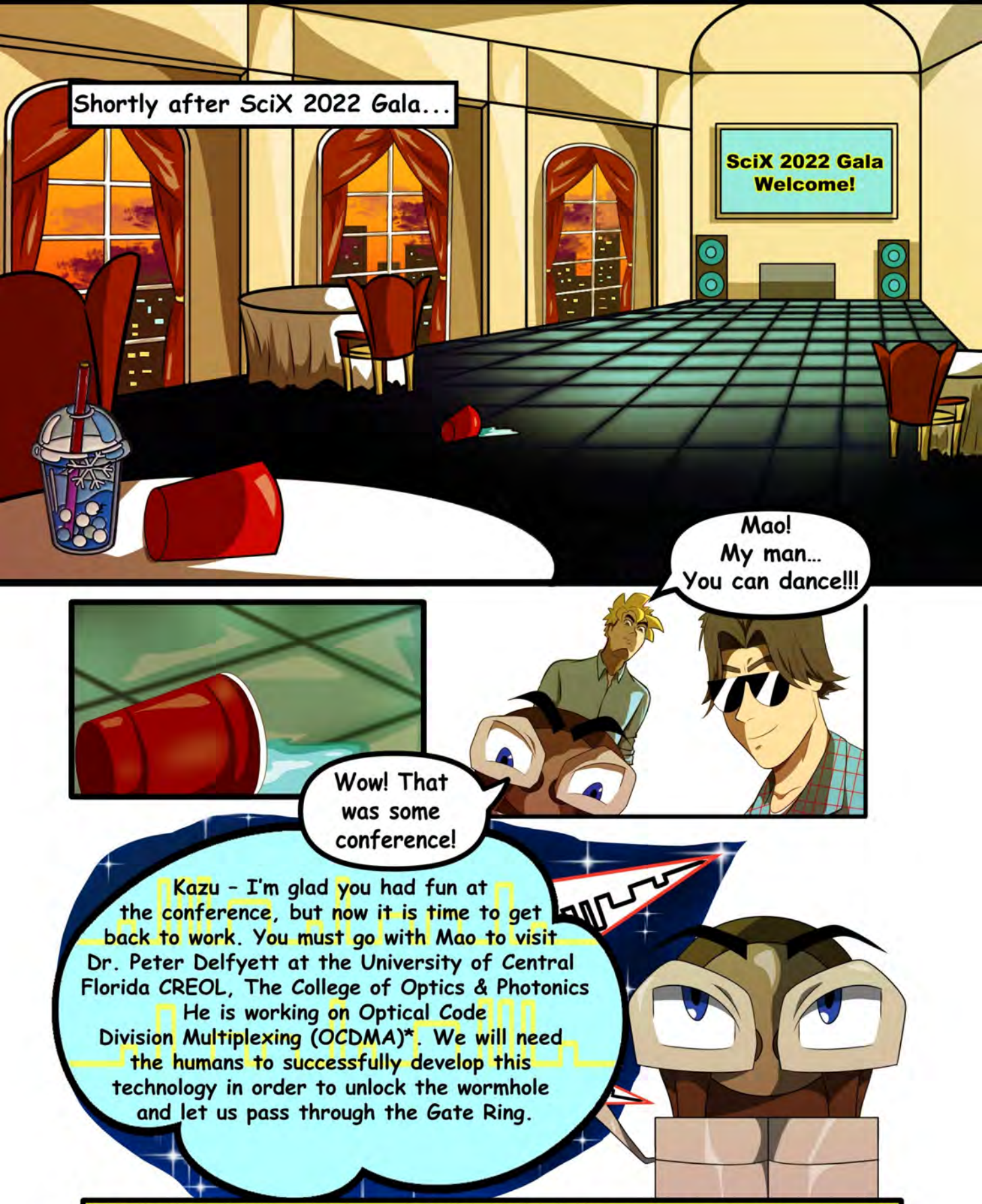
PROJECT AVATAR

OPTOSIGMA COMICS

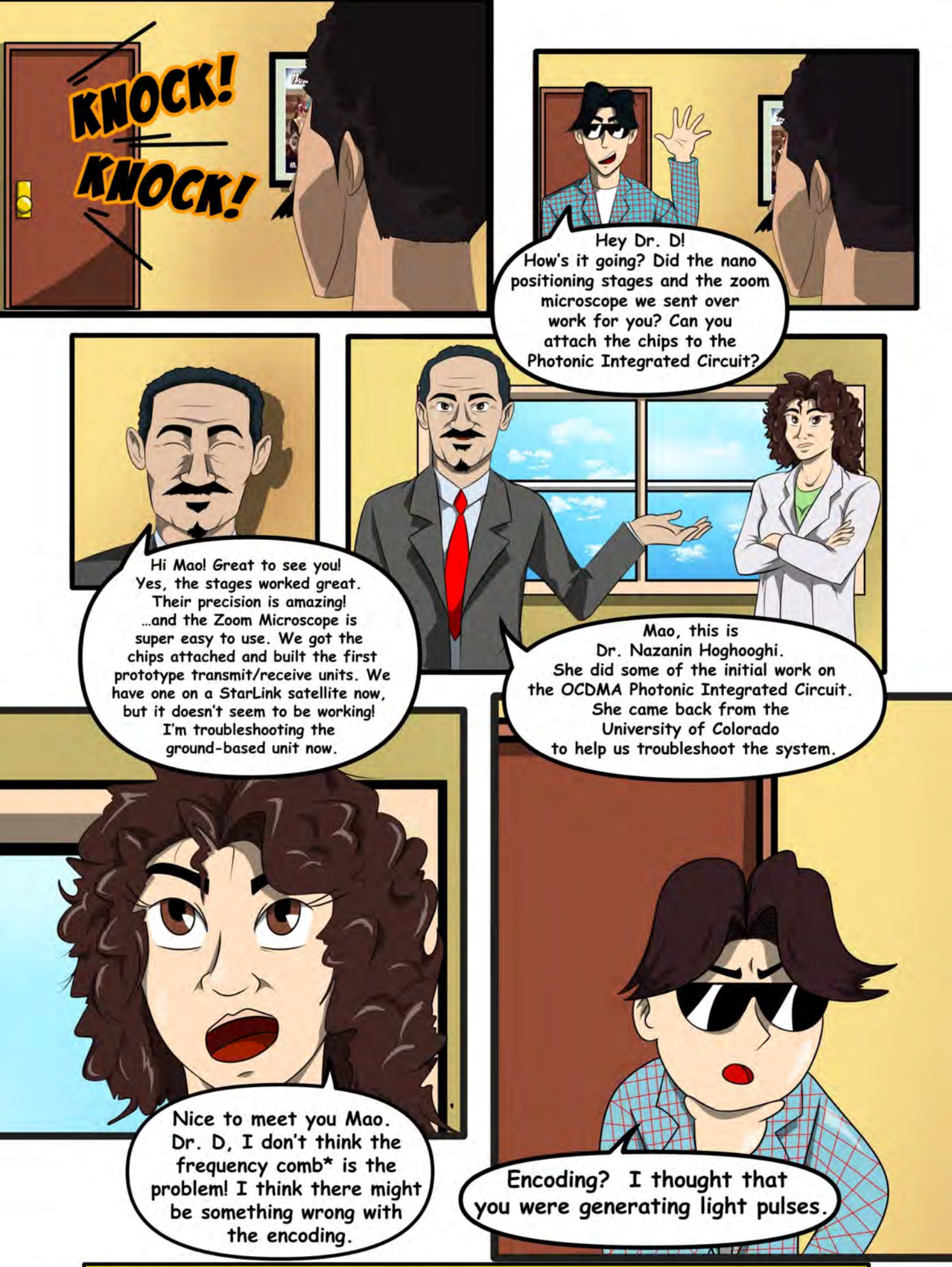
VOLUME 3 - THE KEY TO SALVATION



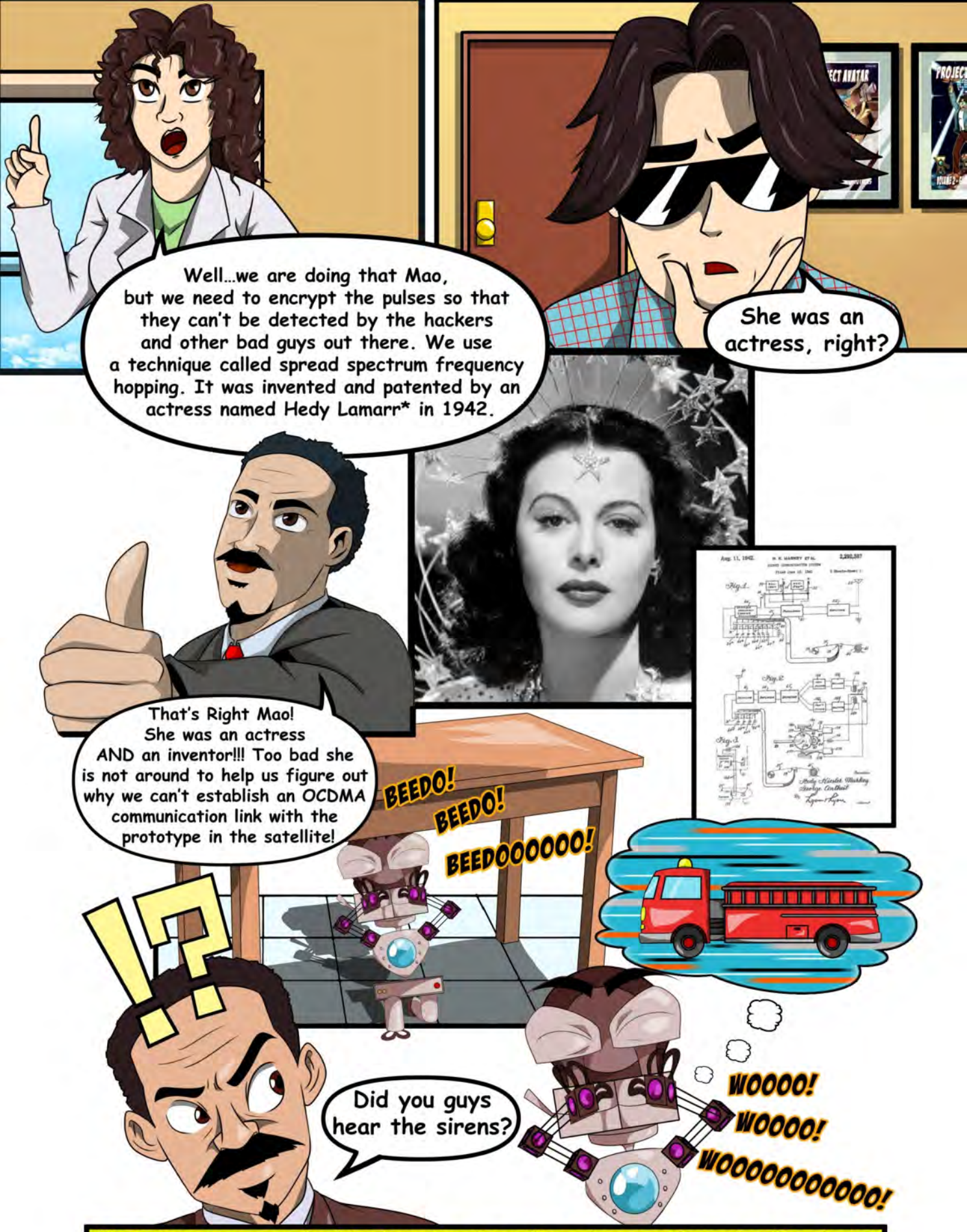
***Optical Code Division Multiplexing (OCDMA) is an optical version of Code Division Multiple Access (CDMA). This secure communications technique relies on changing the frequency and/or intensity of the communications signal as per a pre-defined code, that is synchronized between the transmitter and receiver. By rapidly "hopping" the frequency of the carrier signal over a frequency band, the average intensity of the carrier signal is very small; and it therefore looks like noise. This makes finding the carrier signal difficult if the code that defines the hopping sequence is not known – making this technique a great way to covertly communicate. By contrast if the code is known, the technique serves as a "lock-in amplifier" and helps to dramatically reduce noise.**

Mao, Shiori says I need to go with you to visit Dr. Delfyett. She says he needs help.
No problem Kazu! I know Dr. D well. He is a salsa dancer like me! We just sent him some really cool Nano-Positioning stages. We can check in on how they are working for him.
THE AVENGERS
Hey Mao, can me and my crew talk to these Avengers? They could help Shiori with the Gate Ring project for sure!
Kazu, the Avengers are characters from a movie... they aren't real.
Oh well...I guess we will have to do this the hard way after all...

Wow Mao! I had no idea that Humans had developed 3-D Video holograms
Holograms? Those are fireworks Kazu. It is the nighttime show at the theme park.
What's a Theme Park Mao? I want to go!
OK Kazu, hopefully we can take you and your crew after we visit with Dr. D. You would look great with a set of Mouse Ears - LOL
I just don't get it... Everything looks right! We are generating multiple wavelengths, and we are able to switch them and encode them...

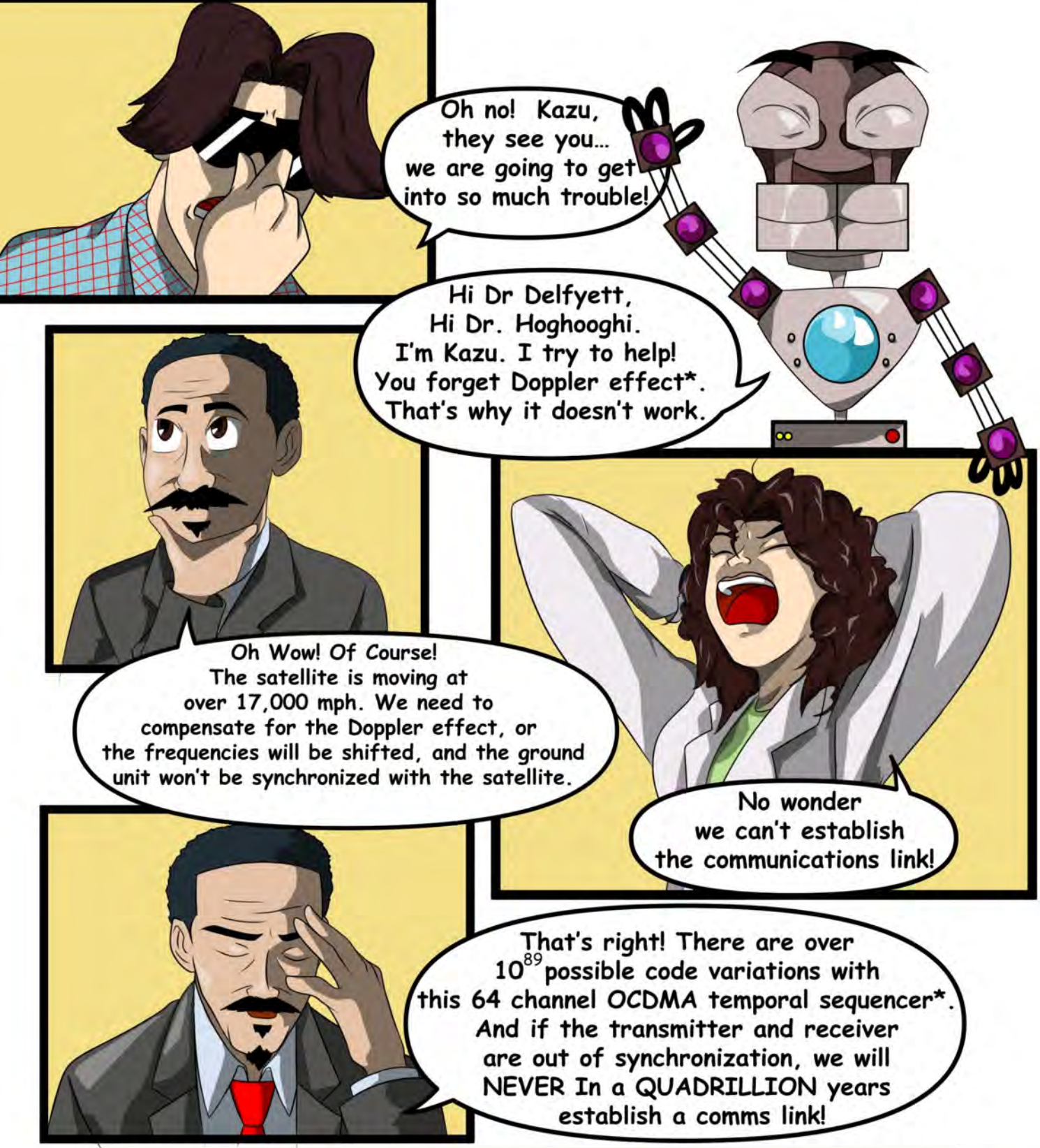


***Frequency Combs are laser sources whose spectrum is comprised of discrete and equally spaced frequency peaks (lines). The precise separation between each peak, allows for their use as a high precision metrology tool that can be used to measure time and frequency. Frequency combs can be generated by modulating a continuous wave (CW) laser source, through four-wave mixing in a nonlinear media, or by stabilizing a mode-locked laser cavity.**



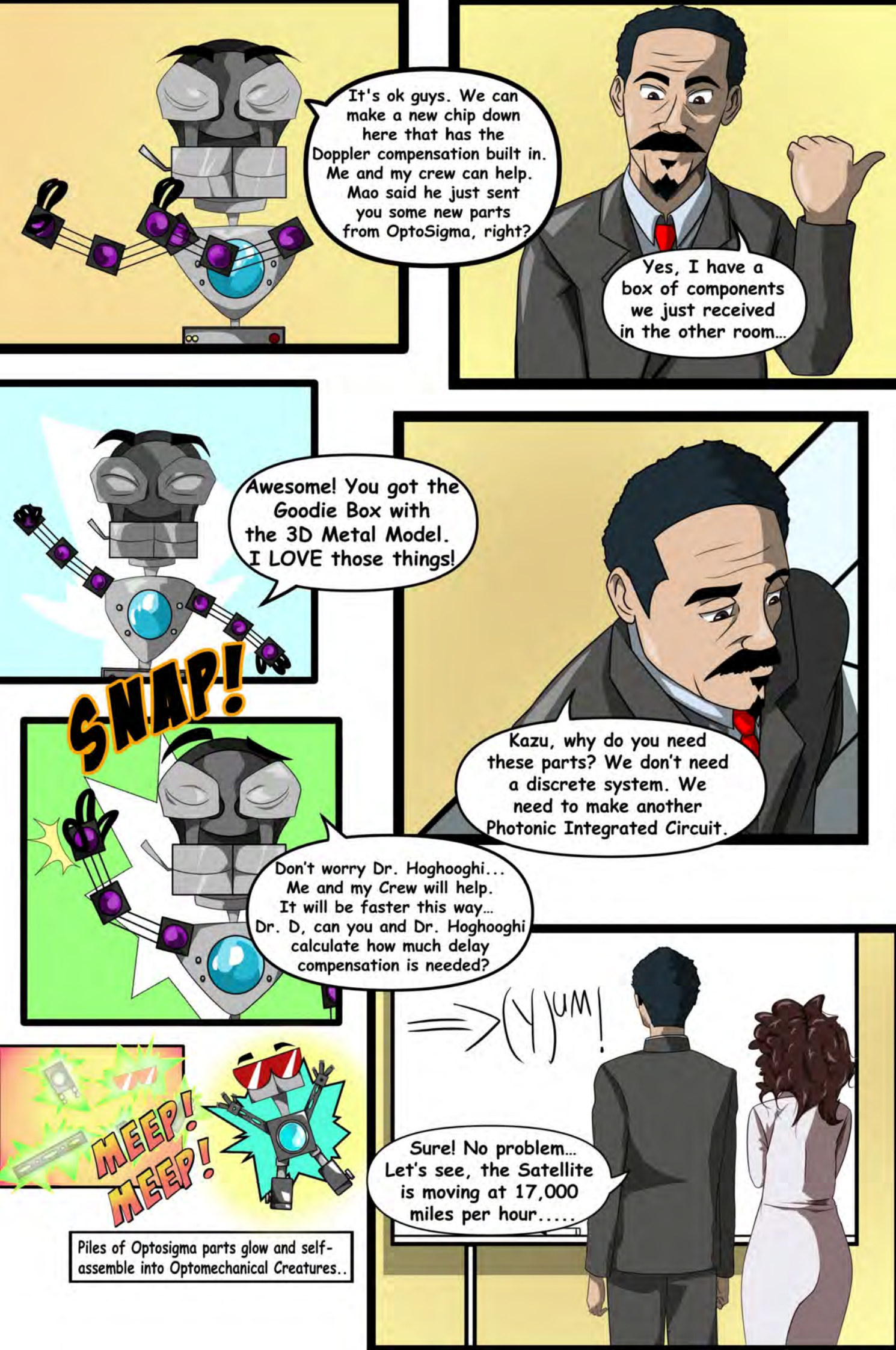
*Hedy Lamarr was an Austrian-born American film actress and inventor. She starred in 30 movies between 1930 and 1958. She was married and divorced six times and had three children. She patented a Secret Communication System under her maiden name Hedy Kiesler Markey with a composer and pianist named George Antheil, and was awarded US Patent 2,292,387 in 1942. The basic concepts Hedy and George proposed, form the foundation of the communication protocols used in modern cell phones, WiFi devices, and Blootooth technologies.

There must be an accident or something on campus!
WEEOO...
WEEEOOO...
MEEP...
MEEP...
WEEEEOOOOOO...
Hey, that's not coming from outside! The sounds are coming from under the table!
Holy Cow! What are you!?
?!

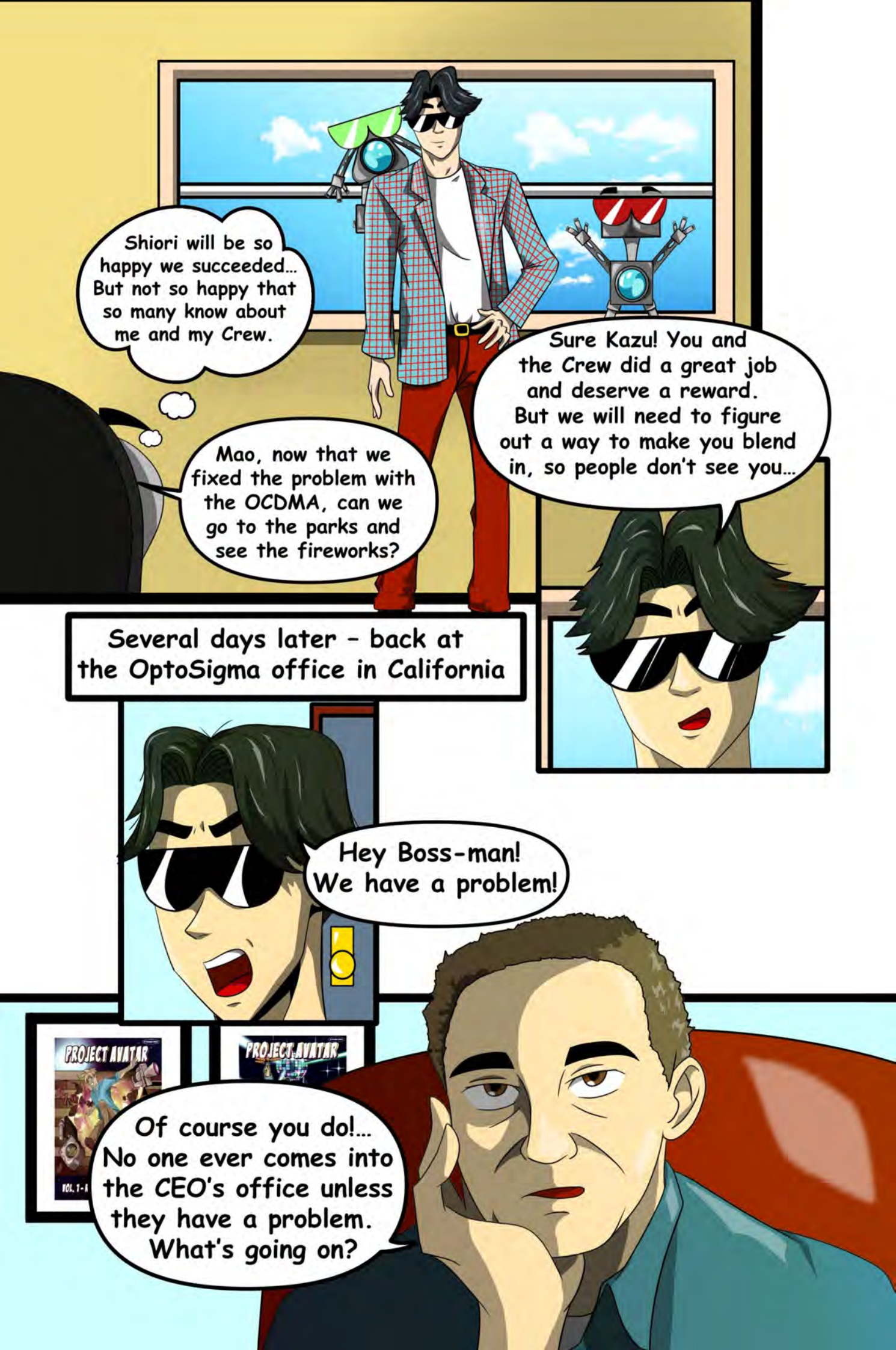


***The Doppler effect (or Doppler shift) is the change in frequency of a wave when measured by an observer that is moving at a different rate or direction as compared to the wave. First described by Christian Doppler in 1842, this phenomenon is most commonly observed when a vehicle (such as an ambulance or police car) passes a stationary observer. The change in pitch from high frequency to low as the vehicle approaches and then passes the observer is caused by the emission of each wave crest being closer to the observer as the vehicle approaches and farther as it recedes. Since the time it takes each crest of the wave to reach the observer changes as the vehicle approaches and then recedes, the observed frequency of the wave changes over time – creating a change in the sound pitch. This effect is also referred to as "red shift" and "blue shift" and is commonly observed in Astronomy.**

*** In a 64 channel OCDMA system using spectral phase encoding, where each color can be either "in-phase" or "out-of-phase", there are 64 orthogonal codes. Each of the 'sub-codes' can be temporally sequenced 64! different ways (1.268×10^{89} different combinations), for generating a single orthogonal 'super-code'. Fun Fact: - This also happens to be the highest factorial that can be calculated on many hand-held scientific calculators due to memory limitations.**


It's ok guys. We can make a new chip down here that has the Doppler compensation built in. Me and my crew can help. Mao said he just sent you some new parts from OptoSigma, right?
Yes, I have a box of components we just received in the other room...
Awesome! You got the Goodie Box with the 3D Metal Model. I LOVE those things!
SNAP!
Kazu, why do you need these parts? We don't need a discrete system. We need to make another Photonic Integrated Circuit.
Don't worry Dr. Hoghooghi... Me and my Crew will help. It will be faster this way... Dr. D, can you and Dr. Hoghooghi calculate how much delay compensation is needed?
YUM!
MEEP! MEEP!
Sure! No problem... Let's see, the Satellite is moving at 17,000 miles per hour.....
Piles of Optosigma parts glow and self-assemble into Optomechanical Creatures..

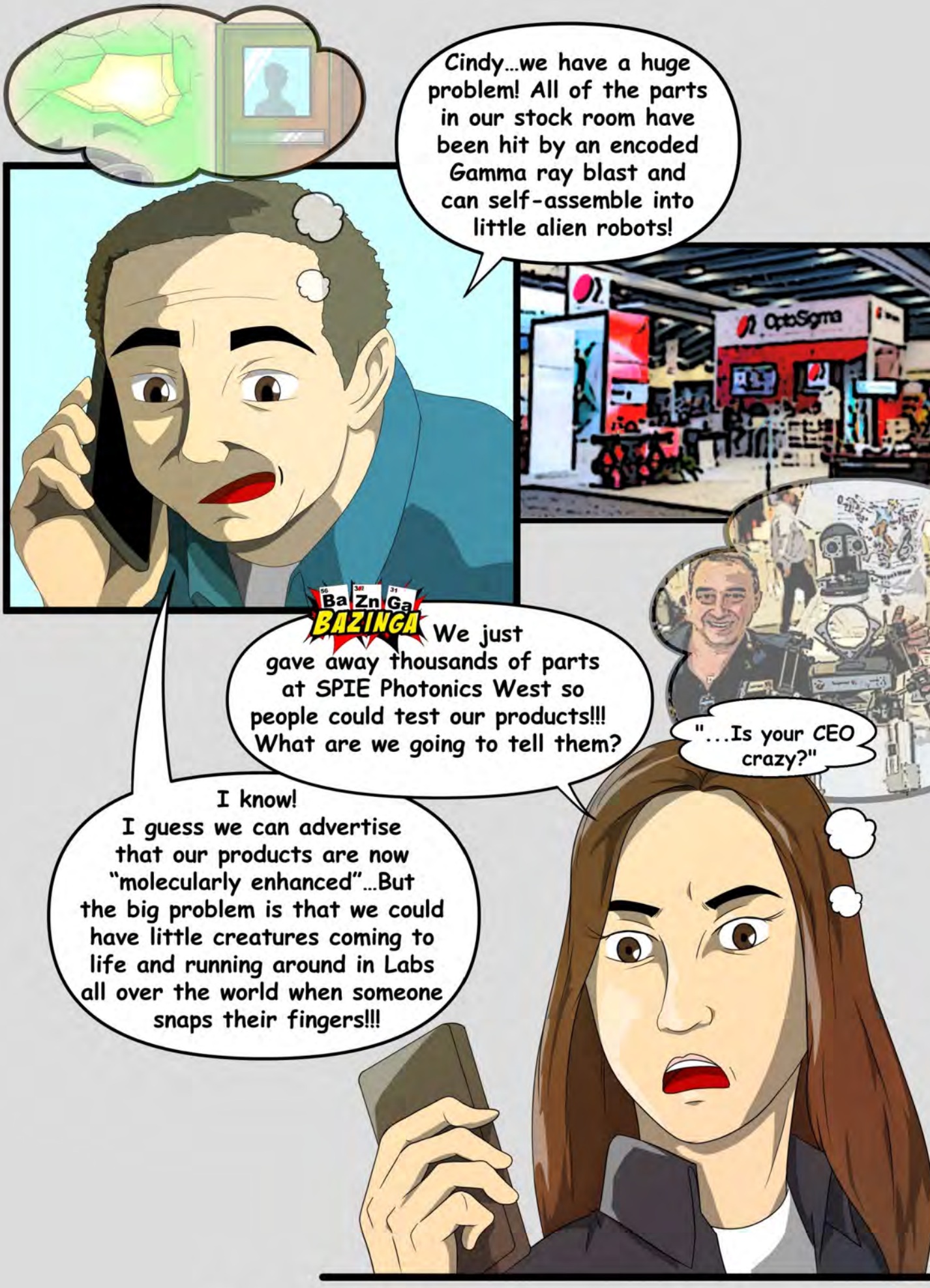
BANZAI!
万歳!
PROJECT AVATAR
All done!
Try this one.
It should work now.
Wow! That was fast!
Kazu, you and your
crew are amazing!
My students need
to take lessons
from you guys...
Hey! I was one
of your students!!!
Not you Dr. Hoghooghi...
You were one of my
best and brightest!
Let's test this thing.
The system is connected and communicating!
Thank you Kazu! You and the Crew saved
the day! Our OCDMA technology works! This
is going to be a great advancement for
Photonics when we publish our findings...
PROJECT AVATAR
PROJECT AVATAR


Shiori will be so happy we succeeded... But not so happy that so many know about me and my Crew.
Mao, now that we fixed the problem with the OCDMA, can we go to the parks and see the fireworks?
Sure Kazu! You and the Crew did a great job and deserve a reward. But we will need to figure out a way to make you blend in, so people don't see you...
Several days later - back at the OptoSigma office in California
Hey Boss-man! We have a problem!
PROJECT AVATAR
PROJECT AVATAR
Of course you do!... No one ever comes into the CEO's office unless they have a problem. What's going on?

Well, remember last month when we had the explosion in the laboratory?
!!
Explosion!?!?!?
Oh, I guess we forgot to tell you about that…well long story, but the lab got hit by a Gamma ray and our parts self-assembled into a creature called Kazu. We tried to keep him a secret, but people are finding out and…
Uhm…I'm sorry to interrupt, but we have another problem! The Gamma ray blew a hole into the stock room and now all of the parts are glowing!

Oh yeah…I forgot to mention Kazu can create a bunch of little robots from the stockroom parts when he snaps his fingers.
How many people know?
OK, No problem…We'll get everyone who knows about Kazu to wear a cool badge or pin so we can tell who knows the secret and who doesn't.
PA
PROJECT AVATAR
Let's ask Cindy and the Marketing team to come up with some designs that people will want to wear. We can make them a collector's item.

Hey Boss man, here is my expense report. After we visited with Dr. D, I took Kazu and the Crew to visit the Orlando Theme parks and bought them all costumes to blend in with the kids. You should see them! They look so cute!
EXPENSE REPORT



To Be Continued...

OptoSigma

PROJECT AVATAR

Scan Me!

A STEM BASED COMIC BOOK

Download your Comic at:

www.optosigma.com/comics