**Sarah-Jane at CERN**

“If mini black holes are detected at the predicted energies, not only will it prove the existence of extra dimensions and by extension parallel universes, but it will also solve the famous information paradox in black holes," said the very eminent physics professor on the stage at the front of the darkened conference room. A very complicated graphic resolved on the screen behind him. “Solving the paradox is possible because, in the gravity's rainbow model, mini black holes have a minimum radius below which they cannot shrink. However, if black holes are not detected at the predicted energy levels, this would mean one of three possibilities. One, extra dimensions do not exist. Two, they exist, but they are smaller than expected. Or three, the parameters of gravity's rainbow need to be modified.”

Near the back of the room, Sarah-Jane Smith sighed wearily. She understood about black holes and parallel universes better than anyone else in the room. That was why she was there, of course, representing UNIT’s scientific corps. But she knew about them from experience of places like Zeta Minor where Professor Sorenson had tried to harness the energy from a well that connected two dimensions. She didn’t actually have any post graduate degrees in physics or astronomy.

She didn’t fully understand what the man on the stage was talking about and the graphics on screen and in the colourful brochure she had been given didn’t make any sense.

They had lost her, in fact, somewhere around ‘gravity rainbow’. What on Earth – if Earth had anything to do with it at all – was that about?

“K9,” she whispered. By her feet a whirring electronic equivalent of a ‘woof’ responded. “K9, I need some air. Carry on listening and try to break it down into small chunks of information that normal people understand.”

“Affirmative, mistress,” K9 answered. Sarah-Jane wasn’t entirely sure that K9 could break down the lecture as she would have liked. At times like this she really needed The Doctor to talk down to her as if she was twelve years old or demonstrate something with a piece of string.

Just as long as it wasn’t ‘string theory’ which was something else that had left her behind hours ago.

She quietly slipped out of the conference room and blinked a few times as she emerged into a brightly lit corridor. As her eyes adjusted she saw another of the big, bold signs that were dotted around the complex reminding here that this was CERN, the acronym derived from Organisation Européenne pour la Recherche Nucléaire – or European Organization for Nuclear Research in plain English. Neither was as scary as it sounded. They weren’t making bombs or anything, here. But, then again, if that lecture was about what she thought it was about, nuclear bombs might be the least cataclysmic thing to worry about.

She noted that she was still in Switzerland. It was possible to end up in France through some of the deep tunnels and passages of this huge complex, but she knew she hadn’t walked that far after arriving at the hospitality wing near lake Geneva.

A coffee machine dispensed free drinks to anyone who needed them a little way down the corridor. She helped herself, noting that the cup with the CERN logo on it was fully biodegradable. They might turn the planet inside out with their experiments, but at least they weren’t destroying the ecosystem.

“Are you all right, there, Miss Smith?” asked a voice in a northern English accent. She looked around to see a tall, slightly skinny man in a CERN sweatshirt and jeans. The fact that he had spoken to her in English surprised her at first. The lecture was actually in French, with simultaneous translations through headsets into twelve other languages. She didn’t need the headset because she still had enough residual TARDIS energy from her travels with The Doctor to understand any language on Earth or beyond it, but when she heard English that didn’t need translating it was a surprise.

“How do you know my name?” she asked, a lifetime of investigative journalism making her naturally suspicious. Of course, she had a visitor badge with her name on, but he had addressed her before getting close enough to see that.

“I’ve read most of your UNIT files,” the man responded with a wide, enthusiastic smile. “A lot of us have. You’re a bit of a celebrity around here.”

She looked at the badge on his coat. He was Professor Brian Cox, who, she realised was a bit of a celebrity himself. She didn’t know much about his first career as a pop star. She was too old for MTV by his time, and hadn’t yet adopted Luke and Sky to bring young people’s music into her life. But she did know about his rise to the top of his field as a physicist and had seen some of the TV programmes where he had become the friendly face of science to a bewildered audience.

A friendly face of science was just what she needed right now. She admitted as much to Professor Cox who smiled reassuringly.

“Have you actually seen the LHC, yet?” he asked.

“The Large Hadron Collider?” If he thought acronyms would confuse her then he had missed the part where she spent much of the nineteen-seventies among military people. The Brigadier, Mike Yates, good old Benton, even Harry with his naval terms all used far more confusing acronyms than LHC.

But knowing what it was called didn’t make it any more easy to understand.

“I think it’s on the itinerary for tomorrow,” she said.

“Come on, I’ll give you a sneak preview,” Professor Cox said. He grinned again in a way that made Sarah-Jane understand why the TV watching public liked him and reminded herself that he was at least twenty years younger than she was.

Whatever else he was, he was a man with access to all areas of CERN. Nobody questioned him when he led Sarah-Jane to the lift down to the LHC which was key-operated only by a trusted few.

“You’re not breaking any rules by taking me down here, are you?” Sarah-Jane asked as the lift went down a long way.

“No, not at all,” he assured her. “You’re a VIP guest, in any case. I know a couple of people who would be jealous that I got to talk to you.”

“Me, a VIP?” Sarah-Jane shook her head. “I’m not, really. I’m just an ordinary person.”

“You’ve been where almost all of us here would die to go – outer space, the past, the future.”

“You HAVE read my UNIT files. Why?”

“For the same reason you were asked to come to the conference. For what you know about black holes and alternative dimensions. And for… you know… him.”

“Ah… him.” Sarah-Jane laughed softly. Then the lift finally stopped and the doors opened. They stepped out into something that resembled a London underground station without the comforts. The tunnel curving away out of sight in either direction was partially filled with what looked like a thick water pipe. Around the walls and ceilings mysterious conduits snaked into the distance.

For all the build up, it was slightly underwhelming.

“We really didn’t spend much money on decoration down here,” Professor Cox said, detecting a lack of awe in her expression. “But this…” He waved towards the thick pipe. “This is the world’s largest and most powerful particle accelerator. It is a twenty-seven kilometre ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way.”

Sarah-Jane still wasn’t altogether impressed.

“What IS a hadron, anyway?”

“A hadron is any particle that is made from quarks, anti-quarks and gluons.”

“Forget I asked,” Sarah-Jane sighed. “It’s no use, I’m never going to understand the half of it. But…”

They were walking along a footpath beside the accelerator. Sarah-Jane still couldn’t quite get over expecting a gurgle of water through it. The professor did his best to explain why firing protons at super speed around the accelerator and crashing them into each other was an astounding achievement for mankind.

“And you use the same equipment… this big pipe…. you create black holes in here?” she asked.

“Well… not exactly ‘create’,” Professor Cox started to explain. “More… that is…. Well, yes, we do. But it’s really not as terrifying as you imagine. They only last for microseconds and they’re really microscopic…..”

“Even so… it still seems like tampering with something none of you fully understand. And… you know… The Doctor would probably tell you to stop.”

“Yes… I suppose he would,” the Professor admitted. “But none of us… none of us working at CERN… or any humsn being for that matter… actually answers to The Doctor, as amazing as he is. And he shouldn’t be telling us where our limits lie.”

“Yes, that’s a way of looking at it, I suppose. I look at it as risking turning a big part of Europe into a smoking hole of devastation.”

“We HAVE been running the LHC since 2008 without doing that,” Professor Cox assured her. “Besides….”

He paused, mid-sentence and looked around. Sarah-Jane did, too. Something had changed. The air felt different, and there was a noise in the distance but getting louder, as if something was coming closer.

There was a man in another white lab coat further down the tunnel. He heard the noise, too, and looked around.

Then, to Sarah-Jane’s surprise, the Professor pushed her flat against the wall. She began to protest about the unchivalric nature of his actions, but the approaching noise and the cry from the other scientist silenced her objections.

Then the Professor cried out, too, as something enveloped him momentarily before sweeping away through the tunnel.

When the noise had faded Sarah-Jane looked at the Professor with concern. He was as white as a sheet and sagging weakly.

“Are you all right?” she asked, feeling foolish because he obviously wasn’t.

“I’m… still standing,” he answered. “But….”

He managed to raise a hand to point. The other scientist was lying in a heap on the floor.

Sarah-Jane ran to him. Professor Cox stumbled, holding onto the wall. By the time he reached her she had examined the scientist carefully.

“This is Professor Eduard Dupré,” she said, looking at his tag. “One of your lot?”

“Yes. Is he….”

“He’s breathing, but he needs help.”

The Professor turned to an emergency telephone on the wall.

“That won’t do,” Sarah-Jane told him. “We all need to get out of here quickly. Whatever that was… it was moving fast…. How long do you think it would take it to cover seventeen kilometres and come right around again?”

“Not long,” The Professor admitted. As weak as he was from contact with the unexplained entity, he helped Sarah-Jane lift Professor Dupré. Fortunately, he was a slim figure, but it was hard work all the same carrying him back to the closest service lift.

As the lift door slid opened they began to hear the sound again. They bundled the unconscious man in and Sarah-Jane hit the up button. The door slid shut again just as the entity passed by.

Up above the fact that something was wrong in the LHC was already known. Emergency procedures were being carried out noisily but efficiently all around them while a stretcher was brought to rush the deathly sick Professor Dupré to the in-house medical facility. Professor Cox was taken there in a wheelchair and Sarah-Jane, though she was unhurt, came along for a check-up.

An hour later Sarah-Jane and the Professor were drinking coffee in an otherwise quiet hospitality suite, aware of a lot of activity going on elsewhere. UNIT were nominally in charge of the emergency, overriding CERN’s private security. There had been some argument about that. CERN was politically neutral and even a UN military presence violated that neutrality. But, on the other hand, UNIT had been INVITED to the conference to discuss security implications of certain projects. Kate Stewart, perhaps channelling some of her father’s stubbornness, won the argument.

“Dupré is being treated for extreme symptoms of leukaemia,” Professor Cox noted. “He’s very ill, but responding to treatment. We’re… hopeful.”

“Did he suffer from leukaemia?” Sarah-Jane asked, almost certain she knew the answer to the question.

“No. Not at all. We all get regular medical check-up here, and it would be in his records. For that matter, I’ve never been anaemic before, but they’ve had to pump me full of iron supplements.”

“Two forms of blood disease, one serious, one less serious,” Sarah-Jane noted.

“We’re both alive,” Professor Cox acknowledged. “We’ve had word from the French sector. They have a dead technician found in the tunnel a few minutes before it happened to us. They say he looks like old paper, as if his body were just drained.”

“He must have been hit first,” Sarah-Jane guessed. “Then… by the time it got around to Dupré it didn’t have as much umph left. And you just got the last of it.”

“Umph?”

“Technical term,” Sarah-Jane replied.

“But… what WAS it?” Professor Cox asked. “It looked like smoke, but when it went through me, I thought it was going to pull my soul out with it. And… yes, we physicists still mostly believe we have a soul. But… what could have that effect on a human body?”

“At a guess, something from the dungeon dimensions. An energy entity of some sort that is devastating in contact with flesh and blood humans.”

“Dungeon dimensions is a technical term, too?”

“Yes. And you can be sure that I’m the best you’re going to get for an expert on this kind of thing. It is exactly why I was brought to the conference. Second best, anyway. Since we can’t persuade The Doctor to come to things like this.”

 “And… I suppose it IS our fault… we’ve opened a gate, doorway, portal, whatever, to the ‘dungeon dimension’ with our experiments?”

Sarah-Jane tried to be kind. Professor Cox actually looked rather deflated by these occurrences. One man dead and another near death, he himself actually affected physically, were taking its toll on his confidence in his purely experimental science.

“Sometimes these things happen without any interference from humans,” she said in a conciliatory tone. “There ARE natural weak points. There’s a Rift in Cardiff that gets constantly monitored, and I had dealings with a random interstitial weakness a few months ago in Ealing. There was another a few years ago in London that swallowed a bus. Kate Stewart let me see the UNIT file since it involved a certain person.”

“If there was anything like your Cardiff problem here we would never have been allowed to build the LHC,” Professor Cox admitted. “Thank you for trying to make me feel better, but it does seem obvious that something we did caused this. Almost certainly the black hole experiments. They WERE only created for a fraction of time. But I suppose it is possible… a thing made of insubstantial gases or whatever it was… wouldn’t need an ACTUAL door, would it?”

“I’m trying not to say ‘told you so’,” Sarah-Jane said. “But….”

“You told us so… yes.”

“Well, there’s no point in sitting around feeling sorry for yourself. Let’s do something about it. I’ve not had the full grand tour, but I presume all that crashing protons together isn’t run from somebody’s laptop? You have a control centre?”

“Yes, of course.” Professor Cox put down his coffee cup and stood up quickly – a bit too quickly. He groaned drizzly, but rallied himself manfully. He led Sarah-Jane along corridors that weren’t part of the polished visitor centre and conference suite. This was where the work was done. Scientists and technicians were getting on with that work despite the presence of the UNIT forces who insisted on checking everybody’s ID at every corner. The Professor’s celebrity status and Sarah-Jane’s notoriety within UNIT made it a little easier for them, at least. They reached the central control centre with only a slight delay.

The room was buzzing with activity, of course, all overseen by Kate Stewart whose scientific background at least meant that she understood what was going on. Sarah-Jane half smiled in remembrance of the Brigadier’s impatience with science’s usually slow progress.

“Professor…. Miss Smith,” she called out. “I’m glad to see you’re both recovered.”

“I wasn’t affected,” Sarah-Jane answered. “Thanks to the Professor. He pushed me out of the way.”

Professor Cox was suitably modest about his heroic action. He found a place at a computer terminal and set to work. Sarah-Jane grabbed a seat beside him. Kate Stewart hovered close by.

 “It’s registering on our scanners,” the Professor noted after a while. He pointed to a schematic of one section of the LHC tunnel. A scattering of blue blips appeared and rapidly disappeared like a racing car passing the grandstand. “It’s still circling around, getting faster every time. But not so fast it can’t be analysed. It’s made up of anti-neutron particles and negatively charged gluons.”

“Just that?” Sarah-Jane queried. “It… seemed more ‘alive’ than that.”

“We’re all made of atoms,” the Professor pointed out. “The combination that makes life as we know it is just one of the miracles of existence. In your dungeon dimensions perhaps life is a bit less solid than here.”

“If it is alive,” Kate Stewart said. “Then does that mean it can be killed?”

Sarah-Jane looked at her with a suddenly fierce stare. The Professor, too, was appalled.

“A unique lifework is identified and you ask how to kill it,” he said. “What sort of scientist are YOU?”

“One tasked with protecting the human race from deadly alien entities,” Kate answered, though perhaps she was slightly abashed by the scathing response. “It HAS killed a man and put another in hospital.”

Sarah-Jane shook her head and watched as the blips streaked across the screen again.

“Yes… I know. But… I’ve been wondering if that was intentional. I mean… you know… when The Doctor and I were on Zeta Minor and the antimatter creature was near… every time I felt a sort of dread, as if something evil was near. I was sort of wrong. It wasn’t evil as such. It was just from an opposite dimension and I suppose our evil was its good and vice versa….”

Both of her listeners were looking at her with expectation that she was going to get to the point – eventually.

“Well.. the thing is… when we were down in the tunnel, when the entity passed through the Professor… I didn’t feel dread. It was more like… like….”

“Fear, desperation, confusion,” Professor Cox finished for her. “Not my fear… I wasn’t really scared. It was too sudden to feel anything like that. But… I think it was the entity’s emotions.”

“Lost,” Sarah-Jane added. “It was lost. It is spinning around the tunnel because it is lost and scared in a strange place. It’s trying to find its way home….”

“Yes,” Professor Cox agreed. “Yes, I felt that, too. I was too busy fainting to realise it at the time, but I felt all of that. Besides… this is a unique being…. Our first thought shouldn’t be to kill it.”

“Well it can’t stay here. What if it stops spinning around and tries to get out into the general area? You have thousands of people working in this complex. To say nothing of civilians beyond your gates.”

“I don’t think it WILL stop spinning,” Professor Cox answered. “Look at the way its speeding up all the time. I think it knows that it can create its own mini black hole by creating centrifugal forces.”

“Of course,” Kate Stewart noted. “That’s how the creatures from San Helios opened up a wormhole to try to reach Earth. Unfortunately, that’s not much help, here. Doctor Taylor worked out how to close wormholes, but not to open them.”

The mildly eccentric UNIT boffin was furiously typing at another terminal, but not yet coming up with any solutions.

“It can’t do it,” Professor Cox said. “It isn’t going fast enough. It is trying, but its nowhere near the speeds we used in the black hole experiment. Maybe the gravity on this planet slows it down, or some unknown factor. But if it can’t get up the speed it will just circle around indefinitely – or perhaps until it runs out of energy and… dies.”

“Then… you know what you’re going to have to do….” Sarah-Jane told him.

“Run the black hole programme,” he answered.

“No!” Kate protested. “That could just let in a dozen more of them.”

“I think we have to take the chance.”

“Yes,” Sarah-Jane agreed. “Yes. Run the programme.”

“There are protocols,” Professor Cox told them. “Especially since this is unscheduled. We need to inform the French section. Nobody is down there, anyway, but there needs to be an evacuation warning. It takes a bit of time.”

It took nearly an hour, while the entity continued to speed around the endless circle, trying to gain speed, but never enough to create its own portal back to where it came from.

“You know, in its way, this proves that the mini black hole theory is correct,” the Professor pointed out. “There ARE other dimensions beyond them. It changes everything about how we perceive the universe.”

“I’m not sure you’ll be able to talk about it outside this room,” Sarah-Jane told him. “Kate will get it classified at the highest possible level.”

“Yes, I rather expected that. It isn’t the first time. There are a few things we can’t reveal to the public. The fact that most people don’t know what we’re talking about most of the time is something of an advantage. Nobody expects any real revelations about the origins of the universe or the meaning of life from us. We’re just the geeks with unlimited funds and a cool visitor centre.”

“I know how you feel,” Sarah-Jane told him. “Just about everything I’ve seen and done is under the Official Secrets Act.”

Professor Cox smiled a smile of a comrade in arms and then turned to initiate the programme that created the mini black holes far below ground in the Large Hadron Collider. On screen a new red dot began to chase, then overtake the blips that represented the alien. It was soon overtaking it every few seconds as phenomenal speeds were reached. The rate was counting up on screen, but Sarah-Jane couldn’t look at it without her eyes watering. She looked around instead at the people in the control centre. Kate Stewart looked anxious. She was still convinced this would do more harm thsn good. Doctor Taylor peered through his thick round glasses in excitement. He was clearly sure it was going to work. Around them the CERN technicians wavered between the two extremes.

“Of course we could still just turn Switzerland inside out,” the Professor whispered so that Sarah-Jane was the only one who could hear.

“I… think I trust you not to do that,” she answered.

“There’s a turn around,” The Professor teased. Then his attention was taken by the screen where all kinds of data, incomprehensible to Sarah-Jane was scrolling rapidly. At other terminals where his colleagues were watching the same data excited murmurs rose. “We have an opening,” he said. “A mini black hole. There’s the negative polarisation from the singularity and…..”

And in an eyeblink it was over. The blips and the miniscule dot that indicated the black hole converged and then both winked out of existence. Amidst cheers and congratulations the Professor calmly carried out the close down procedures at the end of the experiment.

“We did it,” Sarah-Jane whispered. “We sent it back. At least… it seemed as if we did. I suppose its possible we just annihilated it?”

“No… it went through,” Professor Cox assured her. “Those figures, there, all those negatives, prove it. And… nothing came the other way. I can assure you of that, Miss Stewart.”

“Good,” Kate answered. “Tomorrow… we need a round table meeting to discuss what happened today and whether further experiments of the sort can be allowed. Its bad nought keeping things from popping up in Cardiff and Ealing, without you manufacturing them, here.”

“Yes, I expected that,” Professor Cox said. “I should warn you that my colleagues and I will argue very strongly against any restrictions imposed from outside. But in the meantime, I am going to take Miss Smith down into the LHC to show her that all is well down there, as I know she is itching to do.”

The Professor was right. She did want to go down to see for herself... to feel for herself. She followed the Professor to the secure lift that he operated with his key. She felt the long descent and then, finally, the doors opened. She stepped out a little hesitantly, remembering how deadly the entity’s accidental presence had been.

“No,” she said after looking both ways and concentrating hard. “No, I can’t feel anything. I though I would. I really thought I would feel some kind of... I don’t know... relief, maybe even gratitude... though I suppose it didn’t even really know we were trying to help it. It didn’t have that kind of understanding of our world, did it?”

“Probably not,” the Professor guessed.

“The air down here is so PROCESSED,” Sarah-Jane complained. “I need to breathe real air.”

“I know a little café with a view of the lake. It does English tea. Why don’t we take Kate Stewart, too? I think you two are kind of friends, and today has strained that friendship. Let’s see if that can be mended, too.”

“Did anyone ever tell you that you’re a very clever man?” Sarah-Jane asked him. He had put his finger on the one thing still bothering her.

“Many people, in fact.”

“Well, you are. But don’t forget about The Doctor. She’s always going to be smarter than you and your whole CERN lot put together.”

“I can live with that,” The Professor answered.