

Gossamer

by Stephen Baxter

The flitter bucked. Lvov looked up from her data desk, startled. Beyond the flitter's translucent hull, the wormhole was flooded with sheets of blue-white light which raced toward and past the flitter, giving Lvov the impression of huge, uncontrolled speed.

"We've got a problem," Cobh said. The pilot bent over her own data desk, a frown creasing her thin face.

Lvov had been listening to her data desk's synthesized murmur on temperature inversion layers in nitrogen atmospheres; now she tapped the desk to shut it off. The flitter was a transparent tube, deceptively warm and comfortable. Impossibly fragile. *Astronauts have problems in space*, she thought. *But not me. I'm no hero; I'm only a researcher.* Lvov was twenty-eight years old; she had no plans to die—and certainly not during a routine four-hour hop through a Poole wormhole that had been human-rated for eighty years.

She clung to her desk, her knuckles whitening, wondering if she ought to feel scared.

Cobh sighed and pushed her data desk away; it floated before her. "Close up your suit and buckle up."

"What's wrong?"

"Our speed through the wormhole has increased." Cobh pulled her own restraint harness around her. "We'll reach the terminus in another minute—"

"What? But we should have been traveling for another half-hour."

Cobh looked irritated. "I know that. I think the Interface has become unstable. The wormhole is buckling."

"What does that mean? Are we in danger?"

Cobh checked the integrity of Lvov's pressure suit, then pulled her data desk to her. Cobh was a Caucasian, strong-faced, a native of Mars, perhaps fifty years old. "Well, we can't turn back. One way or the other it'll be over in a few more seconds. Hold tight."

Now Lvov could see the Interface itself, the terminus of the wormhole. The Interface was a blue-white tetrahedron, an angular cage that exploded at her from infinity.

Glowing struts swept over the flitter.

The craft hurtled out of the collapsing wormhole. Light founted around the fleeing craft, as stressed spacetime yielded in a gush of heavy particles.

Lvov glimpsed stars, wheeling.

Cobh dragged the flitter sideways, away from the energy fount—

There was a *lurch*, a discontinuity in the scene beyond the hull. Suddenly a planet loomed before them.

"Lethe," Cobh said. "Where did that come from? I'll have to take her down—we're too close."

Lvov saw a flat, complex landscape, gray-crimson in the light of a swollen moon. The scene was dimly lit, and it rocked wildly as the flitter tumbled. And, stretching between world and moon, she saw...

No. It was impossible.

The vision was gone, receded into darkness.

"Here it comes," Cobh yelled.

Foam erupted, filling the flitter. The foam pushed into Lvov's ears, mouth, and eyes; she was blinded, but she found she could breathe.

She heard a collision, a grinding that lasted seconds, and she imagined the flitter ploughing its way into the surface of the planet. She felt a hard lurch, a rebound.

The fitter came to rest.

A synthesized voice emitted blurred safety instructions. There was a ticking as the hull cooled.

In the sudden stillness, still blinded by foam, Lvov tried to recapture what she had seen. *Spider web. It was a web, stretching from the planet to its moon.*

"Welcome to Pluto." Cobh's voice was breathless, ironic.

Lvov stood on the surface of Pluto.

The suit's insulation was good, but enough heat leaked to send nitrogen clouds hissing around her footsteps, and where she walked she burned craters in the ice. Gravity was only a few percent of G, and Lvov, Earth-born, felt as if she might blow away.

There were clouds above her: wispy cirrus, aerosol clusters suspended in an atmosphere of nitrogen and methane. The clouds occluded bone-white stars. From here, Sol and the moon, Charon, were hidden by the planet's bulk, and it was *dark*, dark on dark, the damaged landscape visible only as a sketch in starlight.

The flitter had dug a trench a mile long and fifty yards deep in this world's antique surface, so Lvov was at the bottom of a valley walled by nitrogen ice. Cobh was hauling equipment out of the crumpled-up wreck of the flitter: scooters, data desks, life-support boxes, Lvov's equipment. Most of the stuff had been robust enough to survive the impact, Lvov saw, but not her own equipment.

Maybe a geologist could have crawled around with nothing more than a hammer and a set of sample bags. But Lvov was an atmospheric scientist. What was she going to achieve here without her equipment?

Her fear was fading now, to be replaced by irritation, impatience. She was five light-hours from Sol; already she was missing the online nets. She kicked at the ice. She was *stuck* here; she couldn't talk to anyone, and there wasn't even the processing power to generate a Virtual environment.

Cobh finished wrestling with the wreckage. She was breathing hard. "Come on," she said. "Let's get out of this ditch and take a look around." She showed Lvov how to work a scooter. It was a simple platform, its inert gas jets controlled by twists of raised handles.

Side by side, Cobh and Lvov rose out of the crash scar.

Pluto ice was a rich crimson laced with organic purple. Lvov made out patterns, dimly, on the surface of the ice; they were like bas-relief, discs the size of dinner plates, with the intricate complexity of snowflakes.

Lvov landed clumsily on the rim of the crash scar, the scooter's blunt prow crunching into surface ice, and she was grateful for the low gravity. The weight and heat of the scooters quickly obliterated the ice patterns.

"We've come down near the equator," Cobh said. "The albedo is higher at the south pole; a cap of methane ice there, I'm told."

"Yes."

Cobh pointed to a bright blue spark, high in the sky. "That's the wormhole Interface, where we emerged, fifty thousand miles away."

Lvov squinted at constellations unchanged from those she'd grown up with on Earth: "Are we stranded?"

Cobh said, with reasonable patience, "For the time being. The flitter is wrecked, and the wormhole has collapsed; we're going to have to go back to Jupiter the long way round."

Three billion miles... "Ten hours ago I was asleep in a hotel room on Io. And now this. What a mess."

Cobh laughed. "I've already sent off messages to the Inner System. They'll be received in about five hours. A one-way GUTship will be sent to retrieve us. It will refuel here, with Charon ice—"

"How long?"

"It depends on the readiness of a ship. Say ten days to prepare, then a ten-day flight out here—"

"Twenty days?"

"We're in no danger. We've supplies for a month. Although we're going to have to live in these suits."

"Lethe. This trip was supposed to last seventy-two hours."

"Well," Cobh said testily, "you'll have to call and cancel your appointments, won't you? All we have to do is wait here; we're not going to be comfortable, but we're safe enough."

"Do you know what happened to the wormhole?"

Cobh shrugged. She stared up at the distant blue spark. "As far as I know, nothing like this has happened before. I think the Interface itself became unstable, and that fed back into the throat... But I don't know how we fell to Pluto so quickly. That doesn't make sense."

"How so?"

"Our trajectory was spacelike. Superluminal." She glanced at Lvov obliquely, as if embarrassed. "For a moment there, we appeared to be traveling faster than light."

"Through normal space? That's impossible."

"Of course it is." Cobh reached up to scratch her cheek, but her gloved fingers rattled against her faceplate. "I think I'll go up to the Interface and take a look around there."

Cobh showed Lvov how to access the life support boxes. Then she strapped her data desk to her back, climbed aboard her scooter, and lifted off the planet's surface, heading for the Interface. Lvov watched her dwindle.

Lvov's isolation closed in. She was alone, the only human on the surface of Pluto.

A reply from the Inner System came within twelve hours of the crash. A GUTship was being sent from Jupiter. It would take thirteen days to refit the ship, followed by an eight-day flight to Pluto, then more delay in taking on fresh reaction mass at Charon. Lvov chafed at the timescale, restless.

There was other mail: concerned notes from Lvov's family, a testy demand for updates from her research supervisor, and for Cobh, orders from her employer to mark as much of the flitter wreck as she could for salvage and analysis. Cobh's ship was a commercial wormhole transit vessel, hired by Oxford—Lvov's university—for this trip. Now, it seemed, a complex battle over liability would be joined between Oxford, Cobh's firm, and the insurance companies.

Lvov, five light-hours from home, found it difficult to respond to the mail asynchronously. She felt as if she had been cut out of the online mind of humanity. In the end, she drafted replies to her family and deleted the rest of the messages.

She checked her research equipment again, but it really was unuseable. She tried to sleep. The suit was uncomfortable, claustrophobic. She was restless, bored, a little scared.

She began a systematic survey of the surface, taking her scooter on widening spiral sweeps around the crash scar.

The landscape was surprisingly complex, a starlit sculpture of feathery ridges and fine ravines. She kept a few hundred feet above the surface; whenever she flew too low, her heat evoked billowing vapor from fragile nitrogen ice, obliterating ancient features, and she experienced obscure guilt.

She found more of the snowflakelike features, generally in little clusters of eight or ten.

Pluto, like its moon-twin Charon, was a ball of rock clad by thick mantles of water ice and nitrogen ice, and laced with methane, ammonia, and organic compounds. It was like a big, stable comet nucleus; it barely deserved the status of "planet." There were *moons* bigger than Pluto.

There had been only a handful of visitors in the eighty years since the building of the Poole wormhole. None of them had troubled to walk the surfaces of Pluto or Charon. The wormhole, Lvov realized, hadn't been built as a commercial proposition, but as a sort of stunt: the link which connected, at last, all of the System's planets to the rapid-transit hub at Jupiter.

She tired of her plodding survey. She made sure she could locate the crash scar, lifted the scooter to a mile above the surface, and flew toward the south polar cap.

Cobh called from the Interface. "I think I'm figuring out what happened here—that superluminal effect I talked about. Lvov, have you heard of an Alcubierre wave?" She dumped images to Lvov's desk—portraits of the wormhole Interface, graphics.

"No." Lvov ignored the input and concentrated on flying the scooter. "Cobh, why should a wormhole become unstable? Hundreds of wormhole rapid transits are made every day, all across the System."

"A wormhole is a flaw in space. It's inherently unstable anyway. The throat and mouths are kept open by active feedback loops involving threads of exotic matter. That's matter with a negative energy density, a sort of antigravity which—"

"But this wormhole went wrong."

"Maybe the tuning wasn't perfect. The presence of the flitter's mass in the throat was enough to send the wormhole over the edge. If the wormhole had been more heavily used, the instability might have been detected earlier, and fixed...."

Over the gray-white pole, Lvov flew through banks of aerosol mist; Cobh's voice whispered to her, remote, without meaning.

Sunrise on Pluto:

Sol was a point of light, low on Lvov's unfolding horizon, wreathed in the complex strata of a cirrus cloud. The Sun was a thousand times fainter than from Earth, but

brighter than any planet in Earth's sky.

The Inner System was a puddle of light around Sol, an oblique disc small enough for Lvov to cover with the palm of her hand. It was a disc that contained almost all of man's hundreds of billions. Sol brought no heat to her raised hand, but she saw faint shadows, cast by the sun on her faceplate.

The nitrogen atmosphere was dynamic. At perihelion—the closest approach to Sol which Pluto was nearing—the air expanded, to three planetary diameters. Methane and other volatiles joined the thickening air, sublimating from the planet's surface. Then, when Pluto turned away from Sol and sailed into its two-hundred-year winter, the air snowed down.

Lvov wished she had her atmospheric analysis equipment now; she felt its lack like an ache.

She passed over spectacular features: Buie Crater, Tombaugh Plateau, the Lowell Range. She recorded them all, walked on them.

After a while, her world, of Earth and information and work, seemed remote, a glittering abstraction. Pluto was like a complex, blind fish, drifting around its two-century orbit, gradually interfacing with her. Changing her, she suspected.

Ten hours after leaving the crash scar, Lvov arrived at the sub-Charon point, called Christy. She kept the scooter hovering, puffs of gas holding her against Pluto's gentle gravity. Sol was halfway up the sky, a diamond of light. Charon hung directly over Lvov's head, a misty blue disc, six times the size of Luna as seen from Earth. Half the moon's lit hemisphere was turned away from Lvov, toward Sol.

Like Luna, Charon was tidally locked to its parent, and kept the same face to Pluto as it orbited. But, unlike Earth, Pluto was also locked to its twin. Every six days the worlds turned about each other, facing each other constantly, like two waltzers. Pluto-Charon was the only significant system in which both partners were tidally locked.

Charon's surface looked pocked. Lvov had her faceplate enhance the image. Many of the gouges were deep and quite regular.

She remarked on this to Cobh, at the Interface.

"The Poole people mostly used Charon material for the building of the wormhole," Cobh said. "Charon is just rock and water ice. It's easier to get to water ice, in particular. Charon doesn't have the inconvenience of an atmosphere, or an overlay of nitrogen ice over the water. And the gravity's shallower."

The wormhole builders had flown out here in a huge, unreliable GUTship. They had lifted ice and rock off Charon, and used it to construct tetrahedra of exotic matter. The tetrahedra had served as Interfaces, the termini of a wormhole. One Interface had been left in orbit around Pluto, and the other had been hauled laboriously back to Jupiter by the GUTship, itself replenished with Charon ice reaction mass.

By such crude means, Michael Poole and his people had opened up the Solar System.

"They made Lethe's own mess of Charon," Lvov said.

She could almost see Cobh's characteristic shrug. *So what?*

Pluto's surface was geologically complex, here at this point of maximal tidal stress. She flew over ravines and ridges; in places, it looked as if the land had been smashed up with an immense hammer, cracked and fractured. She imagined there was a greater mix, here, of interior material with the surface ice.

In many places she saw gatherings of the peculiar snowflakes she had noticed before. Perhaps they were some form of frosting effect, she wondered. She descended, thinking vaguely of collecting samples.

She killed the scooter's jets some yards above the surface, and let the little craft fall under Pluto's gentle gravity. She hit the ice with a soft collision, but without heat-damaging the surface features much beyond a few feet.

She stepped off the scooter. The ice crunched, and she felt layers compress under her, but the fractured surface supported her weight. She looked up toward Charon. The crimson moon was immense, round, heavy.

She caught a glimmer of light, an arc, directly above her.

It was gone immediately. She closed her eyes and tried to recapture it. *A line, slowly curving, like a thread. A web. Suspended between Pluto and Charon.*

She looked again, with her faceplate set to optimal enhancement. She couldn't recapture the vision.

She didn't say anything to Cobh.

"I was right, by the way," Cobh was saying.

"What?" Lvov tried to focus.

"The wormhole instability, when we crashed. It did cause an Alcubierre wave."

"What's an Alcubierre wave?"

"The Interface's negative energy region expanded from the tetrahedron, just for a moment. The negative energy distorted a chunk of spacetime. The chunk containing the flitter, and us."

On one side of the flitter, Cobh said, spacetime had contracted. Like a model black hole. On the other side, it expanded—like a rerun of the Big Bang, the expansion at the beginning of the Universe.

"An Alcubierre wave is a front in spacetime. The Interface—with us embedded inside—was carried along. We were pushed away from the expanding region, and toward

the contraction."

"Like a surfer, on a wave."

"Right." Cobh sounded excited. "The effect's been known to theory, almost since the formulation of relativity. But I don't think anyone's observed it before."

"How lucky for us," Lvov said drily. "You said we traveled faster than light. But that's impossible."

"You can't move faster than light *within spacetime*. Wormholes are one way of getting around this; in a wormhole you are passing through a branch in spacetime. The Alcubierre effect is another way. The superluminal velocity comes from the distortion of space itself; we were carried along *within* distorting space.

"So we weren't breaking lightspeed within our raft of spacetime. But that spacetime itself was distorting at more than lightspeed."

"It sounds like cheating."

"So sue me. Or look up the math."

"Couldn't we use your Alcubierre effect to drive starships?"

"No. The instabilities and the energy drain are forbidding."

One of the snowflake patterns lay mostly undamaged, within Lvov's reach. She crouched and peered at it. The flake was perhaps a foot across. Internal structure was visible within the clear ice as layers of tubes and compartments; it was highly symmetrical, and very complex. She said to Cobh, "This is an impressive crystallization effect. If that's what it is." Gingerly, she reached out with thumb and forefinger, and snapped a short tube off the rim of the flake. She laid the sample on her desk. After a few seconds the analysis presented. "It's mostly water ice, with some contaminants," she told Cobh. "But in a novel molecular form. Denser than normal ice, a kind of glass. Water would freeze like this under high pressures—several thousand atmospheres."

"Perhaps it's material from the interior, brought out by the chthonic mixing in that region."

"Perhaps." Lvov felt more confident now; she was intrigued. "Cobh, there's a larger specimen a few feet farther away."

"Take it easy, Lvov."

She stepped forward. "I'll be fine. I—"

The surface shattered.

Lvov's left foot dropped forward, into a shallow hole; something crackled under the sole of her boot. Threads of ice crystals, oddly woven together, spun up and tracked precise parabolae around her leg.

The fall seemed to take an age; the ice tipped up toward her like an opening door. She put her hands out. Sloe couldn't stop the fall, but she was able to cushion herself, and she kept her faceplate away from the ice. She finished up on her backside; she felt the chill of Pluto ice through the suit material over her buttocks and calves.

"...Lvov? Are you OK?"

She was panting, she found. "I'm fine."

"You were screaming."

"Was I? I'm sorry. I fell."

"You *fell*? How?"

"There was a hole, in the ice." She massaged her left ankle; it didn't seem to be hurt. "It was covered up."

"Show me."

She got to her feet, stepped gingerly back to the open hole, and held up her data desk. The hole was only a few inches deep. "It was covered by a sort of lid, I think."

"Move the desk closer to the hole." Light from the desk, controlled by Cobh, played over the shallow pit.

Lvov found a piece of the smashed lid. It was mostly ice, but there was a texture to its undersurface, embedded thread which bound the ice together.

"Lvov," Cobh said. "Take a look at this."

Lvov lifted the desk aside and peered into the hole. The walls were quite smooth. At the base there was a cluster of spheres, fist-sized. Lvov counted seven; all but one of the spheres had been smashed by her stumble. She picked up the one intact sphere, and turned it over in her hand. It was pearlgray, almost translucent. There was something embedded inside, disc-shaped, complex.

Cobh sounded breathless. "Are you thinking what I'm thinking?"

"It's an egg," Lvov said. She looked around wildly, at the open pit, the egg, the snowflake patterns. Suddenly she saw the meaning of the scene; it was as if a light had shone up from within Pluto, illuminating her. The "snowflakes" represented *life*, she intuited; they had dug the burrows, laid these eggs, and now their bodies of water glass lay dormant or dead, on the ancient ice....

"I'm coming down," Cobh said sternly. "We're going to have to discuss this. Don't say anything to the Inner System; wait until I get back. This could mean trouble for us, Lvov."

Lvov placed the egg back in the shattered nest.

She met Cobh at the crash scar. Cobh was shoveling nitrogen and water ice into the life-support modules' raw material hopper. She hooked up her own and Lvov's suits to the modules, recharging the suits' internal systems. Then she began to carve GUTdrive components out of the flitter's hull. The flitter's central Grand Unified Theory chamber was compact, no larger than a basketball, and the rest of the drive was similarly scaled. "I bet I could get this working," Cobh said. "Although it couldn't take us anywhere."

Lvov sat on a fragment of the shattered hull. Tentatively, she told Cobh about the web.

Cobh stood with hands on hips, facing Lvov, and Lvov could hear her sucking drink from the nipples in her helmet. "Spiders from Pluto? Give me a break."

"It's only an analogy," Lvov said defensively. "I'm an atmospheric specialist, not a biologist." She tapped the surface of her desk. "It's not spider web. Obviously. But if that substance has anything like the characteristics of true spider silk, it's not impossible." She read from her desk. "Spider silk has a breaking strain twice that of steel, but thirty times the elasticity. It's a type of liquid crystal. It's used commercially—did you know that?" She fingered the fabric of her suit. "We could be wearing spider silk right now."

"What about the hole with the lid?"

"There are trapdoor spiders in America. On Earth. I remember, when I was a kid... The spiders make burrows, lined with silk, with hinged lids."

"Why make burrows on Pluto?"

"I don't know. Maybe the eggs can last out the winter that way. Maybe the creatures, the flakes, only have active life during the perihelion period, when the atmosphere expands and enriches." She thought that through. "That fits. That's why the Poole people didn't spot anything. The construction team was here close to the last aphelion. Pluto's year is so long that we're still only half-way to the next perihelion—"

"So how do they live?" Cobh snapped. "What do they eat?"

"There must be more to the ecosystem than one species," Lvov conceded. "The flakes—the spiders—need water glass. But there's little of that on the surface. Maybe there is some biocycle—plants or burrowing animals—which brings ice and glass to the surface, from the interior."

"That doesn't make sense. The layer of nitrogen over water ice is too deep."

"Then where do the flakes get their glass?"

"Don't ask me," Cobh said. "It's your dumb hypothesis. And what about the web? What's the point of that—if it's real?"

Lvov ground to a halt. "I don't know," she said lamely. *Although Pluto/Charon is the only place in the System where you could build a spider web between worlds.*

Cobh toyed with a fitting from the drive. "Have you told anyone about this yet? In the Inner System, I mean."

"No. You said you wanted to talk about that."

"Right." Lvov saw Cobh close her eyes; her face was masked by the glimmer of her faceplate. "Listen. Here's what we say. We've seen nothing here. Nothing that couldn't be explained by crystallization effects."

Lvov was baffled. "What are you talking about? What about the eggs? Why would we lie about this? Besides, we have the desks—records."

"Data desks can be lost, or wiped, or their contents amended."

Lvov wished she could see Cobh's face. "Why would we do such a thing?"

"Think it through. Once Earth hears about this, these flake-spiders of yours will be protected. Won't they?"

"Of course. What's bad about that?"

"It's bad for us, Lvov. You've seen what a mess the Poole people made of Charon. If this system is inhabited, *a fast GUTship won't be allowed to come for us*. It wouldn't be allowed to refuel here. Not if it meant further damage to the native life forms."

Lvov shrugged. "So we'd have to wait for a slower ship. A liner; one that won't need to take on more reaction mass here."

Cobh laughed at her. "You don't know much about the economics of GUTship transport, do you? Now that the System is crisscrossed by Poole wormholes, how many liners like that do you think are still running? I've already checked the manifests. There are *two* liners capable of a round trip to Pluto still in service. One is in dry dock; the other is heading for Saturn—"

"On the other side of the System."

"Right. There's no way either of those ships could reach us for, I'd say, a year."

We only have a month's supplies. A bubble of panic gathered in Lvov's stomach.

"Do you get it bet?" Cobh said heavily. "*We'll be sacrificed*, if there's a chance that our rescue would damage the new ecology, here."

"No. It wouldn't happen like that."

Cobh shrugged. "There are precedents."

She was right, Lvov knew. There *were* precedents, of new forms of life discovered in corners of the system: from Mercury to the remote Kuiper objects. In every case the territory had been ring-fenced, the local conditions preserved, once life—or even a plausible candidate for life—was recognized.

Cobh said, "Pan-genetic diversity. Pan-environmental management. That's the key to it; the public policy of preserving all the species and habitats of Sol, into the indefinite future. The lives of two humans won't matter a damn against that."

"What are you suggesting?"

"That we don't tell the Inner System about the flakes."

Lvov tried to recapture her mood of a few days before: when Pluto hadn't mattered to her, when the crash had been just an inconvenience. *Now, suddenly, we're talking about threats to our lives, the destruction of an ecology.*

What a dilemma. If I don't tell of the flakes, their ecology may be destroyed during our rescue. But if I do tell, the GUTship won't come for me, and I'll lose my life.

Cobh seemed to be waiting for an answer.

Lvov thought of how Sol light looked over Pluto's ice fields, at dawn.

She decided to stall. "We'll say nothing. For now. But I don't accept either of your options."

Cobh laughed. "What else is there? The wormhole is destroyed; even this flitter is disabled."

"We have time. Days, before the GUTship is due to be launched. Let's search for another solution. A win-win."

Cobh shrugged. She looked suspicious.

She's right to be, Lvov thought, exploring her own decision with surprise. *I've every intention of telling the truth later, of diverting the GUTship, if I have to.*

I may give up my life for this world.

I think.

In the days that followed, Cobh tinkered with the GUTdrive, and flew up to the Interface to gather more data on the Alcubierre phenomenon.

Lvov roamed the surface of Pluto, with her desk set to full record. She came to love the wreaths of cirrus clouds, the huge, misty moon, the slow, oceanic pulse of the centuries-long year.

Everywhere she found the inert bodies of snowflakes, or evidence of their presence: eggs, lidded burrows. She found no other life forms—or, more likely, she told herself, she wasn't equipped to recognize any others.

She was drawn back to Christy, the sub-Charon point, where the topography was at its most complex and interesting, and where the greatest density of flakes was to be found. It was as if, she thought, the flakes had gathered here, yearning for the huge,

inaccessible moon above them. But what could the flakes possibly want of Charon? What did it mean for them?

Lvov encountered Cobh at the crash scar, recharging her suit's systems from the life support packs. Cobh seemed quiet. She kept her face, hooded by her faceplate, turned from Lvov. Lvov watched her for a while. "You're being evasive," she said eventually. "Something's changed—something you're not telling me about."

Cobh made to turn away, but Lvov grabbed her arm. "I think you've found a third option. Haven't you? You've found some other way to resolve this situation, without destroying either us or the flakes."

Cobh shook off her hand. "Yes. Yes, I think I know a way. But—"

"But what?"

"It's *dangerous*, damn it. Maybe unworkable. Lethal." Cobh's hands pulled at each other.

She's scared, Lvov saw. She stepped back from Cobh. Without giving herself time to think about it, she said, "Our deal's off. I'm going to tell the Inner System about the flakes. Right now. So we're going to have to go with your new idea, dangerous or not."

Cobh studied her face; Cobh seemed to be weighing up Lvov's determination, perhaps even her physical strength. Lvov felt as if she were a data desk being downloaded. The moment stretched, and Lvov felt her breath tighten in her chest. Would she be able to defend herself, physically, if it came to that? And was her own will really so strong?

I have changed, she thought. *Pluto has changed me.*

At last Cobh looked away. "Send your damn message," she said.

Before Cobh—or Lvov herself—had a chance to waver, Lvov picked up her desk and sent a message to the inner worlds. She downloaded all the data she had on the flakes: text, images, analyses, her own observations and hypotheses.

"It's done," she said at last.

"And the GUTship?"

"I'm sure they'll cancel it." Lvov smiled. "I'm also sure they won't tell us they've done so."

"So we're left with no choice," Cobh said angrily. "Look, I know it's the right thing to do. To preserve the flakes. I just don't want to die, that's all. I hope you're right, Lvov."

"You haven't told me how we're going to get home."

Cobh grinned through her faceplate. "Surfing."

"All right. You're doing fine. Now let go of the scooter."

Lvov took a deep breath, and kicked the scooter away with both legs; the little device tumbled away, catching the deep light of Sol, and Lvov rolled in reaction.

Cobh reached out and steadied her. "You can't fall," Cobh said. "You're in orbit. You understand that, don't you?"

"Of course I do," Lvov grumbled.

The two of them drifted in space, close to the defunct Poole wormhole Interface. The Interface itself was a tetrahedron of electric blue struts, enclosing darkness, its size overwhelming; Lvov felt as if she were floating beside the carcass of some huge, wrecked building.

Pluto and Charon hovered before her like balloons, their surfaces mottled and complex, their forms visibly distorted from the spherical. Their separation was only fourteen of Pluto's diameters. The worlds were strikingly different in hue, with Pluto a blood red, Charon ice blue. *That's the difference in surface composition*, Lvov thought absently. *All that water ice on Charon's surface.*

The panorama was stunningly beautiful. Lvov had a sudden, gut-level intuition of the *rightness* of the various System authorities' rigid pan-environment policies.

Cobh had strapped her data desk to her chest; now she checked the time. "Any moment now. Lvov, you'll be fine. Remember, you'll feel no acceleration, no matter how fast we travel. At the centre of an Alcubierre wave, spacetime is locally flat; you'll still be in free fall. There will be tidal forces, but they will remain small. Just keep your breathing even, and—"

"Shut up, Cobh," Lvov said tightly. "I know all this."

Cobh's desk flared with light. "*There*," she breathed. "The GUTdrive has fired. Just a few seconds, now."

A spark of light arced up from Pluto's surface and tracked, in complete silence, under the belly of the parent world. It was the flitter's GUTdrive, salvaged and stabilized by Cobh. The flame was brighter than Sol; Lvov saw its light reflected in Pluto, as if the surface was a great, fractured mirror of ice. Where the flame passed, tongues of nitrogen gas billowed up.

The GUTdrive passed over Christy. Lvov had left her desk there to monitor the flakes, and the image the desk transmitted, displayed in the corner of her faceplate, showed a spark crossing the sky.

Then the GUTdrive veered sharply upward, climbing directly toward Lvov and Cobh at the Interface.

"Cobh, are you sure this is going to work?"

Lvov could hear Cobh's breath rasp, shallow. "Look, Lvov, I know you're scared, but pestering me with dumb-ass questions isn't going to help. Once the drive enters the

Interface, it will take only seconds for the instability to set in. Seconds, and then we'll be home. In the Inner System, at any rate. Or..."

"Or what?"

Cobh didn't reply.

Or not, Lvov finished for her. *If Cobh has designed this new instability right, the Alcubierre wave will carry us home. If not—*

The GUTdrive flame approached, becoming dazzling. Lvov tried to regulate her breathing, to keep her limbs hanging loose—

"Lethe," Cobh whispered.

"What?" Lvov demanded, alarmed.

"Take a look at Pluto. At Christy."

Lvov looked into her faceplate.

Where the warmth and light of the GUTdrive had passed, Christy was a ferment. Nitrogen billowed. And, amid the pale fountains, *burrows were opening*. Lids folded back. Eggs cracked. Infant flakes soared and sailed, with webs and nets of their silk-analogue hauling at the rising air.

Lvov caught glimpses of threads, long, sparkling, trailing down to Pluto—and up toward Charon. Already, Lvov saw, some of the baby flakes had hurtled more than a planetary diameter from the surface, toward the moon.

"It's goose summer," she said.

"What?"

"When I was a kid... the young spiders spin bits of webs, and climb to the top of grass stalks, and float off on the breeze. Goose summer—'gossamer.'

"Right," Cobh said skeptically. "Well, it looks as if they are making for Charon. They use the evaporation of the atmosphere for lift... Perhaps they follow last year's threads, to the moon. They must fly off every perihelion, rebuilding their web bridge every time. They think the perihelion is here now. The warmth of the drive—it's remarkable. But why go to Charon?"

Lvov couldn't take her eyes off the flakes. "Because of the water," she said. It all seemed to make sense, now that she saw the flakes in action. "There must be water glass on Charon's surface. The baby flakes use it to build their bodies. They take other nutrients from Pluto's interior, and the glass from Charon... They need the resources of *both* worlds to survive—"

"Lvov!"

The GUTdrive flared past them, sudden, dazzling, and plunged into the damaged Interface.

Electric-blue light exploded from the Interface, washing over her.

There was a ball of light, unearthly, behind her, and an irregular patch of darkness ahead, like a rip in space. Tidal forces plucked gently at her belly and limbs.

Pluto, Charon, and goose summer disappeared. But the stars, the eternal stars, shone down on her, just as they had during her childhood on Earth. She stared at the stars, trusting, and felt no fear.

Remotely, she heard Cobh whoop, exhilarated.

The tides faded. The darkness before her healed, to reveal the brilliance and warmth of Sol.