

## Ball Lightning: A Shocking Scientific Mystery

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for [National Geographic News](#)

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People have reported seeing ball lightning—a rare phenomenon that resembles a glowing sphere of electricity—for hundreds of years.

But scientists still can't explain what causes it, or even exactly what it is.

"There's certainly no consensus. I don't think that anyone knows what it is," said Graham K. Hubler, a physicist at the U.S. Naval Research Laboratory in Washington, D.C.

"Most scientists feel that the proper model hasn't been found yet."

Surveys estimate that between 1 in 30 and 1 in 150 people believe that they have seen ball lightning. Hubler is one of them.

His close encounter happened at age 16, while he was riding out a thunderstorm in an open-sided park pavilion.

"It's extraordinary—you're so startled that you remember it for the rest of your life," he said.

He describes seeing a glowing, tennis ball-size formation hovering nearby.

"It drifted along a few feet above the ground," Hubler recalled, "but when it came inside [the pavilion] it dropped down to the ground and skittered along the floor."

"It made lots of gyrations or oscillations and a hissing sound like boiling water. When it went out the other side [of the pavilion], it climbed back up [several feet off the ground]."

Hubler says the ball behaved as if it had a charge and was following electric field lines along the Earth.

"I remember telling people what I had seen, and they thought I was crazy, so I stopped talking about it," he said.

"I didn't know what I'd seen until ten years later when I attended a seminar in graduate school."

### Lightning Stories

While some skeptics remain, there is significant observational evidence for ball lightning's existence.

"[There are] around 10,000 written accounts of observations covering many countries with similar properties recurring in many observations," said John Abrahamson, a professor of chemistry at the University of Canterbury in Christchurch, New Zealand.

"All this points to a phenomenon which is repeatable and justifies a single label."

Thousands of eyewitnesses have described seeing a floating, glowing ball similar to a tennis ball or even a beach ball.

The sightings generally accompany thunderstorms, but it's unclear what other similarities ball lightning might share with its conventional relative.

(See and download a [lightning wallpaper photo](#).)

Ball lightning floats near the ground, sometimes bounces off the ground or other objects, and does not obey the whims of wind or the laws of gravity.

An average ball lightning glows with the power of a 100-watt bulb. Some have been reported to melt through glass windows and burn through screens.

The record suggests that ball lightning is not inherently deadly, but there are reports of people being killed by contact—most notably the pioneering electricity researcher Georg Richmann, who died in 1753.

Richmann is believed to have been electrocuted by ball lightning as he conducted a lightning-rod experiment in St. Petersburg, Russia.

The phenomenon lasts only a short time, perhaps ten seconds, before either fading away or violently dissipating with a small explosion.

### **Ball Lightning Research**

Despite some fairly consistent characteristics, ball lightning has thus far defied scientific explanation—but it's not for a lack of theories.

Scientists have postulated that plasma may be behind the phenomenon.

Plasma clouds are composed of charged particles that recombine into atoms and glow with light.

The clouds may be created by an energy source like a conventional lightning bolt and could theoretically form ball lightning.

An alternative theory promotes the notion that small particles held together in a ball by electrical charges emit chemical energy through oxidation.

This theory suggests that when lightning strikes a surface, a vapor is formed. The vapor condenses into particles that mix with oxygen in the air and then slowly burn with the release of chemical energy.

"The whole picture is electrical energy, in a huge amount really, and a small part of that energy gets converted to chemical energy and stored in particles," said the University of Canterbury's Abrahamson, who supports the theory.

Laboratory work is currently seeking to reproduce ball lightning under this model and several others.

Meanwhile, the Naval Research Lab's Hubler hopes that technology will leave less room for the real thing to hide.

"There is such a proliferation of video cameras these days that people must have captured [pictures of] ball lightning, and it would be an immense help to see some of those videos and study them," he said.

"Here's a real, physical phenomenon that's out there in nature, and we don't have the foggiest idea what it is—that's interesting," he added.

"I hope in my lifetime we find out what it is. It's possible that there's some very new physics in it and that could be very profound."

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