

## Ball Lightning Mystery Solved? Electrical Phenomenon Created in Lab

Brian Handwerk  
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Brazilian scientists may have solved a shocking scientific mystery by creating ball lightning in the lab.

Physicist Antonio Pavão and doctoral student Gerson Paiva of the Federal University of Pernambuco have created orbs of electricity about the size of golf balls that mimic natural ball lightning.

The fluffy-looking spheres spin, throw off sparks, and vibrate.

They also move erratically about the lab, rolling around on the floor, bouncing off objects, and burning whatever they touch (*see enlarged photo for stills from laboratory video*).

People have reported seeing ball lightning in nature for hundreds of years, but there is no scientific consensus as to what causes the phenomenon.

(Read ["Ball Lightning: A Shocking Scientific Mystery"](#) [May 31, 2006].)

"Since Benjamin Franklin, or even before him, different explanations have been proposed," Pavão said.

"But now we are producing balls [of lightning] as a result of silicon combustion. I believe that with our results, ball lightning is losing its status [as a] mystery."

### Recent Clues to Centuries-Old Mystery

According to various surveys, between 1 in 30 and 1 in 150 people report having seen natural ball lightning.

Thousands of accounts describe brief encounters with orbs the size of tennis balls, or even beach balls, that seem alive with electricity.

Ball lightning often appears during thunderstorms and typically glows, spins, hisses, bounces, and floats.

The balls have been reported to melt glass windows, burn objects, and even kill people—notably the 18th-century electricity researcher Georg Richmann.

Many theories have been proposed to explain the phenomenon.

John Abrahamson and James Dinniss, of the University of Canterbury in Christchurch, New Zealand, first proposed the ball-lightning theory that lies behind Pavão's research.

The pair suggested that when lightning strikes a surface, like the Earth's silica-rich soil, a vapor is formed. This silicon vapor may condense into particles that combine with oxygen in the air to slowly burn with the chemical energy of oxidation.

Pavão and Paiva have spent two years testing the theory with a simple experiment.

They used electrodes to shock silicon wafers with enough electricity to create a silicon vapor.

Most of the artificial orbs lasted two to five seconds, but at least one has survived as long as eight seconds—approximating natural ball lightning and far exceeding previous efforts to create the phenomenon in the lab.

Ball lightning expert Graham K. Hubler, a physicist at the U.S. Naval Research Laboratory in Washington, D.C., called the work "very promising."

"The eight seconds is extraordinary and bodes well for a possible explanation for many ball-lightning events," he said.

Abrahamson, the New Zealand scientist, agrees.

"Their balls are of sufficient duration and size to enter the mainstream of ball lightning seen in nature," Abrahamson said.

"Also the balls have sufficient properties similar to those in nature to be convincing ball lightning."

#### **Other Sources of the Phenomenon?**

Abrahamson added that other materials besides silicon could also form ball lightning, though none of them have been successfully tested.

"Our theory includes many materials, such as aluminum and iron metals, which appear to be the sources of some balls seen in nature," he said.

Some sightings of ball lightning have occurred in or around airplanes, Abrahamson explained, which suggests that aluminum in the aircraft may have caused the phenomenon.

If these materials can produce ball lightning, he said, the phenomenon may occur after lightning strikes power poles, electrical fittings, roof materials, and other objects.

(Download a [lightning wallpaper photo](#).)

In fact, Abrahamson suggested, conventional lightning may not be the only energy source for the curious orbs.

"It could be smaller atmospheric discharges or even friction heating from earthquakes—balls have been seen coming from an active fault," he said.

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