

**Graviton**  
**by Stephen Jogerst**

The lab was a dreary place. It might be called downright dull. The sterile environment was quiet except for the occasional thrum of a far-off piece of equipment. Project, Chimera, was coming to a scheduled close and the staff had started jumping to other projects. The janitorial staff was still around, thank God, doing their best to stay busy in a building with only four people working in it. There was a rumor of a Ping Pong table in the basement. They made a habit of sticking with the building rather than the project and had already submitted their applications to the next project head that was scheduled to use the facility.

Chimera's purpose was to find the first real element in the 'island of stability,' the supposed far-off zone of predicted atomic stability in a proposed Periodic Table that went far beyond the current scope. The goal was to synthesize and stabilize an ultra-heavy new element. True to its name, project Chimera's team had been smashing smaller atoms together in order to create a new heavier one. A new element hadn't been added to the Table in decades. To whoever found the next one would go fame, fortune, and at least a paragraph in the history books. The project was now in its final phase but a problem had been discovered that threatened to derail the champagne bottles being opened.

Joey sat at his desk and smiled at the webcam. A small sea of 3rd graders stared back at him on his computer screen. "And that kids, is basically what I do. Take smaller atoms, smash them together, and make bigger ones! It's hard work but it's a bit like solving a mystery." He sipped his coffee. A hand shot up among the children.

"Why is it so difficult?" inquired a kid, with an obvious uncaring tone. His teacher probably told him to ask questions for a participation grade.

"Good question," Joey continued. "You see, atoms can't stand being smashed together and when they get too big, they have a tantrum and fall apart. That's how nuclear reactors and nuclear bombs work, a whole pile of atoms get mad and fall apart all at once and release

energy. My goal is to figure out how to make an even heavier element that doesn't get mad and fall apart." Another hand went up.

"Well has it worked?" a bored-looking child asked.

Joey paused for just a moment. "I uh, can't say for certain that we've actually succeeded yet, but our results are fairly promising." Joey lied. The teacher waived and cut in.

"That's all the time we have for today, Dr, thank you for your time! Say, goodbye kids!"

Joey waved and closed down the Zoom call. It hurt to lie like that to a kid. What was he going to say? "Why yes, child, my team has succeeded where every other project had failed and I'm about to become a world-famous scientist." That would've been a little presumptuous. Joey didn't really like the public outreach parts of his job, but as the head of the team, his Federal grants required it. Besides, Mrs. Riley's 3rd graders had been on the schedule for weeks now and it would have been simply unprofessional to cancel. Over his computer monitor, Joey spied his team huddled around the workstation in the lab. They looked annoyed. He had a feeling he knew what was annoying them. He went to deal with the problem, but first, he needed to heat up his coffee.

Chimera's three other researchers stared at the sample container suspended inside the vacuum chamber, visibly annoyed. The negative sign on the display continued to mock them. Eighteen months of careful dedicated work hinged on the quality of their data collection. This negative sign wasn't quality, it was a travesty. The number had just flipped again, the second time since this morning.

"Well that doesn't make any sense," Sam noted, taking a sip of her coffee.

Walking in from the labs' kitchen, Joey noted the serious expression on the team's faces "What's everyone staring at?" he inquired, knowingly.

Three pairs of eyeballs sat intently gazing at the numbers on the screen. The fourth, Joey's, gazed at his coffee, contemplating whether his pancreas was keen on six sugars, or his

usual five. After another moment, the tension seemed to escalate in the room as the three scientists shifted in their chairs. Alex was the first to break the awkward silence.

“The goddam machine balance is out of calibration again! I thought you fixed that,” she said, gesturing at Bill. “This is going to ruin a week’s worth of data collection if you can’t get a handle on it.”

Bill thumbed through his notes, finding the graph he needed. Alex had a temper and he had prepared for her assumption that it was his equipment calibration. “Here it is, checked it twice. That balance is certified for better accuracy than Santa’s Nice List. Look, even the backup sensor agrees.” he explained, handing the paper across the desk to her.

“Is anyone going to tell me what we’re all looking at?” Joey asked again, this time noticeably annoyed. Inside, he hoped he didn’t know the answer already but he was all but certain. Alex finally answered him.

“The weight of the sample went crazy for a minute... again. One second it was steady at one hundred micrograms, then the balance indicated a shift to negative five micrograms. Then it shifted back to one hundred. Not only that, it gave us the same behavior this morning right before Sam walked in. And there’s something else, too. It’s always a shift lasting precisely ninety-seven seconds.”

Joey rolled his eyes and sighed. This is precisely what he did not need this morning. Erroneous data could kill research projects, especially projects as high profile as this. The team’s funding had been on the chopping block at the National Science Foundation ever since they had reported the first errors in their data sets. With so many teams working, and such a prize on the line, small problems had a habit of blowing up into grant canceling drama. Joey had already had to meet with grant board members assuring them that their data problems were just some faulty equipment and that any problems in the data sets could easily be mitigated. He hoped he was right.

Joey, ever the dramatic, centered himself and relayed his plan. “Alright, this is now the third time this error has popped since we achieved synthesis three days ago. Let’s get ahead of this now before it blows up in our faces. Meeting in five minutes.”

Five minutes was just enough time to use the bathroom and heat up everyone’s mug. As the team gathered around their conference table, the air in the room was frustrated. They were on track for a Nobel Prize, if they could only get these silly equipment bugs out of the system long enough to complete their work. The race was on and everyone knew it. They weren’t the only team working on this area of research. The Russians and Chinese were close, the Brits were rumored to have fast-tracked a project, and the Japanese were noticeably radio silent on anything related to elemental physics these days. CERN, the global nuclear physics organization in Switzerland had been constantly begging all the teams for updates and to share data but no one was talking.

Sam and Alex traded notes back and forth and recited the observations. Bill grabbed a dry erase marker and started surveying the team as Joey walked in. “Okay, what do we know?”

“Well, the weight of the sample seems to be fluctuating,” Sam noted. “And we can’t find any equipment malfunction to explain it.”

“Yes, it’s happened three times...” Alex started but Bill cut her off.

“Four.” He noted, more annoyed.

Everyone turned to look at Bill. “Yeah it happened again in the five minutes before this meeting,” he explained.

“Two occurrences in fifteen minutes, three since this morning, and four in the past three days.” Joey summarized. A thought had just occurred to him.

“It has to be a sensor malfunction.” Alex offered.

Bill took down notes on the whiteboard, visibly frustrated. “I’m telling you it’s not instrumentation! Our equipment is solid and has passed every industry benchmark we can throw at it.”

There was a pause. No one was questioning the quality of work of Bill or the team but it was hard not to take it personally. Joey stared at his coffee. Bill adjusted his glasses.

“The thought occurs to me that I’ve never actually seen an occurrence of this problem. I believe you guys of course, but it’s interesting that it always happens when I’m out of the room,” he observed.

Sam took the opportunity to break the tension with a joke. “Well, what are you saying, boss, that your presence can make the laws of physics change? I mean, we all know you’re good at what you do, but really?”

Joey Chuckled. Sam was funny and he appreciated her sense of humor. “Actually no, Sam. I was going to suggest the opposite, that my NOT being present somehow changes the laws of physics.”

Alex broke in, “Oh pish posh.” The group shared a chuckle.

“I’m actually quite serious,” Joey added, “and I think I might know what the cause of our frustration is.” The group perked up at his change in tone. “Meet me back in the lab in five minutes. I need another cup of coffee.” He gathered his mug with a smile and walked out.

“I believe that man has a caffeine addiction” Bill noted, his attitude defused and trying not to laugh.

Alex cut in on the joke. “A caffeine addiction? That man’s caffeine levels could kill any insect within 15 yards.”

Five minutes later, the team was huddled back around the workstation, staring at the numbers. Joey walked in smiling, stealing a glance at the readout. Negative five micrograms. The team was annoyed by Joey’s sense of drama.

“Okay, clue us in, boss,” Bill asked dryly. “What did you do?”

“I made a cup of coffee,” Joey explained, trying not to smile. “The clue was the second occurrence,” he added. “I think the coffee maker is throwing some kind of interference into the

system and it appears I'm right. Look." He pointed. "The coffee maker just stopped heating and the weight has returned to normal."

Bill looked over at Alex, noting that she looked a little red in the face "Alex, are you okay?" He inquired.

Alex looked as if she would burn a hole through the table with her eyes. "I get it, I think," she stated matter of factly. "Every occurrence of the shift has been while Joey was making a cup of coffee, except this morning." She pointed at Joey and then to Sam. "You weren't even here yet, and this morning we had another occurrence when Sam made her cup!"

"Precisely." Joey punctuated. "The question we have to ask ourselves now is 'Why does turning a coffee maker on and off have any effect on a microscopic element sample, suspended inside a vacuum chamber, ten meters away?'"

The question hung for a moment before Bill offered an explanation.

"Physically speaking, the only thing coming off the coffee maker in any measurable way is a slight magnetic field as its heating element turns on. Kinda like a low-key electromagnet. Who wants to bet that the heating cycle of our coffee maker's element is ninety-seven seconds?" His expression changed from frustration to interest and he got up from his chair. "Be right back," he stated as he disappeared down the hall.

Ever the skeptic, Alex piped in. "How would a magnetic field have anything like that kind of effect on our sample?"

Joey cut in. "Well, I think it's important to remember we're dealing with a new element here. No one's ever made any observations before or knows what its properties are. I imagine folks were pretty confused when they isolated Neon for the first time and it glowed when they shocked it with electricity."

"Alright, Joey's got a good point, we are in uncharted territory. Let's keep an open mind." Sam interjected.

Alex scribbled some notes and offered an observation. “I think there’s something interesting to note in the value of the shift in weight. The first time we observed the shift it went from one hundred micrograms to negative three.” she paused for effect and consulted her notes. “Today’s measurements were all consistent with one hundred to negative five. Why the difference?”

Sam swirled her cup of coffee and offered a thought. “What if it’s gravity?”

“I beg your pardon?” scoffed Bill as he returned.

“No, I’m actually serious.” Sam cut him off. “What if the influence of gravity is changing from the sample’s perspective?”

There was a pause and everyone stared at her.

“Objects don’t get to pick and choose what gravity they interact with, Sam,” Joey noted, curious where she was going with this line of thinking. “But... there are no silly ideas, so let’s hear it.”

Sam continued. “Well, gravity is just a field, right?” The group nodded. “And if it is just a field, maybe it can be shielded. Maybe that’s what we’re seeing.” She looked from face to face. “The element we synthesized could be shielding itself from the effects of gravity... at least in the presence of our magic coffee maker, that is.”

Bill looked at her and proceeded to look at his phone.

“What are you doing, Bill?” Alex asked.

“Checking to see if it’s April 1st and Sam is playing pranks.” He answered quickly. As he retrieved a small metal box from his pocket. “In all seriousness, I just got this magnet out of storage. Its field strength is at least an order of magnitude more powerful than anything the coffee maker is throwing off.” The group shared a laugh at Bill’s joke and Joey brought everyone back to the problem at hand.

“I mean, it’s a far-fetched idea, to say the least, Sam,” Joey began, “but since we are dealing with an all-new element, I think we should keep it on the table as a possibility. I don’t even want to think about the implications of that idea if you are right.”

Joey was unsettled. The possibilities of what they were talking about were world-changing. An element that could turn off its interaction with gravity could have fantastic uses across every sector of technology. It was still a far-fetched concept and there were a million other possibilities to disprove, but Sam’s idea was compelling and if she was right, the whole world might change.

Joey gestured to Bill and his magnet. “Let’s see it, Bill, let’s see if your magnet has the same effect as the coffee maker.”

Bill unsheathed the little magnet from its metal box. All the eyes in the room were pegged to the readout.

“What the...” Sam started. “Why zero? Why aren’t we seeing negative three or negative five like before?”

Joey sipped his coffee. “Because the sample just levitated off the measurement plate.” Six sugars was the right call.