More Concerns About CERN: Their New Proposed Collider's Magnetic…

Source: [Giza Death Star]

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February 8, 2019

Last week, you'll recall, I blogged about CERN's plans for an even *bigger* particle collider, one with an enormous 100km (60 miles) circumference. At the time I posted, I pointed out that the energies such a collider would be operating that would be… well, to use the late Art Bell's expression, "gimongous", dwarfing even the enormous energies and magnetic field strengths of the current Large Hadron Collider.

Mr. P.J. spotted *this* article, and shared it:

[Designing Magnets for the World's Largest Particle Collider]

Now, the subtitle of this article says it all: "To produce a field of 16 teslas for CERN's Future Circular Collider, scientists must invent a new class of magnets." But wait, there's more:

> *At the Large Hadron Collider (LHC) in Switzerland, man-made magnetic fields—roughly 200,000 times stronger than the Earth's—accelerate particles into one another at nearly the speed of light. Experiments by this world-renowned particle accelerator have provided critical data supporting the Standard Model, a theory describing how particles in our universe behave and interact. But physicists are keen to know whether the model holds up for particles at even higher energies.*

> *More experiments must also be done to extend the Standard Model, to answer questions such as why the universe has so much matter compared to antimatter, what exactly is dark matter, and why neutrinos have mass. CERN, the research organization behind the LHC, hopes to explore these mysteries with its proposed next-generation facility, the Future Circular Collider (FCC).*
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> *On 15 January, CERN released its first report outlining potential designs for the FCC, with input from more than 130 institutions. The facility would come with an estimated price tag between €9 billion (US $10.2 billion) and €21 billion, and part of the facility could open as soon as 2040.*
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> *If realized, the FCC will produce magnetic fields nearly twice as strong as the LHC, and accelerate particles to unprecedented energies of 100 tera-electron volts, compared to the LHC's energies of 13 TeV. Whereas the magnetic system at the LHC can achieve strengths of 8.3 teslas, the FCC system would be able to achieve 16 T. (Emphasis added)*

To achieve this feat, superconducting magnets of niobium tin will have to be used:

> *More than 4,500 magnets will be required for the FCC, and those magnets must rely on new designs and materials. The magnets currently used in the LHC are made of niobium titanium (NbTi)—but for the FCC, scientists will switch to the more powerful superconducting material niobium tin (Nb_3Sn).*
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> *"The only superconducting material suitable in producing accelerator magnets achieving 16 T is Nb_3Sn," says Arnaud Marsollier, head of media relations at CERN. However, this material is sensitive to the tiniest deformation. This is problematic considering the extreme changes the material will undergo, which could degrade its superconducting properties.*

> *Therefore, scientists need new designs to minimize stress on these systems.*

Now, most readers of my books, and in particular, *The Third Way*, and of my various blogs on the subject of conCERNs about CERN, will be familiar with one of my high octane speculations about the device: with magnetic field strengths several magnitudes stronger than the local field strength of the planet itself, I've always thought it possible that planetary effects could ensue from using the device, via resonance, and that these effects could affect everything from weather to aggregate human behavior, and possibly even, via the magnetic coupling between the Earth and the Sun, have affects on the Sun itself. I've even entertained the speculation that with such strong magnetic fields buried under the Earth, that such effects might even extend to the dynamo operating in the interior of the planet, which in turn would affect the magnetosphere itself. Perhaps the strange sudden shifting of the magnetic north pole is somehow related to these hypothesized effects.

Now, if you're wondering just how strong a tesla is, this article is helpful:

What is Magnetic Field Strength?

Take note of what is stated at the beginning of this article:

> *Magnetic field strength is a measure of the intensity of a magnetic field, given in teslas (T), the standard unit. One tesla is equal to one weber per square meter, where one weber is the equivalent per second that is required to induce an electromotive force of one volt. Another way to define a tesla is that a magnetic field of 1 tesla must exert force of 1 newton on a wire of 1 meter carrying 1 ampere of current. This is a lot of force for a magnetic field to exert, as a newton is the force necessary to accelerate a 1 kg weight at 1 meter per second squared.*

If all that sounds complicated, people can just think of magnetic field strength in teslas by reference to known field strengths. For instance, the Earth's magnetic field is equivalent to 1/30,000th of a tesla. Still, this is enough for birds to navigate by and to keep a compass hand pointed north. The magnetic field of Jupiter, the largest planet in the solar system, is about ten times stronger than Earth's, or 1/3,000th of a tesla. This is caused by charge circulating through metallic hydrogen in its interior.

Those very small magnetic strengths may seem to be nothing, but note for a moment that birds migrate – it is thought – by using magnetic field lines through the magnetite in their beaks and brains. In the presence of field strengths several orders of magnitude larger than that, what happens? Short answer: we don't really know. The article tries to reassure us with this:

A typical loudspeaker magnetic generates a strength of 1 to 2.4 teslas.

But then it follows that statement with this:

The magnetic field necessary to levitate a frog is about 17 teslas. The strongest electromagnets, which make use of superconductors, measure approximately 20 teslas. The strongest continuous magnetic field yet generated is 45 teslas, at Florida State University's National High Magnetic Field Laboratory in Tallahassee, while the strongest pulsed magnetic field obtained non-destructively was 100 teslas at the Los Alamos National Laboratory.

And now CERN wants to *double* those field strengths(perhaps they plan experiments in frog levitation). So, while these magnets may not be the 100 teslas at Los Alamos, I suspect that interesting things might "begin to happen" when one adds rotation, and maybe the odd magnetic precessional wobble or two… And add all these systems and their enormous magnetic fields *together*, and my high octane speculations about (un?)intended resonance effects on other systems gets very murky indeed. And then there's that curious wording of the last phrase of the sentence quoted above: "..while the strongest pulsed magnetic field obtained non-destructively was 100 teslas at the Los Alamos National Laboratory." You don't say. What about the destructive ones?

But, as I say, it's all high octane speculation, a fantastic "yea, but what if…?".

See you on the flip side…