# Fine Structure

Ching-Yu Kuang is a communications engineer at UKAPL, one of two sites working on faster-than-light communication. When the facility first reaches the point where they can receive messages, they discover a message already being broadcast, one which contains all of known physics and far more besides.

Jason Chilton is a superhero. Not a well known one–for the time being, superhumans are a carefully kept secret. Apart from being studied and researched by the government, Jason's main job is to intercept future superhumans before they're Born. This is more difficult than it sounds, because each superhuman is twice as powerful as the last.

Mitchell Calrus is, to the best of his knowledge, an ordinary man. Ordinary men can't walk through walls, though, so when he discovers that he can, he reaches out to quantum physicist Josephine Baird to figure out what exactly is going on.

Adrian Ashmore is the leading expert in the study of teleportation science. After an experiment goes awry, he's arrested for criminal negligence and the project shut down–but when the apparent side effects of that experiment are discovered, imitation projects begin to pop up around the world.

Though seemingly disconnected, isolated events, these stories all trace back to a core truth: reality is far larger than anyone could have ever imagined. And one slice at a time, it is being carved away.

Welcome to Fine Structure. You have 1000 points with which to make purchases in the sections below.

# Time Periods

The story of Fine Structure takes place over an extended period of time. You may choose, here, which part of the story you'd like to inhabit. Your choice of time period may increase or decrease the number of points you start with. Options are listed in chronological order.

### Oul's Egg (-400 CP)

In the 1980s, the world is similar in most ways to the Earth you're familiar with. The A-Layer has yet to be discovered, likewise the Eka Script. The exception comes in the mountain valleys of Ukraine, where a black laboratory site is hard at work investigating an artifact that is completely impenetrable to all forms of matter except for living human flesh.

You will arrive in-jump in 1980, and must survive until 1990, two years after the black site's experiments would reach their conclusion.

### Powers Of Two (+200 CP)

This isn't where it begins, but it is where people start to sit up and take notice, and it is where the bulk of the story takes place, adjusted for events-of-importance. Mike Murphy and several other scientists of some renown find an explanation for a hanging delta in their physics equations, an explanation that leads them to discover a message seemingly being broadcast throughout the universe. Every year, lightning strikes, granting superpowers. A potential breakthrough in teleportation science goes horribly wrong, in what seems to be a freak accident but could not possibly be less than deliberate. This period of time is going to become frenetic, and it is going to do so quickly.

You will arrive in-jump in the '00s, when the first A-Layer transmission is received, and must survive until 2017.

### Astronomer's Loss (-600 CP)

In 2017, John 'Zed' Zhang sketches out and puts into motion the New Cosmology. The universe is reconstructed to imprison the Earth, placing it and its solar system on one side of a black hole, and the rest of the cosmos on the other. It is the safest protection from Oul left. As a consequence, your time on Earth may prove surprisingly mundane, with only the changes in the sky and this new technology or that to distinguish itself.

You will arrive when the last of the stars is gone from the night sky, and must survive until 2027.

# Time Periods (Cont.)

### Crushed Underground (+0 CP)

Welcome to the Talmansk Arcology. Humanity leads an oppressed, harsh existence, toiling away under the boot of the Governor, kept emotionless and compliant by the drugs in their food. Grime and filth are an unavoidable fact of life. Knowledge of things like "love" and "the Sun" are banned. The sorts of details a narrative might skip past in a sentence or two are your grim reality. If any of this is to change, the Governor must be stopped.

You will arrive when Nohta Brown is sixteen years old, and must survive ten years, to the point where the Revolution reaches its climax.

### 1970- (-200 CP)

Humanity's been through one Crash after another, and each time it has resolutely built itself back up again, repurposing old buildings and rebuilding new ones, until just about anywhere you'd care to name has the architectural fingerprints of countless unknown predecessors. Technology has made its usual climb, however, and scientists are concerned that another Crash isn't too far off. If it does happen, humanity will be set back to square one. Again.

You will arrive nine years before junior officer Aks first meets one Anne Poole, and must survive ten years.

### Endworld (+600 CP)

The end of the world is close at hand. The Sun is being drawn into, and devoured by, the black hole separating the Earth and its solar system from the rest of the universe. Science City and its Empyreans have built their way towards functional spacecraft, throwing other fields of science by the wayside in their zeal to reach outer space. In about six months, the Earth will be totally uninhabitable. In much less time than that, Anne Poole is due to be captured by the Adherents to the Trail of the Indivisible Soul and launched into Umbra.

You will arrive in 22985 CE, when Mitch Calrus wakes up in his final body. There is no time limit. Outlive both Umbra and Oul, and you'll move on victorious.

# Origins

Choose one of the following to decide how you will fit into the world of Fine Structure.

### Power (+200 CP)

At its core, the rules are simple. Once a year, every year, lightning strikes, and the person struck develops superpowers. Each person to develop superpowers is exactly twice as strong as the person that came before them. There's also a more complicated set of details about induced pain and hormonal rushes that boils down to another simple fact: every superhuman starts out temporarily insane. That insanity lasts about fifteen seconds, which is enough time that you almost certainly murdered someone with your newfound superspeed, and likely enough time to rack up quite a kill count.

Or maybe that's not how it went down at all. Maybe you were part of a secret program to obtain powers to match those of the Line. Maybe you were just an ordinary researcher who stumbled into the truth of what's out there. Either way, you've got a source of power from outside this reality earthed in you, and it's up to you to decide how to use it. You get an extra 300 points to spend on either 'Exponent' or 'Living Impossibility', under 'Power Perks'.

### Scientist (Free)

In 2002, the paper *Generating Waveforms In Ambient Neutrality* resolves the issue of a longstanding delta term in various physics equations that had previously been intractable. At the same time, it opens up the field of faster-than-light communications for study. It's a narrow field, because as people quickly discover, it doesn't work. Oh, it *would* work, but as far as anyone can tell, somebody beat them to the punch and shut it off, making it useless.

Well, not quite useless. It does allow humanity to get their hands on the Eka Script, a comprehensive guide to scientific knowledge that builds up to modern day and keeps going. You're an expert in some fashion regarding Eka, and with knowledge of the Script, all sorts of marvels are possible.

### Extradimensional (-200 CP)

The crash was rough. Adapting to the bizarre edge case of three-plus-one dimensions was rougher. While you keep your memory of prior jumps, and your memories of your current human form, you've lost your memory of the unbelievable scenes that led this version of you to Earth. That doesn't mean you've tricked yourself into thinking you're normal. Being what you are, where you are, means you have abilities that this universe's science is not yet advanced enough to explain. How you leverage those abilities, and whether you relearn the events that led you here, is up to you.

# Power Perks

### Power Sense (-100 CP, Free Power):

The power in your body means you have a certain sense of other such powers. Whether you contain energy from Xio, Oul, or the Imprisoning God, you will be able to detect the presence of others which contain power from the same source nearby. If your power is derived from Oul or Xio (that is to say, if you took Exponent), you'll also be able to sense the presence of the power of Xio or Oul, respectively, though it will feel wrong to you, warped. In future jumps, the same will apply to other sources of power, allowing you to sense the presence of those that share your power or that of your power's natural enemies.

### Exponent (-200 CP, Discount Power):

Lightning struck, and now you're a superhero, in certain senses. At least, that's how Jason Chilton might phrase it. It's something of the flying brick package–speed, strength, durability, flight–most of which is accomplished by the ability to produce reactionless forces from any part of your body. You also have the ability to accelerate your thought processes to match your superspeed.
You may purchase this perk more than once. Your first purchase of the perk has a relatively small effect, elevating you to roughly twice as strong, fast, etc. as an average human of your build, but each additional purchase doubles the effects.

### Recurrent (-400 CP, Discount Power):

Funny thing, how often lightning seems to show up around you. Whenever you enter a new jump or reality, you'll undergo the Birthing process all over again, struck by a bolt from the blue. With that bolt, a fragment of energy from one of the major powers of that reality earths itself in you, granting you some fraction of their strength and abilities. No initial bout of madness, either–that unpleasant detail was exclusive to Oul's reservoir.

### Living Impossibility (-600 CP, Discount Power):

Unlike those with power earthed from Xio or Oul, you hold the power of the Imprisoning God within your frame. You no longer require food, nor water, nor breath, nor body heat. Your skin cannot be scratched or scraped or penetrated by any means. Limbs and digits will cease to bend at precisely the point where further motion would damage them. More broadly, damaging your body in any form is utterly impossible. Radiation does not pass through your body, and you do not age. In short, your presence is law, as immutable as the Imprisoner's mandate, and even if your continued existence came into conflict with the base laws of reality, the universe would have no clear answer for which of the two of you should yield. Note, however, that none of this protects your sanity, which remains vulnerable to things like memetics, or more mundanely, sensory deprivation.

# Scientist Perks

### Script Interpreter (-100 CP, Free Scientist):

All manner of fantastical science could be tucked away inside the Eka Script, if you knew where to look and–crucially–how to read it. While you can't read it as easily as plain english, you do know a variety of tricks for frequency analysis, code-breaking, and naturalistic language processing that should let you 'set up shop' and start puzzling out whichever section of the Script you decide to focus on.

### Problems Worthy Of Attack (-200 CP, Discount Scientist):

Prove their worth by fighting back, so the saying goes. With most low-hanging fruit plucked clean, scientific accomplishments of true value are likely to be fiendishly complicated to even wrap your head around. Good news for you is that you're among the best and brightest of those positioned to tackle such problems. Such is your level of intelligence and knowledge that you could have co-authored *Generating Waveforms in Ambient Neutrality*, or if you devoted your every waking moment to it, pulled off Jim Akker's feat in cracking the Eka Script.

### Paradox Resolution (-400 CP, Discount Scientist):

When laws of the universe come into conflict, screaming contradiction, there is room during their brief drop into failure mode to define what happens next. If you bear witness to a paradox, and possess scientific knowledge of the physical laws that led to it, you can use that knowledge plus a bit of Eka to 'write in' a definition for the previously undefinable. That answer will then stand as physical law in its own right, and from then on that particular paradox will always resolve as you chose to define it.

### Mental Machination (600, Discount Scientist):

Analyzed at a sufficiently high level, the Eka Script stops looking like the law of physics, and starts looking more like the law, period. Deliver an unambiguous enough statement to the Eka Script–to the universe, really–and it responds. Given a small, empty metal cube to use as a focus point, you may use your knowledge of Eka to set orders with which the universe will comply. Anything that is scientifically possible, you may make happen without the tools or machines you would normally need by constructing informational versions of the machinery required in your head instead. And as the Eka Script attests, 'anything that is scientifically possible' is a long list indeed.

# Extradimensional Perks

### Jumper's Egg (-400 CP, Free Extradimensional):

Your intelligence is not easily disrupted. Should you find yourself in a situation where your mind would be destroyed or dispersed–such as, for example, with your death)–it will instead condense in the shape of an egg near the nearest font of intelligence in the universe (in this universe, that would be humanity). In this form, your abilities will be limited to controlling what materials can pass through your egg and what materials cannot. Given access to an empty or dead mind, however, you will be able to take possession of that mind and its accompanying body. A convoluted path to resurrection, but a useful one all the same. After this jump, this ability will only work once per jump or once every ten years, whichever comes first.

### 4D (-200 CP, Discount Extradimensional):

Due to your origins, you are able to 'lift' yourself and whatever you touch slightly out of three-dimensional space. This means you can phase through objects, turn effectively invisible, phase one object through or into another, or see through objects (although it's less 'see through clothes' and more 'see through clothes, skin, and muscle to a specific depth'). To do so requires focus, so there's no risk of falling through the earth in your sleep.

### Earthing Ritual (-400 CP, Discount Extradimensional):

Whenever you or someone else is separated from their powers, abilities, perks, et cetera, that separation isn't necessarily permanent. The two can be reunited again. This effect isn't quite a Script technology, for the same reason that draining a lake isn't a Script technology. It's just something you can do with a reservoir of power. In any case, it is possible to reach out through time, space, and whatever other dimensions stand in the way to 'earth' that power in its owner once more. Altered or misapplication of the ritual could result in earthing that power in someone other than its original inhabitant, or causing lightning strikes that earth bits and pieces of the power at random. If the earthing ritual itself is one of the things you lose, you can gain it back in the same way, but you'll have to rebuild scientific knowledge of the process before making any real progress on the task.

### Lockdown (-600 CP, Discount Extradimensional):

You've been authorized with special privileges from somewhere far, far above you in the Fine Structure. When dealing with a universe, pocket reality, or other such thing, you may create a cell akin to the Imprisoning God around it. Any attempts to escape will fail, as the sentient prison alters the laws of reality within whenever a method could be used to make an exit, blocking its use. The cell will last until the conditions you set for it are fulfilled, then dissolve, reverting the laws to their prior state.

# Eka Knowledge

By purchasing an option listed here, you will gain knowledge of the relevant section of the Eka Script, enough so to build and implement machinery that functions on the relevant principles. Additionally, these options will be appended or integrated into the Eka Script in future universes.

Your first two purchases in this section are discounted. If you chose the Scientist or Extradimensional origins, you get an extra 400 CP to spend in this section.

### Imprisoner's Blind Spot (Free):

Your unique status as a jumper affords you certain protections that others in this world do not share. Personally wielding Eka-derived knowledge will not cause the Imprisoning God to act against you unless you use it to attempt to escape the cell wall. Similarly, when the Imprisoning God acts against others, you won't be swept up in it unless you had an active role in whatever project moved it to take action.

### FTL Communications (Free):

Imagine a space running parallel to reality, one with a speed of light far and above our own, called the A Layer. In theory, it is possible to send and receive waveforms through that space much faster than through ordinary space. Of course, you'll likely find that using the space for that purpose is impossible, at least in this universe, but the same method allows you read-only access to the Eka Script itself.

### Time Travel (-400 CP):

Time might not be the fourth dimension, really, but you can model it as one, which sometimes helps, and there are multiple ways to traverse it. Backward, via semi-closed timelike loop; forward, via Standing Wave Time Suspension; or some other, more exotic means of movement along the temporal axis is available to you. At least, in principle, and with the right equipment.

### Subnucleonic Replication (-400 CP):

It turns out that energy, mass, and information are all equivalent–and unlike those first two, information isn't conserved. It is possible to generate new information, and it is possible to convert that new information to matter. The math for even simple molecules is fiendish, mind you. But given a few years and access to supercomputer processing time, it would be possible to derive all the way from single molecules to printing out food, diamonds, entire computers, copies of living human beings. Past that becomes rather difficult to predict.

# Eka Knowledge (Cont.)

### 'Verse Chorus (-400 CP):

Countless parallel universes exist, radiating from a central point and arranged in a loop. Travel any distance *ana* or *kata*, and you'll find another universe just like the one you left behind. This isn't terribly useful at first blush, because usually there's no difference between one universe and another, but find a way to break the symmetry, or a way for realities to diverge, and suddenly trillions of alternate worlds can begin to make their differences known.

### Gravity Manipulation (-400 CP):

As it turns out, one of the constants of reality can be turned into a variable if you know the right directive to send. With proper tools, gravity within an area or tied to a specific informational payload can be adjusted freely, increasing or decreasing or inverting it or even redirecting it to the vector of your choice.

### Force Fields (-400 CP):

One of the more directly militarizable technologies to be found within the Script, force fields are exactly what they sound like. In theory they have both offensive and defensive applications, but the latter is the easier use case: sufficient power would allow them to deflect the force of a nuclear blast.

### Teleportation (-400 CP):

Nothing more or less than the exchange of two informational payloads (and the matter corresponding), teleportation is in theory a frictionless process, but in practice requires a fair bit of energy due to possible imperfections in the machinery involved. For similar reasons, the theoretical upper end of infinite range is curtailed to the more restrained fifty kilometers before odds of success plummet. At least, in its crudest form. There's plenty of room to improve the field, if given the chance to actually get there.

### Waveform Manipulation (-400 CP):

Higher up in the structure, there are places with inhabitants that know how to do this from birth. It's a little more difficult down here, but still tenable. Probabilities are a specific type of information that can be tampered with, altering odds and outcomes to favor a specific result, or a specific band of results, through adjustment of the underlying waveforms. To casual observation, it might appear to be merely unusual luck, or a streak of dice rolls just happening to go your way.

# Eka Knowledge (Cont.)

### Memetics (-400 CP):

In some ways, this is Eka at its simplest. If information is a building block of the universe, that makes thought a fundamental force, one that can be manipulated. Whether you're looking for telepathy, to spread a viral concept, or to put a shattered mind back together, this is the tool for the job.

### Antimemetics (-400 CP):

Some ideas are naturally prone to spread. This is the opposite. Ideas that avoid being thought, information that self-immolates, concepts that do not 'want' to be shared. There are few better ways to hide a secret than to make that secret hide itself.

### Virtuality (-400 CP):

The human mind is, at its most fundamental, data. The substrate it's hosted on? Less important. You have the tech required to scan and convert the mind into a digital format and back again, allowing you to copy an intelligence, or move it from one body to another. A related offshoot technology allows you to simulate a basic virtual environment, in which such an intelligence can be hosted.

### Uncharted Territory (-400 CP):

The Eka Script is enormous, and just about as informationally dense as it is possible to be. All manner of science can be found buried in it somewhere. Choose an option not listed above, gaining access to the basic principles and enough implementation knowledge to put it roughly on par with the other options for purchase.

# Companions

### Neighbor, Coworker, Compatriot (-100 CP):

Your arrival is not the only thing that's changed in the universe. During your time here, you'll meet someone not present in the original series of events and fall into a quick rapport with them. They get an Origin of their choice, plus 600 points (adjusted by their origin's price) to spend on perks or Script knowledge. When the jump is over, they will accompany you to wherever you travel next.

### The Hook (-200 CP):

Where Klick failed, you can succeed. In a sense, at least. The loopholes allowing you to leave this jump while the walls are still up can be extended. Persuade someone here to come with you, and when the jump ends, they'll be brought along for the ride as a companion. Short of dealing with Oul, this may be the only escape route on offer. You may persuade any number of people to come with you this way.

### Unlikely Reunion (Variable Cost):

Through what is apparently a miraculous coincidence, you've been reunited with people you've met before over the years. Any number of existing companions may join you in this jump. Each of them receives an Origin of their choice, plus 600 points (adjusted by their origin's price) to spend on perks or Script knowledge. For just one companion, this costs 100 points; for up to six companions, 200 points; and for more than six companions, 300 points.

# Drawbacks

If you need additional points to make your purchases, you may choose one or more options here, making your stay more difficult in exchange for added rewards.

### This Is Not Over and I Am Not Dead (+0 CP):

It's possible, by the time the jump ends, that there will still be things you want to take care of. In taking this option, you may remain in-jump beyond when you would usually depart, up until you decide it is time to leave (or until you die). If you didn't take the scenario $|[A]| = p(\cdot,|[A]|)-1$, later in the document, this option will not extend your stay beyond the point where the walls around the universe are removed.

### Check the GEWRs (+100 CP):

Time takes its toll on everyone, and you're not as sprightly as you used to be. Your limbs creak, your knees are wobbly (not as much cartilage in them as there once was), and in general your level of physical ability is on par with your average elderly man. Try to avoid too much strenuous activity, like going up and down ladders.

### Two Hundred Twenty Three (+100 CP):

The guilt of it eats at you. Maybe you were a Line member with an ugly Birth, maybe you were a scientist with an experiment that went unforeseeably awry. In any case, due to circumstances that were out of your control, the deaths of hundreds of people are on your hands. If you want to alleviate the weight on your conscience, you'll need to save at least one life for each life cut short.

### Taphophobia (+100 CP):

What happened to you wasn't as serious as what happened to Anne Poole, but it was still deeply unpleasant. Through some mishap, Script-related or otherwise, you were temporarily buried alive. In time you were rescued, and physically you came out unharmed, but the resultant sensory deprivation has left you worse for wear. It may take you some time to readjust to the amount of stimuli present in modern day life.

### No Head For Numbers (+200 CP):

Put bluntly, you're not a math guy. High school formulas are as good as you can manage, and that's with some real effort put in. The fact that incredible superscience is being pulled out of the Eka Script doesn't improve your ability or motivation to grapple with the equations, it just makes them more frustrating. If you want to make use of the Script yourself, you'd better have someone on retainer that can do the actual work for you.

# Drawbacks (Cont.)

### In Sight (+200 CP):

No exceptions for you, jumper. The Imprisoning God watches over all the universe, and its rules do not allow for exceptions. You no longer benefit from 'Imprisoner's Blind Spot' under 'Eka Knowledge', and even abilities that don't derive from this universe's laws of physics can be locked out if they cross a line. Be exceedingly careful in how you use the tools at your disposal.

### Fight Scenes (+200 CP):

There may have been one conflict that started all this, but there are plenty of others along the way, and in one of those, you've been embroiled to the point of making some serious enemies. Which enemies will depend on your choice of time period–in Powers of Two, you might hold the enmity of Moxon and his artificial Powers, while in Endworld, you might be Undesirable Number Two for the Adherents to the Trail of the Indivisible Soul. In any case, expect them to have a personal investment in your defeat.

### Eka Overdose (+300 CP, requires at least one Eka purchase):

The Script is not without its dangers. Bite in too deeply, and you may find it biting back. Like Ching-Yu Kuang, something parasitic and metaphorical has wrapped itself around your brainstem. Consumptive. There are some advantages, mind you, to using your mind to play host to the raw data of the Script. Makes it easier to run the numbers. But having this *much* of the Script in your skull is dangerous. You'll need to either ramp up your intellect somehow to be capable of processing it all, or get the ideas out of your head and onto physical storage before you develop serious brain damage.

### Severed (+300 CP):

The nature of your entry to the universe lost you a few things en route. Your perks, powers, and special abilities were separated from you, trapped in a reservoir akin to Xio and Oul's. In theory, they're still out there to be earthed, but even if you have the means to restore contact, you'll only be able to earth a small portion at a time. Better hope nobody else finds a way to tap your pool any time soon.

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Xio and Oul descended into a nameless flatland, the containment locks came down around them, and after their last ergs, the two of them collapsed. The flatland wasn't as empty as expected, and some time after, a lab in Ukraine discovers a peculiar egg. So far, this is the story as observed. But this picture seems to be missing something.

Where is Mitch Calrus?

If you take this scenario, Xio's mortal incarnation is nowhere to be found on Earth. Likewise, his reservoirs of power outside the cell wall are entirely absent. There exists no information regarding Oul's former enemy anywhere in the universe, nor any indication of where he might have gone. Humanity is on its own.

In Mitchell's absence, certain loopholes that were otherwise open for you become closed. Having entered this universe, it is no longer possible for you to leave. You cannot finish the jump until the cell wall comes down, and the cell wall will not come down until Oul is destroyed. Additionally, you must take the drawback 'In Sight', gaining no points for it. Forced to play by the Imprisoning God's rules, you will have to best a superweapon that came from so far up the Structure that any comparative terms will fall short in describing it.

Should you prevail despite these restrictions, living long enough to see Oul defeated and the barriers opened, in addition to your other purchases from this jump, you receive two extra rewards:

### Jacob's Ladder (Free):

A stairway to Heaven, and to everywhere else. You've gained access to a branch of the Script that details the principles required for traversing the Structure itself, moving from tiny three-plus-one dimensional flatlands all the way up to eighty-plus-six dimensional totalities and beyond. Additionally, you gain access to a related section of the Script that should allow you to bootstrap yourself into the sort of multidimensional being that would be at home further up the structure, though the process for going up even a single dimension may prove a vast undertaking, the sort that dwarfs other projects you might tackle with use of the Script.

### Spark (Free, Optional):

Defeating a higher-ordinal superweapon like Oul is a good enough way to prove yourself. If you're inclined, you may take your planeswalker's spark as a reward. This will end your chain, allowing you to roam the multiverse and other jump settings at will.

# Endings

At the end of the jump, it's time to choose where you go from here. If you perished or otherwise failed your chain during your time here, you will have to select 'Klick's Exit'.

### Three Plus One:

Maybe this little slice of the Structure has intrigued you. If you're so inclined, you may choose to remain in this jump permanently. You'll retain everything you've collected throughout your chain, and your universe-hopping days will be done.

### Klick's Exit:

It's time for you to conclude your adventures. This may not lead you to the afterlife, but it does return you to the universe you left when you first started your chain. Again, you'll keep everything you've gathered to date, but this will mark the end of your travels.

### A Kataward Shift:

Moving seamlessly from one universe to another, you leave Fine Structure behind to continue your adventures. Choose another jump to carry on to. You may not have earned your spark here, but there will be other opportunities, so you may get the opportunity to return one day.

# Notes

This jump is based on Fine Structure by QNTM, available at https://qntm.org/structure.