Earth's Magnetic Field Can Flip 10 Times Faster Than We Thought

Now it's just showing off.

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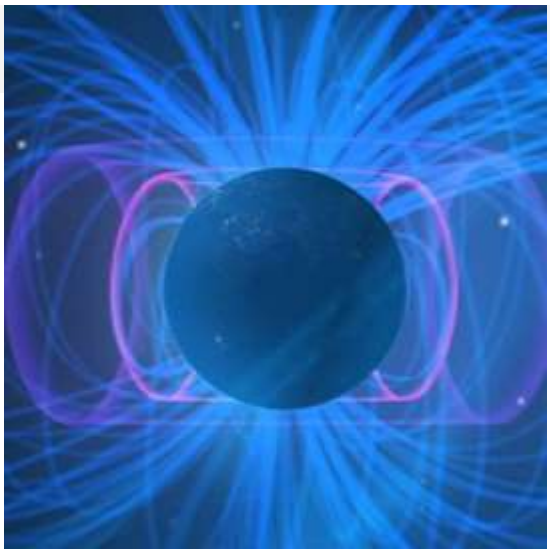

Researchers have discovered that changes to Earth's magnetic field can happen incredibly quickly.

- **Computer simulations revealed that Earth's magnetic field has changed directions 10 times faster than previously thought.**
- **Understanding how our magnetic field changes can help protect vital electrical instruments here on Earth and in orbit.**

Scientists from the University of Leeds and the University of California, San Diego have discovered that Earth's magnetic field—already a well-documented rascal—may swap directions much faster than previously thought.

"We have very incomplete knowledge of our magnetic field prior to 400 years ago," Leeds geomagnetist Chris Davies said in a statement. "Since these rapid changes represent some of the more extreme behavior of the

liquid core, they could give important information about the behavior of Earth's deep interior."

Earth's magnetic field is generated by electrical currents that form from molten globs of iron swirling in Earth's liquid outer core. We know Earth's magnetic field is in constant flux; the magnetic north pole, for instance, is racing away from Canada and toward Siberia at a rate of up to 37 miles per year. And the geologic record has shown us the poles have moved before, and even switched places, in the distant past.

The scientists used computer simulations to map variations in Earth's magnetic field over the past 100,000 years. They found it changed directions up to 10 times faster than the current record of one degree per year. For example, roughly 39,000 years ago, Earth's geomagnetic field changed direction by roughly 2.5 degrees per year.

What's going on? Davies and his colleague Catherine Constable of UC San Diego discovered localized weaknesses in the magnetic field can signal an upcoming change or reversal. Most of these weaknesses, they say, have occurred in lower latitudes.

Earth's magnetic field guards us against harmful solar and cosmic radiation that could disrupt our energy grid and disable satellites circling Earth. It also aids navigation systems and protects our fragile atmosphere. Understanding exactly how this complex and dynamic shield works is a top priority for researchers...