unusually large apartment for an officetel, and one the university kept for special visitors. Like most Korean homes, hers had heat that came up through the floors, beds low to the ground, an impossible washing machine the landlord recommended she watch a YouTube video to figure out, and no oven.

Paul thought she would hate all these aspects of their place. In fact, she only hated the impossible washing machine. She loved the *ondol*, the heated floors, the way her body warmed from the soles up; she could swear she'd never been truly warm before. She loved the steel-and-glass

seriousness of her building. And she loved having no oven the way she loved many of the people she saw every day having no English—it took something she realized she'd never really wanted out of the daily equation.

Publicly as well as privately, she called Paul Victor rather than calling him by his name. Or she called him Pygmalion, though her tone was something neither of them fully understood. He simply called her Babe.

Yoon, the wife of her husband's new colleague In-Su, had given her brochures, things to do to entertain herself. She sat in the living room of her apartment and leafed through them, wondering.

"I want you to get out," Paul said every night after the lab. "Go to that spa, maybe. If you're intimidated by the subway, cab it." By *spa* he meant bathhouse, a place recommended by Yoon. Paul had trouble getting through his days without feeling Fan's days satisfied her. Fan sometimes pulled a certain facial expression when Paul fretted: mouth curved up a little, eyebrows raised a little, quietly optimistic. She started to pull it now but stopped.

"The one time I went to a spa in the U.S. I wanted to kill myself." Not that Paul didn't know. "All these people telling me I could've been a hand model." She picked up her left hand with her right and swung the fingers through the air. "Those fingers! Sooo elegant!" I really just wanted to shoo them out and clean the tables. Clorox, Victor, Clorox."

"You feel like you don't deserve it," said Paul.

"That's not it. Who feels better about life because of their fingers?" Fan looked at her fingers, nails still a little mooned with garden grime. "They just need to flatter you. It feels so fake."

"You miss teaching?"

"The classroom has gotten boring. I appreciate the time off. I can refresh a little."

"Ah," said Paul. "You can do some reading, go over your syllabuses here, jazz things up."

"I guess." Had she given him what he needed to end this conversation?

"I'm happy, Victor," she said, knowing that he wouldn't understand the appeal of this stillness.

No matter what Fan said, Paul wanted to think she loved her job. Fan taught as adjunct faculty, a second-tier worker, not expected to publish, underpaid. She taught mostly Shakespeare courses and sometimes fiction. She was paid \$3,900 per course and got health insurance if she taught four or more courses per year, but she had Paul's insurance, so it didn't matter. She earned little most years—well under \$25,000—and if she had ever been competitive for a tenure-track teaching job, she was not any longer. She had published two stories in a decent but not highly selective literary journal, and never published any criticism, not even parts of her dissertation.

Her adviser in her doctoral program talked her out of writing a dissertation on Shakespeare, her great literary love, on the grounds that so many Shakespeare scholars existed the move was career suicide. So she wrote a dissertation on doubling motifs in the work of Thomas Kyd, a Renaissance playwright she got heartily sick of by the time she finished her PhD (it didn't help that he only wrote one identified play, *The Spanish Tragedy*).

She had not got much out of the process but an inner voice that boomed out Kyd lines like *farewell, good ha ha ha* at random moments. And, in an irony Shakespeare himself would have appreciated, she failed to find a tenure-track job, and wound up teaching Shakespeare, for a handful of coin, anyway.

The only way in which her education gave her a certain standard of living was, sadly, that it enabled her to marry Paul. He loved her but would not have fallen in love with a woman who had no standing within the academic world. Or one whose standing was equal to his, though he observed careful civilities about her work. She knew this about him, as she knew that a part of her love attached to the comfort that came with his money.

She wondered: if she had pursued Shakespeare, which she really loved, or gone after fiction, getting a degree in that and trying harder to publish, would things have worked out differently? She met her husband at the university, and he had tenure, plus a lab for his work.

Perhaps she had given Paul enough. *Own your authority*, he often told her about her teaching. Perhaps he'd imagined he heard something he could call owning.

Paul had grown up with money, and now had more. As a cloner, he did work in the agricultural sector, cloning sheep and cattle. What he earned varied, always within the six-figure range.

“Paul makes gu’ money,” as Fan’s father put it, meaning *good money*. Her dad said *gu’ money* about a lot of people’s earnings. Once as a little girl she asked him what that meant. He said, Gu’ money is what anybody makes who makes more than me.

Fan grew up in the Appalachian part of Pennsylvania. Her family mined coal. Neither of her parents finished middle school. Her father went from the mines to work as a machinist. Early in her life, there were times when they had cereal for dinner, always the sweet kind with pastel bits.

Fan would arrange the colors in her bowl: baby blue in the center, a circle of pink around it, then the boring tan ones. Sometimes they had odd combinations of food from the Food Bank—once a block of American cheese, canned beef stew, canned corn. Fan’s mother, in what Fan took as a sort of protest, mixed these things into one dish. The cheese, probably more of a Velveeta than a real cheese, formed a molten blob in the center of the stew, and the corn floated. Once again Fan became obsessed with the aesthetics of her plate, swirling the stew around the cheese, the corn kernels moving fast and on top, like the bodies of Olympic swimmers. Both of her parents understood this stirring-staring as another form of protest. It was not.

Fan got ahead in life, went to school, working as a maid at a hotel. And she’d come to like that work in many ways, a fact that bothered Paul. He wanted her to hire a cleaning lady. She secretly loved cleaning the house, if she was in the mood, especially white surfaces like tubs. The sprays that made them shimmer. She might at times need to vee-fold the ends of a newly unwrapped roll of toilet paper. And then she’d hate to use it to wipe herself, so she’d hold in her pee for a while.

Unlike her, Paul loved his work. He loved to talk about it, not just the hope but the grotesqueries of animal cloning: the gigantism so extreme host mothers could die giving birth, the hundreds of deformations and deaths among the clones that preceded success, the aging that made Dolly the cloned sheep like a twelve-year-old at the age of three. She understood the basics, like how most of the quirks in cloning came from gene expression, not just what genes were present in the clone but

whether they got turned on or turned off, so, for instance, the first cloned cat, named CC for Copy Cat or Carbon Copy, turned out a striped tabby, though her genes came from a cat that was calico.

Paul brought home photos to show her: a cloned calf with an enlarged heart that looked like a catcher's mitt; newborn creatures otherwise normal but with massive heads, so a newborn calf body sprawled under a head almost the size of a grown cow's; pig livers huge and bulbous with fat; swollen tongues jutting from tiny heads, as if the creatures had been hung.

Fan loved animals and wondered why Paul's work did not bother her more. Most of the photos were from other cloners' projects. They did not trouble her, though, even if Paul had a hand in the process, and her feeling was that in making a thing you got a free pass: it could be botched, like the play within a play in Kyd's *Spanish Tragedy*, a silly scene with a drama performed at court in which every character theoretically spoke a foreign language, though the characters just spoke English and pretended not to understand each other. The botch of the making showed the maker's hand.

"It's the newest medieval thing going," she said to Paul about cloning, and it became a joke for them. "Want to hear the newest medieval, Babe?" he said when he came home from work. Until Seoul: here when she asked him what the Middle Ages had produced that day, he shrugged.

"Oh," she said. "It's people, isn't it. I guess that's different." He didn't answer, merely watched her.

Fan for now just concerned herself with loving her freedom and with physics. Introduced to physics by Paul, she had come to understand it far better than he did. The concepts at least, not the math. She joined the British Institute of Physics one day, kind of a gag, but also serious. She selected her membership title from a very British pull-down menu: *Professor Dame*.

The truth was that physics formed part of her attraction to Paul. It seemed to have answers, if puzzling ones, to questions she found hard to articulate. Fan had always felt as if she were part of a world other people seemed unerringly tuned into, but that she herself perceived dimly. She felt like one of the mice Paul once told her about, who had human brain cells injected into their brains and grew neural nets rich



with human cells, Frankenstein mice called *chimeras*. “They do seem smarter after,” Paul said noncommittally, “for mice,” but the mice stuck with her—knowing enough to consider their caged scrabbling lives with a sense of pointlessness, she guessed, but at the same time, knowing too little to make sense of it. Condemned just to watch.

Now she read her physics obsessively, her favorite magazines, *New Scientist* and *Physics World*. What intrigued her mostly involved quanta, bits like electrons that don’t seem to exist in any specific space or state, strangely, until they’re measured. They’re in superposition, a word she loved, which meant they’re blurs of possibilities, both waves and particles at once. Outside of any understandable time. Possibly entangled, so that changes in one entangled particle would cause an instantaneous but opposite change in the other, no matter how far apart. Quantum particles make up all atoms, so they’re what humans are at the deepest level, but they exist according to a different set of rules. The science spoke to Fan, as her voice spoke to her spouse, in a way she couldn’t put her quantum finger on.

“I want to be everything at once,” she told Paul, and he replied, borrowing her unreadable tone,

“You can’t. You’re too complicated.”

Fan realized, when she put her hand to her head, that her hair had been scraped into a bun. It was one of those perfectly round buns Korean women seemed to do with a flick of the wrist. She had felt the pull but had no idea the woman, middle-aged and standing before her in a black bikini that could have been a bathing suit but was probably underwear, edged with a little lace, had accomplished in a second this perfect globe of hair. Fan patted it in delight, like a child.

Fan lay naked on a narrow plastic table. The woman in the bikini pulled Fan’s hand off her hair and placed it at her side, not gently. She had the exact look, Fan thought, of an old aunt eyeing a messy little girl, an aunt who didn’t know you or care about you but somehow got stuck getting you ready for an event like a wedding.

The woman was a *ddemiri*, a masseuse whose job was to take salt and a special cloth and scrub the dead skin off Fan’s body. Then the woman would massage her. Fan had not meant to sign up for a massage but the *ddemiri* said “Massage!” in a half shout, pointing to the word

*massage* on a list of services, and there seemed no way to contradict her. None of the four *ddemiri* working away on nude women, all of them Korean, spoke to their clients, or smiled. When they wanted to move the women onto their backs or sides, they grabbed their limbs and flopped them.

Fan had been soaking in a warm mugwort pool waiting for her *masseuse* to finish with a previous client. She watched the *ddemiri* pound the women's bodies with their forearms; they cupped their hands and smacked the flesh, mostly around the butt, with a cracking sound like a bone breaking.

Fan, for the first time since arriving in Korea, felt anxiety welling up into her stomach. She cast her eyes around for an exit. But that was impossible; she had no clothes on, only a dim idea of how to find the locker that held her clothes, and the *masseuse* leveled her vexed gaze at her every few seconds. The woman had cropped hair and a physique that offered the bikini little contour.

The *masseuses*, most between fifty and sixty years old, had the same look, stern and unbending, as if they couldn't stop totting up the vast capacity for error found in human flesh. Yoon was right. Fan had come to the *jjimjilbang*, the bathhouse, only after Yoon warned her it would not be like an American spa.

The women are not "friendly like your American massage people," Yoon said, but "very professional, very trained." Fan understood this to mean they didn't flatter you, or introduce themselves, or offer you cups of cucumber water. Or rhapsodize about your fingers. Yoon had visited the U.S., and she knew.

"In your country they want to make you feel special," she said, "here it is just the body."

The *jjimjilbang* was indeed like no spa in the United States—cheap, utilitarian, full of families with little kids and grandmas, and with several sex-segregated floors where nude women strolled from tub to tub or dropped to stretch or do calisthenics. Fan had spent two weeks reveling in her silence and solitude before she started doing things, but even then was choosy. She joined a Korean class that met twice a week at the university, and she visited this spa. Called Dragon Hill, the place was enormous—floor after floor including pools for swimming, enormous tubs for soaking, a video arcade, places to eat, and lord knows what else.

With Fan's arm in the right place the *ddemiri* began working on her body. She leaned into her, using the towel and the salt and rubbing the dead skin off her in shreds and long grey rolls, curled and insubstantial as spider webbing. What was dead on Fan stripped away, literally. The *ddemiri* put Fan on her side and scissored her legs, she pushed her on her back, on her stomach. She scrubbed down Fan's breasts and her butt and in front stopped only at her pubic hair. Every inch of Fan gave up its dead cells, grey, thin, scattering around her as if she burned in an impossible slow burn and threw off ash. The word *dde* kept rolling through Fan's mind: *dde*, *ded*, *dead*. How strange, Fan thought, that words keep circling to the same thing, like water swirling in a drain. She imagined *ddemiri* somehow meant *death watcher*, a possible reading of the roots of the word in English, though of course it wasn't English.

At some points—at Fan's breasts, at her feet—the *ddemiri's* scrubbing hurt so much Fan cried out, but the masseuse did not slow down, or even appear to notice.

Every few moments the *ddemiri* took a bowl of warm water and poured it all over Fan's body. Now and then she poured it carefully over Fan's forehead. The ash spilled away with the water and then the woman worked the towel once more and the flecks re-accumulated.

As the *ddemiri* worked—leaning all her strength, her self, into the deadness at Fan's surface—she reached up to Fan's face, every minute or so, and smoothed the hair back from her temple. Like the gesture she used to form the bun, this one was quick and sure. She placed her palm on Fan's hair, sleeked it back. Fan's hair sat tight in her bun with no stray strands; her hair got wet regardless, warm water from the bowls sloshing across the table.

The gesture felt like a mother's, a pointless and absent-minded keeping neat. The *ddemiri* kept up the smoothing as she finished the scrub and began to massage, cupping her hands and beating Fan's ass with the bone-crunching sound she'd heard earlier. It hurt a little but not as much as the sound had promised, then made her feel alive. The *ddemiri* worked on Fan's feet, her back, her neck. The woman's hand, all muscle, felt light only as it smoothed down her forehead.

Fan began crying to herself, on and off, the water still draining from her face concealing the tears. At the end of the massage the *ddemiri* pulled the band out with one hand, grasped Fan's hair and washed it,

massaging her scalp. There had been no purpose, then, to keeping her hair slicked down and wet, out of the way of the oils, the salts, the skin.

Fan cried a little more. It felt pure, to get all this woman's attention and also its complete absence. To be so wholly cared for by someone who didn't love her.

Finally, the masseuse slapped her butt with an air of finality and stepped back. Fan stood up, naked and spilling water, muscles separately jumping to life. The ddemiri punched her services into Fan's bracelet, given to her on check-in. All payment at the jjimjilbang happened on departure.

"Can I have your name?" Fan asked her.

"Uh?" The ddemiri looked startled, then waved her hand. "No, no."

Fan wasn't sure if the ddemiri had understood her and somehow rejected the idea of sharing her name, or if she had not understood. But you couldn't choose your ddemiri by name anyway. If Fan came back at the same time, she reasoned, the woman would be here. Came back when? Tomorrow?

Tomorrow might seem desperate. Fan would come back once a week, she decided. And she'd sit stubbornly in her mugwort pool until this particular ddemiri was free. Once a week—one day in seven. One was a decorous number.

Fan got back to her apartment, by cab, at around five o'clock. Paul was not there yet, but she expected him soon. He had been coming home much earlier than he would have in the States, throwing himself down on the couch with an unhappy look. He did this tonight. He had a habit when things bothered him of staring down at his thumbs, jerking them up and down, as if thinking through their opposability.

He had begun using a gel in his straight dark hair, slicking it back as Korean professional men did. Fan had always found his looks a bit generic, a little bit like the actor Seth Rogen, maybe, but cleaned up. He trimmed his beard close here and with the gelled hair looked more individual, a heavy-cheeked man with a nose that flared, and brows that never really ended, but ran across the top of his face in swards and strands.

"I don't know how to contribute," Paul said. "I don't know what they're doing. I never hear from In-Su."

"Can't you just stop into the lab? Talk to them?"

Paul shrugged and looked at his thumbs. “In-Su won’t tell me the schedule. I stop in but there’re just the grad students and I have to ask them what they’re doing. It’s embarrassing.”

She wondered if he wanted her to say, *We can go home.*

She said instead: “Let’s get dumplings.”

Fan suggested they go to a North Korean dumpling restaurant they knew of in Insadong, a pedestrian neighborhood, then take a walk. Paul found a lot of Korean food too spicy, though Fan loved it. North Korean food was mild. Today had been a cool, sunny day. Her body, suffused with new blood and scrubbed bare, felt alive beneath her, and she wanted to walk, to move.

“Three objects can be entangled,” she told Paul. “They’ve proven it.” This news had just been reported in *Physics World*. Fan had lately become obsessed with entanglement, how human it felt in some way—particles causing one another to change but stay opposite, like a particle with up spin creating down spin in the other. Three particles entangled would also keep changing one another’s states. It was bizarre and Einstein dismissed entanglement as *spooky action at a distance*, but it kept proving true. In the past, only two particles were found to be entangled.

“Huh,” said Paul, idly looking at three fingers. “I wouldn’t have expected that. Two makes a weird sort of sense. Symmetry or something.”

“Lee Smolin thinks all particles have views on the universe. Based on their events. Perspectives. Entanglement is shared perspectives.”

Fan and Paul had passed through the crowded streets of Insadong proper and moved onto a broad avenue.

“Gazillions of quantum particles in the body. Who knows how many of them are entangled. Maybe that’s the reason you meet someone and you just have to see them again.”

“That’s poetry,” said Paul.

“But particles in human bodies are entangled with particles in other human bodies. We know that.”

“It’s still poetry.” Calling things *poetry* was not a compliment.

In bed that night Fan reached over to Paul and wedged one hand under his waist and used the other to pull his hips to her. It wasn’t like her to initiate sex so straightforwardly, but her body felt too delicious to keep to herself: as soft as the tip of a petal—she couldn’t stop feeling her own arms—the alive, blood-rushed surface.

Paul sank onto her, kissing her. She wondered if he would be too dejected about work to want to make love to her, but he became hard right away and ran his tongue through her mouth as if he'd lost something in there. He lubricated even before she touched him.

She placed his right hand on her thigh.

"It feels like embryo skin," he said. "What did you say they scrubbed you with?"

"Salt."

"Salt." Paul put his tongue to her shoulder. "I don't taste anything. Just you."

Funny to think she had a flavor, like an herb he might recognize in a dish.

"They wash it off."

Just the flick of his forefinger around her clit for a few minutes brought her to climax. Everything down there felt sweet and warm and full. They had intercourse with Paul on top—his choice, she was finished—and her legs wound round his shoulders. Before Paul would enter her, he asked her twice if she was sure she'd put in her diaphragm. He often did this. She wondered what had come first in Paul, the interest in cloning, or the fear of birth.

Whatever Paul might be dealing with at the lab, Fan would never agree to leave. It surprised her how much she had fallen in love with Korea, as much as it would have surprised her to fall in love with a man other than Paul. In fact, she fell in love, with Seoul in particular, the way people fall in love with other people: a visceral, even hormonal, giddy love, deep down in her body. She and Paul visited the city in the fall of the year before the move, maple leaves colored and swirling through the air like rose petals, Seoul calm and shut down for a harvest holiday.

Then the holiday ended and people thronged the streets as if they'd been poured up from the center of the earth, shopping, eating. They stayed then in Insadong. Vendors lined the streets, selling cheap clothes with delicate touches like openwork on the sleeves, dozens of kinds of foods: lollipops of scorched sugar, edible horns of soft ice cream, nuts, fruits. Yesterday's dumpling stand became today's pancakes bristling with scallion. She could hardly take it in. She reached an equilibrium she'd never felt before, so much to see and describe to herself her inner

voice couldn't go beyond description and have reactions beyond an open receptive joy.

Everyone smiled at her and said what they could in English, even if it were just *OK* or *hello*, and they seemed both happy to see her and unable to see the person talking made her, whom they couldn't access. She had that feeling of teenage infatuation: as if someone has carbonated your blood.

The red of the maples was even a bit richer than a rose. She and Paul walked along a river at the edge of Insadong, a paved walkway by a channel of water. Paul saw her admiring the trees and picked up a handful of leaves, handing her a bunch by the stem. They crossed the street and he bought her a bag of walnut-shaped candy, dough molded around a nut and sweet bean paste.

"Paul! Candy and flowers!" she said, and she saw herself suddenly through his eyes: she was never so uncomplicatedly happy. He smiled, and looked nervous at the same time, rattled with wonder. She had used his name.

Fan was unsure how Paul had met In-Su (at a conference, had Paul said?), or why he'd been invited to take part in this work, given that most of his research was in agriculture. Any way of phrasing the question to him seemed to question his skills, however, and their relationship had always had that certain delicacy in regard to their work.

Paul never used the word *adjunct*. Rarely did anyone in her life: her father had no idea what it meant. He called his daughter "Professor" and could break down in tears talking about how far she'd gotten in life, *all on her own, I couldn't help her*, he'd say. Her mother had Alzheimer's; that stress and age had made him maudlin.

She would touch his shoulder. "You help me every day, Pop." And she meant what she said, though not quite in the meaning he took: his strong but bent body, knobby with old breaks, his hands dark even years removed from the machine grease and black oils of his job, reminded her she could be doing worse things than what she was doing. It was more complicated than that he had been impoverished by his lack of education, while she had been near-impoverished by its access.

*Grease-monkey hands*, he said of himself. And she was proud of his pride. But when she saw the course of her life, she saw a Ferris wheel that had peaked when she got her BA. She perched at the top of things

staring off into the educational future, seeing a vision like a tourist brochure of a beach, a paradise—a job that couldn't be taken away from her because of tenure and that paid well, and gave her summers off. But the wheel kept turning and landed her in the same place she'd begun. She x'ed up papers instead of bathroom mirrors (with Windex; spraying in an x shape gave you the best clean); each month she paid money she didn't have to companies she didn't recognize that had bought her loans. Before her marriage she taught a full course load in the summer to keep up. All for the privilege of having a job for which she did not have to wear knee pads.

And she missed the society of her old job. Among the chambermaids, as the hotel where she worked called its maids, the position gave the women workers an equality; her smoke breaks with the other women, the times they stood rinsing out their mops together, seemed like some of the purest moments of communion she'd ever known. They had many religions and origins and ethnicities but ultimately, they were maids, the ones who put sponge and Mr. Clean Magic Eraser to the grime left by others, those other people with no sense and no shame. They laughed about the guests: who had a quickie in the afternoon; what love affairs they'd interrupted, sometimes the chambermaids in their maid outfits surprising women—now and then a man—in their own versions of maid's outfits.

This surprising of maid-dressers—sometimes just a glance through a door left a little open—happened often enough that they had a code for it: *We got company*, they said, or *We got company in 432*. Ultimately the maids as a group approved of guests for their lovemaking. They watched these guests in the hallways, reported back on their public demeanors, stacked against their private ones.

Once a week or so Fan and Yoon met to shop or have lunch. Yoon and In-Su had two little boys—five and seven, adorable—but like many Seoul-ites they had household help. She called Fan, saying simply *You want lunch? You want to shop?* either picking Fan up or telling her where to meet. For lunch Yoon nearly always insisted on a Paris Café, one of a chain of patisseries in Seoul, and Fan could never decide if this was because Yoon felt Fan would be more comfortable with European food, or if Yoon loved the chance to eat the rich pastries—chocolate tarts, Napoleons, tiramisus: she picked them up with silver tongs and heaped



them on her tray. Over time Fan suspected the latter; Yoon chose her sweets while giving Fan a bright and secret smile. Fan could imagine In-Su looking down on Yoon for her love of fat and chocolate and sugar, a man who thought so necessarily about women as devices that made babies, and the stuff of babies.

Yoon tended to linger on her consonants and she had a particular and lovely way of saying the letter *s*, with almost a *sh* sound. When she and Yoon talked, Yoon often looked at her and let out a slow *yessss*, eyes meeting hers, a word that felt full of thought and empathy.

In their first physics conversation, Paul talked to Fan about observation. They were driving, dating. Paul wheeled this way and that to avoid bicyclists, she pretended the white line was a food the car was eating.

"It's weird," Paul said, "but it seems like until quantum things are observed they're in every possible state at once. Outside of any physical place or physical time." He told her one of the proofs of this came from an experiment known as the double-slit. In it, quantum bits like photons get shot through parallel slits. The photons remain in superposition until they hit a detector. Then the wave-function collapses and they become particles only. They're not in any definite state until they're measured.

"It makes no sense," Paul said, "but there it is. The results have been replicated thousands of times with all kinds of projectiles and quantum particles. Grad students can do the double slit. It's that clear."

"What's happening, then, when we're not measuring?"

"We'll never know. Physicists say it's like looking in the refrigerator to see if the light is on when the door's closed."

"But we kind of do know what the fridge light's doing."

"There's that."

Fan looked over at Paul, neutral as usual, jittering the wheel with one hand on top of it, one in his lap. "Why are you all there, then," she asked, "stable like that in your body? Why am I? I want to be a wave. I want to hit at things in a big messy way and be everywhere."

"Your body is complicated. And warm. Quantum effects are stronger at low temperatures." Paul's spare hand stroked his chin, as if confirming its warmth.

"You wouldn't think so."

"But within you your quanta must be all kinds of coherent."

Fan loved the language of physics: how objects in a definite state were said to be *decoherent*, rather than the opposite. *Coherent* meant in superposition, everywhere and in multiple states at once. And to be a thing like herself was to be a *classical object*. Classical objects were complex and mostly decoherent structures. But inside them, as Paul said, the little bits could pop around all over the place.

Paul said, "There are physicists like Andrei Linde who think we humans were made to detect things and keep this happening. Decohering and cohering. We participate in making the universe."

"Why would that have to happen though." Fan tapped her foot on the dashboard for a minute. She was a squirrely passenger. "Why can't what made us to watch do the watching? That sounds awfully theological."

"Linde doesn't believe in God. It's like the universe's need. Just part of the needs of existence, I guess. The rules."

"The needs of existence." Both Fan and Paul had been raised Catholic and rejected it. "Existence should have no needs."

Paul added, "Maybe the answer is we're always observed, so we're always in a definite state."

And Fan thought of Cate Crawley, a woman she watched on TV. It seemed quite true that if Fan or someone did not watch Cate, Cate wouldn't exist.

"Observation," said Paul. "It's a thing, in physics."

"Observation as reality, huh," she responded, and answered him, as she often did, with Shakespeare. "There needs no ghost, my lord, come from the grave to tell us this."

Fan thought of Instagram, Snapchat, many apps her students mentioned that she'd never heard of, like Tea and GibGab and Yakking: didn't they believe to be seen is to be real? Though the average person wouldn't know about the double slit, Fan thought, that did not mean their instincts had no merit. Popular culture offered its own intuitive cosmology.

Fan felt about Cate's show, *Crawleys Coming On*, the way she felt about physics. There seemed to be something fundamental in the world that the Crawleys, especially Cate, had figured out. As Fan watched the show, she started imagining herself in the scenes, giving Cate advice, asking her questions. In her head she talked like Cate: *Paul, you're being ridick!*

she thought. Or to Cate: *I need your thoughts on this, Cate*, she would think, although she'd also interject her own ideas into the show. *You can't live your life for your mother, Cate.*

They became one another's voices of reason.

Paul and Fan invented drinks for one another. Their drinks became little guessing games, and in Korea, the drinks came to represent physicists. One invented; the other had to guess. One would mention drinks in the morning, and it generally suggested an evening in which they'd have sex. One night, Fan came home from the jjimjilbang and met Paul, as she'd promised, at six in the kitchen. He handed her a highball glass, empty.

"It's the Heisenberg," he told her.

"And I presume my drink is uncertainty-principled elsewhere."

"Exactly." And Paul produced a bottle of Brunello, a wine she loved.

When it was Fan's turn to create a drink, she handed Paul a martini, running a spoon fast around the glass, so the gin and vermouth mixture in his hand still stirred around the olive. It quaked a little.

"The Einstein," she told him.

Paul looked at the glass for a minute. "Ah. Mass and energy. I get it."

Then Paul glanced admiration at her, which she took to mean she'd shown more imagination than he thought she had.

The week after this, after a late Korean class, Fan came home to find in the kitchen a line of plastic cups coiling around the table, each with a sip, maybe a teaspoon, of pastel liquid glazing the bottom.

"Drink," said Paul, "and guess."

She walked around the table, dripping the liquid on her tongue. It was vodka, a little sweetened, with a vaguely floral note. Ten cups' worth barely left a flavor. All the cups had a slightly different color, shading from pale violet to a series of yellows. Paul began to drink too, starting at the other end, drinking towards her.

"This would be the Hugh Everett," she said finally. Hugh Everett believed in infinite universes—the multiverse theory—and that we constantly pop out new versions of ourselves. Any multiverse theory holds that any possible reality must be, somewhere, true.

"It would be."

"You know Bryce DeWitt once told Everett, 'I like your math, but I have the gut feeling I'm not constantly splitting into parallel versions

of myself.' And Everett said, 'Do you feel like you're orbiting the Sun at thirty kilometers per second?'"

"Touché."

There were days when Paul said, "I love you," and Fan spun him by the shoulder and said, "But are you splitting into parallel versions of yourself?" trying to sound jokey, and he looked at her sadly. What did he say? *Don't use science against me.*

Holding a violet drink, Fan said, "But you can't ever stop. Every second there's a choice. You'll have to walk in front of me pouring Hugh Everetts for the rest of our lives."

"What a future." Paul put his hand on Fan's ass, lightly, as if her ass were a vulnerable infant.

Fan moved away from the hand and tipped her finger into the next cup, bluish. She stuck the tip in her mouth and licked it. The lack of clear flavor bugged her.

"What's in this?"

"Vodka and simple syrup. I got a few little bottles of liqueur, chartreuse and amaretto, and I meant to get more, making each one taste different. But then I got lazy and just used food coloring."

"So this is a universe and this is a universe and this is a universe." Fan kept dipping her finger into the cups. "And the difference is food coloring."

Later that night Fan turned to Paul and said, "Victor, we live in chartreuse." Paul had no idea what she was talking about.

"The chartreuse universe. The first one we drank. For us at least. There may be in infinity of Fans and Pauls before us and after us. But we're here."

"Or we phase into another universe with each choice and just don't know it."

"It's weird to think that each of your embryos is a choice you make. You choose to clone. You choose to stick that DNA into those nuclei. So maybe in some universe they'll grow up." She glanced over at Paul, who began his unhappy surveying of his thumbs.

He said, "Terrifying," and she answered, "You knew they could be women."