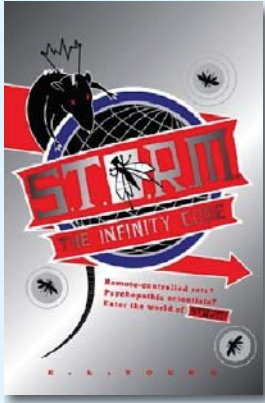


Big Bang Books



STORM – The Infinity Code

EL Young

ISBN 9780330446402

Summary

When Andrew Minkel, a teenage software multi-millionaire, decides to spend his fortune on saving the world from itself, he gathers a crack team of friends to form STORM – Science and Technology to Over-Rule Misery. Gaia Carella, a chemistry whizz with a photographic memory, Caspian Baraban, the son of a maverick astrophysicist and Will Knight, a troubled loner and gadget freak, all heed Andrew's call that "we might be young, but we are not impotent. We can act. We can change the world."

Despite an early success things don't run smoothly for the newly formed covert organisation. Will is consumed with grief over the recent death of his father and the fact that his mother has run off to St Petersburg to have "a little time to sort herself out". Gaia's family background is even less stable with her alcoholic father leaving her to fend for herself. And, even with his millions, Andrew is loathe to stray far from his front door. But when Caspian's father is mysteriously abducted and events take a turn for the worse, the dysfunctional gang find they have to trust each other if they want to survive.

Will, Gaia and Andrew break into Caspian's father's laboratory only to be left with more questions than they started with. Just where is Vassily Baraban? Why do all the papers and notes strewn around the lab mention the big bang, particle colliders and gold nuclei? And why has Caspian emailed his dad saying "Have created Infinity Code. Bringing it to St Petersburg."? The only way to find the answers is to follow Caspian to Russia.

With the help of Will's ingenious gadgets such as the Fly Spy, a robotic flying camera, and Tooth Talk, tiny phones that fit over the wearer's back molar, alongside some well-connected Russian friends and a remote-controlled live rat, the gang finally find themselves in an underground laboratory and with the fate of the world in their hands. Was Andrew right – can they change the world? Or are they just three pesky kids meddling in events beyond their control?

Some science questions raised by the book

What is astrophysics?

Physics is all about asking questions about the world and trying to answer them by observing and experimenting. Astrophysicists are trying to find the answers to questions such as 'how did the universe begin?', 'how will it end?', 'why can we detect only 10% of the mass in the universe?' and 'is there life on other planets?'. Counterintuitively, physicists use particle colliders, which look at matter at the smallest scales, to help them work out how the universe works at the largest scales. To find out more about how particle physics can help us discover more about the universe, take a look at www.particlephysics.ac.uk.

What is the Birch and Swinnerton–Dyer conjecture, and is it really so hard?

In 2000, the Clay Mathematics Institute in the US chose the seven most significant unsolved problems in maths. They called them the 'Millennium Problems' and offered a million dollars for each one that was cracked. One of the problems, the Poincare conjecture, was solved in 2006 by Grigori Perelman – a reclusive Russian mathematician who has so far refused to claim his million dollar reward.

The Birch and Swinnerton–Dyer conjecture is one of six remaining Millennium Problems and so, yes, it is pretty tricky! The branch of maths that studies problems like this one is called number theory. Number theory has lots of important applications in modern life from the processing of digital signals for mobile phones and televisions, to the security of PIN numbers.

What are solar flares and CMEs?

Solar flares are huge explosions on the surface of the Sun. In just a few minutes they heat material to many millions of degrees and release as much energy as a billion megatonnes of TNT. They occur near sunspots, which are regions on the surface of the Sun where the magnetic field has become concentrated. The number of sunspots that you can see rises and falls over an 11 year cycle – the next 'maximum' will be in 2011.

Coronal mass ejections (CMEs) are explosions in the corona, or outer atmosphere of the Sun. (During a total solar eclipse, it is the corona that you can see peeping out from behind the Moon.) The corona is held together by strong magnetic fields, but sometimes immense bubbles of gas and magnetic fields can be suddenly and violently released as coronal mass ejections.

Both solar flares and coronal mass ejections can affect us here on Earth, but it is CMEs that can cause the most damage by interfering with our satellites and communications systems.

You can get the 'space weather' forecast from www.spaceweather.com which monitors sunspot numbers, solar flare activity and provides early warning of coronal mass ejections heading our way.

Would it really be the end of the world if a black hole was made in a particle collider?

Black holes are often thought to be incredibly dangerous and destructive, consuming everything that comes close and this is certainly true for black holes that are created when massive stars collapse. The gravitational pull of a black hole is dependent on the amount of mass (or energy) it contains – the more mass (or energy) it has, the bigger its gravitational attraction.

Some physicists think that it will be possible to make black holes in the new Large Hadron Collider (LHC) which is at a laboratory called CERN in Switzerland. The LHC is the biggest particle accelerator in the world and the particle collisions will be the most energetic outside the natural world. However, even though the energies will be large for man-made particle collisions, if any black holes are produced they will be microscopic and far too small to attract anything. In addition, any tiny black holes that are made will evaporate almost as quickly as they appeared by a process called Hawking Radiation.

Physicists are also confident that the LHC will not produce an Earth-destroying black hole since much more energetic particle collisions happen everyday when cosmic rays hit our atmosphere. To find out more about the LHC, have a look at www.lhc.ac.uk.

What's a Faraday cage?

Michael Faraday discovered that the electric charge on charged conductors is only found on their exterior and that electric fields don't exist within them. This means that enclosures that are made from metal, or other conducting materials, can be used to shield whatever is inside them from electromagnetic signals, such as radio, tv and wireless internet, as well as external electric fields.

A good example of a Faraday Cage is an aeroplane in a thunderstorm. Planes are quite often hit by lightning but because they have metal shells, everyone inside is safe from harm. A less dramatic example is the fact that it is often impossible to have a mobile phone conversation in a lift.

Some things to do

1. If you were in STORM, what gadget would you invent and what would it do? Once you'd proved that it worked, what would you call it? Draw a picture of your gadget.
2. Climate change is one of the problems that Andrew suggests STORM could help solve. There are lots of things that you can do now to help stop global warming. Which of the following will you do to help change the world?
 - Switch off household appliances when not in use – don't leave them on standby
 - Reduce car use by half – share a lift or walk
 - Use energy saving lightbulbs
 - Turn your thermostat down by 1°C
 - Always turn lights off when you leave the room

Can you think of anything else that you could do?

3. Find a fascinating fact in the book, something that made you go 'wow', and make a book mark with your fact on it.

Some things to talk about

Once Will, Andrew and Gaia find out what Caspian is involved in, they start to wonder why he's helping to create such a destructive weapon. Will thinks to himself, "No, you couldn't blame him [Caspian] for being brilliant. But you could blame him for using that brilliance." If you were Caspian, what would you have done? Do you think that scientists think enough about the implications of the research they are doing?

Andrew and Gaia sometimes seem a bit maddened when Will takes control. How do you think the friendship between them all developed during the course of the book?

If you were a multimillionaire like Andrew, how would you spend your money?

There is a stereotype that scientists are geeky, boring, too intelligent, have very few friends and are most probably male. Did the author use this stereotype at all when describing Will, Gaia, Andrew and the other characters in the book? How successful was she in creating likeable and believable characters? Would you like to be friends with any of them?

Some more books to read

Black Holes and Uncle Albert *Russell Stannard*. ISBN 0571226140. Faber and Faber.

The Down to Earth Guide to Global Warming *Laurie David and Cambria Gordon*. ISBN 0439024943. Scholastic.

Evil Inventions (Horrible Science) *Nick Arnold*. ISBN 0439943736. Scholastic.

His Dark Materials trilogy: Northern Lights, The Subtle Knife and The Amber Spyglass *Philip Pullman*. Scholastic.

Find out more about the physics in any book you read at www.physics.org – your guide to physics on the web.