It goes to 11: Florida lab sets new magnet strength record

August 22 2017, by Gary Fineout

Engineers at a lab in Florida have been working quietly for the last two and a half years on building one of the most powerful magnets in the world.

And on Monday, they succeeded. The National High Magnetic Field Laboratory—whose main location is housed at Florida State University—met its goal and reclaimed its status as home to the world's strongest resistive magnet.

They called it "Project 11,"a nod to the comedy film "This is Spinal Tap" about a fictional heavy metal band whose guitarist boasts an amplifier that doesn't go up to 10 but to 11.

Lab officials said they tested a 41.4-tesla magnet, which is roughly 20 times the strength of a magnet used in medical imaging machines and vastly stronger than the ones that get stuck to the door of a household refrigerator. The Earth's magnetic field, by comparison, is one twenty thousandth (.00005) of a tesla. A tesla is a measure of magnetic field strength.

The new magnet—which cost $3.5 million to build—beat the old mark for resistive magnets which was held by a 38.5 tesla magnet in China. The National MagLab had previously held the record for 19 years.

Greg Boebinger, the lab's director, said the loss of the record prompted officials to tell engineers, "Go ahead and make the thing bigger, go

ahead and use more power, just go full volume to 11 and see what you can do."

Resistive magnets are a type of electromagnet used for research. They differ from pulsed magnets, which can reach a higher Tesla but can sustain that power for only a fraction of a second. Resistive magnets can run continuously. Superconducting magnets use less power but tap out at a lower field strength. Hybrid magnets combine superconducting and resistive elements and can reach even higher fields. The National MagLab has the world's strongest hybrid magnet which reaches 45 tesla.

Researchers say they can use these powerful magnets to answer many questions, such as what kind of materials will work best in quantum computers, how does a potential Alzheimer's drug change the brain and what molecules make up a sample of crude oil - and will it be worth drilling for?

The power of the new record-setting magnet, which is confined to a single room inside the lab, doesn't create the type of effects witnessed in the X-Men film series by Magneto. But it's powerful enough that lab officials use non-magnetic tools.

"Local people think we change the weather," said Boebinger, who says he gets asked about Magneto all the time. "We don't even change the magnetic field outside our building."

Instead the magnetic field created by the new powerful magnet will be used by researchers and scientists from across the world as a way to look at and study various types of materials. It's this research that could potentially lead to breakthroughs in medicine, engineering and energy.

This story has been updated to make it clear that the magnet at the National High Magnetic Field Laboratory is home to the strongest

resistive magnet.

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Citation: It goes to 11: Florida lab sets new magnet strength record (2017, August 22) retrieved 27 April 2024 from https://phys.org/news/2017-08-florida-lab-magnet-strength.html

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