Microscopic Ball Lightning

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Abstract

Microscopic ball lightning, smaller than a tenth of a millimeter, has been produced by electrical discharge and electrolysis experiments. It shares the anomalous characteristics of natural ball lightning such as the ability to bore holes in materials and transmute atoms. It groups and organizes in the same way as natural ball lightning, in chains and rings. It has anomalous effects on materials, putting atoms into an anomalous state in which the atoms flow, move, organize, and transmute. Atoms in this state may move with very little heat in their environment. Pictures of microscopic ball lightning effects from various authors are included in this article to help describe the behavior of the phenomenon.

1. Introduction

Natural ball lightning (BL) has been observed for many centuries. It ranges in size from a kilometer to about a centimeter. Smaller ball lightning was not known to exist because it is difficult to see. It may be mistaken for sparks. In the last few decades the anomalous behavior of microscopic plasmoids like those studied by Mesyats, Shoulders, and W. Bostick[iii] became clear, and after 1989 similar anomalous plasmoids were produced in a variety of types of transmutation experiments conducted by researchers working independently. Evidence is presented here showing the existence of these objects and some of their anomalous behaviors and effects, such as ball lightning.

Microscopic ball lightning has been difficult to photograph directly, but its effects on materials are easy to photograph with microscopes. It is clear from the evidence that these microscopic objects behave like larger natural BL.

2. Natural Ball Lightning

Natural ball lightning exhibits the same behavior and effects as its microscopic counterparts. Very large ball lightning is emitted from volcanoes and earthquakes. As explained in other articles (such as "Tornadoes and Ball Lightning as Plasmoids"[iii] submitted for this ISBL conference and in earlier articles[ivvvivii]), these larger kinds of ball lightning exhibit tornado and transmutation effects. People have often thought they were UFOs, and they are responsible for making "crop circle" type markings. Some crop circle markings look like those made by microscopic BL.

Egon Bach gathered many reports of such large objects and studied their behavior.[viii] His book contains many reports of various volcanoes from all over the world. Redoubt volcano, which erupted on Feb. 15, 1990, was witnessed by many. The plasmoid emission phase lasted for about four minutes after the onset. The captain of an oil service ship 35 kilometers away from Redoubt,

Captain Richard Swain, saw the beginning of the eruption. As in many of the volcano reports in the book, there was first a brilliant light with massive electrical displays and the emission of huge numbers of plasmoids, suggesting that, as in the transmutation apparatus, the phenomenon is basically electrical and magnetic, but electricity and magnetism not understood by QM paradigm physics.

Richard Swaim said, “The top of Redoubt lit up with an incredibly bright flash. It seemed the Cook Inlet and the mountains behind it lit up in daytime brightness. A fireball grew above Reboubt with huge tongue-like projections - quite unlike the concentric fireball of nuclear explosions…(8)” Kathy and Dan Thompson saw objects fly out; they said that the objects were “incredibly bright - like solid white electricity," that they had a reddish tail, and that there were huge lightning flashes. They said, "I remember most an immensely huge, perfectly straight and fat lightning stroke that went from the crater straight up. (8)" Many observers described similar phenomena; Wayne Sarris, who was a supervisor at the Drift River Oil Loading Terminal, at the foot of Redoubt, some 12 miles away, was one:

I saw lots of lightning flashes and then a huge reddish-orange lightning just before the volcano blew. That's when the US Geological Survey hotline call got through to me. They called me from Fairbanks on an automatic alert line to inform me of the electric storm. But we were fully alert on our own. We got massive readings of atmospheric electricity on our own instruments ... I saw huge objects shooting up resembling Roman candles. They flew in the two directions of Homer and Anchorage. The objects were completely unlike lightnings. They probably did zoom out of the crater - five or six balls at a given moment - followed by another barrage in short order. They flew mainly southeast and Tuxedni Point.

The objects hardly resembled fireballs. They had such distorted shapes and flew with such incredible rapidity that they almost looked like fleeting reflections. They quickly streaked out from the field of sight ... Most of these rocketing objects were yellowish-white and immensely bright. Other objects were of the most vivid brilliant blue anyone could ever find, as if a blue cellophane strip was lit from behind by a 500-watt light bulb. Still others were of a most vivid emerald-green that also was immensely bright. The red objects bordered in their colors on purplish and fiery red. There were an infinity of shadings to the main colors. There were several kinds of blue - some that verged on violet.

It can be said, however, that the centers of the fireballs were always immeasurably brighter than their periphery, which appeared to be a bit washed out and flame-like. The centers, however, were immensely bright, no less than a floodlight shining straight into your eyes, and similar perhaps to a cutting torch when you add air to it(8)**.**

As Egon Bach wrote, Sarris's estimation of the apparent size meant that the biggest objects were at least 100 to 160 meters in diameter(8). He and others reported that many of the objects had long tails, so that they looked like comets.

John Burns, who was a foreman on the Drift River Oil Terminal, said:

These comet-like things were mostly brilliantly white with a pale greenish and pale orange tinge ... the objects really resembled the illustrations of comets. They left really broad tracks as they flew straight on their paths. There were also common lightnings ... I have seen lightnings in a big tornado back in Texas, but they were no match for all the volcanic lightning(8)**.**

People have seen luminescent tornadoes and described their light and color in much the same way. A tornado in Ohio in 1965 was described in this way:

We were shaken up and our trailer along with others was dented badly from hail the size of baseballs. The beautiful electric blue light that was around the tornado was something to see, and balls of orange and lightning came from the cone point of the tornado. The cone or tail of the tornado reminded me of an elephant trunk….My son and I watched the orange balls of fire roll down the Racy Way Park then it lifted and the roof came off one of the horse barns.... (The tornado took place in Toledo, Ohio, in 1965.[ix])

A tornado in Oklahoma in 1955 was described as being blue and about as bright and large as these objects. A weather observer for the U. S. Weather Service named F. Montgomery[x] who was stationed in Blackwell, Oklahoma, reported:

There were rapidly rotating clouds passing in front of the top of the funnel. These clouds were illuminated only by the luminous band of light. The light would grow dim when these clouds were in front, and then it would grow bright again as I could see between the clouds. As near as I can explain, I would say that the light was the same color as an electric arc welder but very much brighter. The light was so intense that I had to look away when there were no clouds in front. The light and the clouds seemed to be turning to the right like a beacon in a lighthouse.[xi]

The tornado had a deep blue section that was near the top at the cloud layer; it was "very much brighter" than an arc welder and too bright for him to look at, though the tornado was 9 blocks, or about 3600 feet, away from him. He reported that the air from the tornado felt hot and that the temperature as recorded by a thermometer at his instrument shelter rose from 74 degrees Fahrenheit to 80 degrees Fahrenheit when the storm struck. This is evidence of a spectacular rate of radiation. Montgomery also reported that a few minutes after the storm passed there was a taste and smell in the air like that of burnt sulphur, and that the air was clammy, and that it was hard to breathe.

Like comets, the objects from Redoubt volcano moved very quickly. One police officer who asked that his name be withheld said, "Their intense white and bluish-white colors truly puzzled me. I could not think of anything this hot." He said it was a part of his duty to know the speed of aircraft, and he said that the objects moved at 3000 to 4000 miles an hour. He also said that this eruption was a tremendous venting of matter: "The absence of all sound during the enormous venting of so much matter had shocked me(8)."

These recorded events are similar. Anomalous geological plasmoids have energetic aspects. Various meteorological, geological, and astrophysical phenomena share similar characteristics. Electrodes during electrolysis and discharge emit similar plasmoids, as do materials stressed in various ways. Electricity and plasmoids were emitted from Redoubt volcano during its eruption. Transmutation experiments also emit these things. In order to understand these experimental effects, researchers should measure the plasmoids and electricity emitted from their experiments. If researchers only measure heat output, they may miscalculate the energy their experiments produce.

3. **Similarity of Natural Ball Lightning and Microscopic Ball Lightning**

Microscopic ball lightning (MBL) and natural ball lightning behave similarly. Ball lightning is distinctive because of its anomalous characteristics. Microscopic ball lightning seems to share the same characteristics of hole and pit boring, passing through material without a trace, anomalously high energy, transmutation effects, anomalous motion and organization, and causing atoms to behave anomalously.

As yet, as far as I know, there are no good pictures of MBL, although K. Shoulders has been able to take blurry pictures that look like streaks. Figs. 1 and 2 are examples of microscopic BL markings produced during electrical discharge experiments. People have found many kinds of markings suggesting a great variety of anomalous behaviors. **Fig. 1, taken by Urutskoev, shows a trace registered on a nuclear photoemulsion.**[xii] I assume that the long streak is a trail, a marking left by the object as it moved along the photoemulsion, and that beams or rays were emitted sideways. He wrote: "Six such 'comets' were detected inside the area 4 cm^2. Their sizes varied from 300 mcm to 1300 mcm." He wrote that markings signified a very high level of energy radiation. They look a little like markings detected by Matsumoto that he called traces of "white holes." **Fig. 2,[xiii] taken by Matsumoto, is similar to others from Matsumoto showing both ring and trail marks,** as if BL slid and hopped on a nuclear emulsion in a tornado-like manner. It is a marking on an acrylite plastic sheet set outside of a discharge device. Nuclear scientists such as Matsumoto and Urutskoev use sheets like these to catch tracks of particles, and they are useful for catching tracks of MBL. The ring marks in Fig. 2 are about 50 micrometers wide.

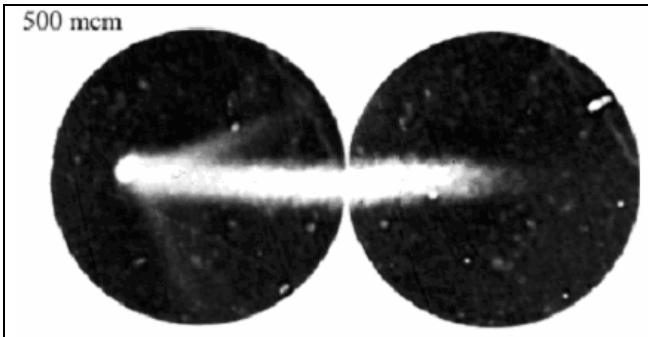

Fig. 1 Comet-like marking with rays.

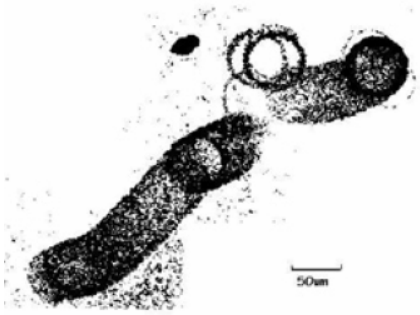

Fig. 2 Ring marks + trail marks suggesting a tornado-like hopping and moving behavior.

One of the well-known anomalous behaviors of ball lightning is boring holes[xiv] in materials such as glass and adobe walls as they pass through. People have tried to calculate the energy that must be expended to melt or vaporize glass in order for the ball lightning to make such holes. However, this method of measuring BL energy is incorrect. Ball lightning and simple electricity cause atoms to move and change in highly anomalous ways. K. Shoulders' work, experiments on electrical discharge, and anecdotal evidence all show this. Ball lightning-like objects may also make pits and holes without passing through something, as the next report by Egon Bach shows.

Egon Bach reported that two large BL instances drilled holes in the ground in the Soviet Union. A slightly flattened glowing ball about 400 meters in diameter hung low near the ground over the same spot for an hour - only 1 kilometer from 7 observers. Afterwards, they found a huge hole that they thought the object had probably dug. No trace of the excavated material could be found, which suggests that the object took it. Another group of 7 men saw a similar red object that was

smaller, about 3 kilometers away from the first. Professor Zolotov was asked to study the holes. One of the strange holes was 3 to 4 feet wide but 30 to 40 feet deep. It widened to 8 feet in diameter at the bottom. The walls were covered with a layer of carbon dust about 0.2 mm thin. The carbon fiber had a radiation three times above normal(8).

Tornadoes also dig pits and trenches in the ground. A tornado or an accompanying fireball dug a trench in a hard-packed clay tennis court at Curepipe, Maritius, in the Indian Ocean, on May 24, 1948:

A trench running in a north-south direction, 60 feet long and 1 to 2 1/2 feet wide, was cut in the bare surface of the court to a depth varying from 1 to 4 inches. The material lifted from the trench was all thrown to the west to a distance of 50 feet; pieces weighing about one pound were thrown as far as 30 feet. The surface material was slightly blackened as if by heating, and a crackling like that of a sugar-cane fire was heard for 2 or 3 minutes.... one claims to have seen a ball of fire about two feet in diameter which crossed from a football pitch to the tennis court through a wire-netting fence without leaving any evidence of it passage...."[xv]

Matsumoto and Savvatimova and some other CF researchers have reported finding carbon residues or carbon fibers. And the microscopic BL may leave deposits of transmuted elements(5), as shown by the research of Matsumoto and Shoulders. Fig. 3, taken by Savvatimova,[xvi] is an example of microscopic BL making trenches in materials. It is a common MBL behavior, and marks like these have been found in experiments by Shoulders and Dash as well. Similar markings may have been found by Matsumoto in plastic sheets in the early 1990s; he called these markings "loop-like" traces. Faint markings like this may have been found in one of G. Miley's experiments, Ni-Plastic Microsphere Run #8(6). Fig. 4, taken by Shoulders,[xvii] shows a typical ring of pits left by microscopic BL. Trench marks and pits like these are associated with this kind of object. .

Fig. 5, a picture that was also taken by Savvatimova(16), shows that a group of MBL or a single MBL made pits while moving. Another explanation for lines of pits like these is the impact of a string of objects, but in this case, because of the trench-like lines between the pits, I believe that a single object made the entire mark as it moved along. This type of pattern could be due to the skipping of an object as it moved. Tornadoes may skip, and the object that made the marking in Fig. 2 may have done so as well. More information about these and other markings photographed by Savvatimova may be found in other articles. The picture shows a more typical shallow short trench mark on the left. At the bottom of the picture in the middle, there is a small group of holes that suggests that a group of objects contacted there.

Does the evidence of ball lightning making holes and trenches in materials with a high melting point such as aluminum or aluminum oxide, or in electrode materials such as palladium or copper, or in the glass, adobe, or hard packed clay mean that the objects expended energy in a conventional way, by heating, in order to move the material or make the material disappear? It is known experimentally that during electrical discharge, metallic electrodes behave as if they are liquefied at a temperature lower than their usual melting point. There is also anecdotal evidence that electricity can make the atoms in metals move anomalously, without noticeably warming the metals.

For example, several hundred years ago, Benjamin Franklin as a part of his research which helped to establish the paradigm of electrical and heat fluids for physics, studied what he called, ironically,

"cold fusion"[xviii] phenomena. By this term he meant the anomalous effect of lightning strikes on metallic objects. These metallic objects, such as coins in a pocket or a sword in a scabbard, seemed to have melted, but he thought it was odd that there was no trace of burning or scorching of the material around the objects, as would be expected if the metals became hot enough to melt. He called this phenomenon "cold fusion" because the objects fused though they were cold. The modern cold fusion phenomenon of atoms fusing or changing behavior is really a part of this same effect of atoms behaving anomalously under stressful conditions such as the presence of BL or electricity.

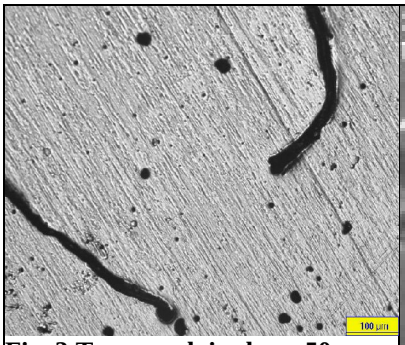

Fig. 3 Top trench is about 50 micrometers wide.

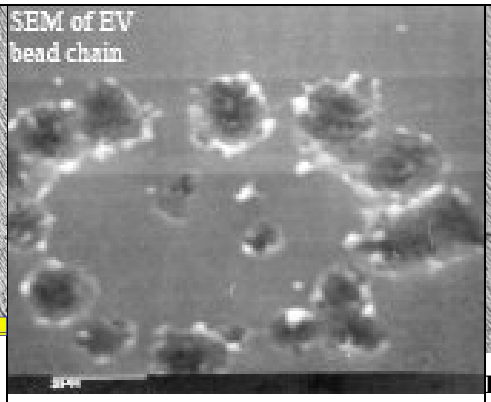

Fig. 4 Scale here is 25 micrometers.

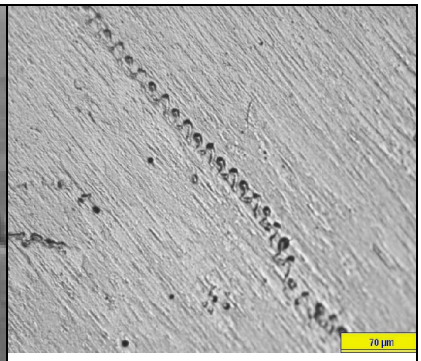

Figure 5. The biggest pit in the zigzag pattern is about 17 micrometers wide.

Benjamin Franklin's research may be evidence of an anomalous behavior of atoms. K. Shoulders reports that the plasmoids he studies make pits in materials and tunnel through materials without heating the materials.[xix] K. Shoulders published Figs. 6 and 7 as an example of this behavior of material(19). He wrote that two plasmoids passed all the way through a sample of aluminum oxide, and then hit a 6-micrometer-thick sample of aluminum that was coated with wax and passed through that also. The two plasmoids left the two small holes in the aluminum sample as shown in Fig. 6. Fig. 7 is a magnification of one of the entry pits into the aluminum target. He reported that the plasmoid passed all the way through the aluminum sample target also. The white deposit around the holes is aluminum oxide from the aluminum oxide sample. He reports that though the aluminum oxide atoms traveled from the aluminum oxide sample to spread themselves on the aluminum target sample, they were not hot. He wrote that the atoms of aluminum oxide had spread themselves out on the target to a thickness of a 1-atom layer, but a coating of wax on the sample was not melted at all. He wrote: "Aluminum oxide has a melting point of 2,050 degrees centigrade, and yet, it has not raised the temperature of the thin substrate material in any perceptible way. Even a thin coating of low temperature wax on the surface, to serve as a temperature indicator, remains undisturbed.(19)"

I speculate that even though these kinds of anomalous objects may not give off heat that is detectable, they may release energy in other ways, such as through electricity or motion. As in the example of Redoubt volcano, the energy may be leaving as electricity or plasmoids of various kinds. Savvatimova, Matsumoto, Urutskoev, and Shoulders reported evidence of atomic transmutation associated with the emission of the microscopic objects. As was reported(5,6), the components of an experiment conducted by Miley had markings like these. Miley reported that transmutation occurred in that experiment.

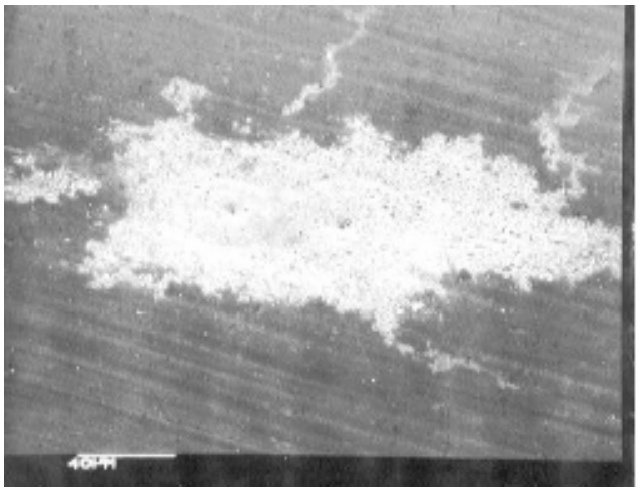

Figure 6 Aluminum oxide deposited on aluminum when two plasmoids bore through aluminum oxide. [19]

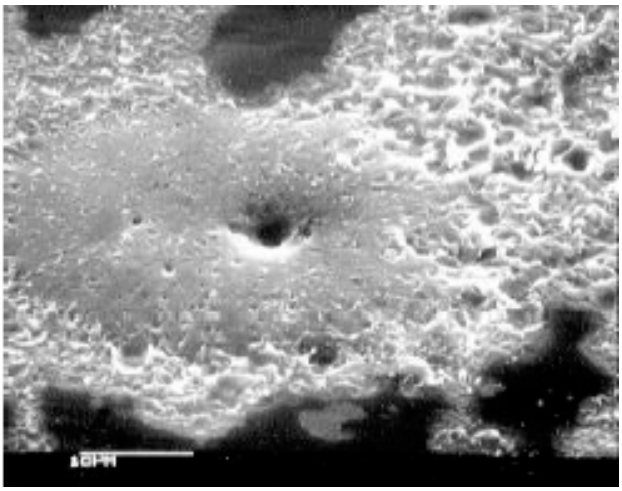

Figure 7 The spot is magnified about 6x. Entry pit of one plasmoid. [19]

4. Mysteries and Questions

There are various BL mysteries. Certain BL can pass through glass without leaving a mark in the glass. As yet, the only report of an effect similar to this is Matsumoto's report that the objects that made the markings in Fig. 2 somehow passed through water and a plastic and glass container to reach the acrylite plastic nuclear emulsion.

Another anomaly of BL reports is sharp-angle turns without acceleration. Even big ball lightning behave this way. Some traces shown by Savvatimova show similar short turns, as does a picture of a plasmoid flight-path shown by Shoulders. How do they organize in chains, rings, and other geometrical shapes? Even tornadoes are known to do this in the atmosphere. The plasmoids described by Egon Bach in his book often were organized as chains. There is a picture of a semicircular ring of giant BL around Redoubt volcano taken by Captain Swaim in Bach's book.

All the MBL markings I know about have been micrometer-sized, ranging from about 1 to 200 micrometers. I don't think that this means that there are no smaller MBL, but objects much smaller than a micrometer are more difficult to photograph with a microscope. Scientific optical microscopes usually don't have a good resolution past a micrometer. MBL may be found that is subatomic-particle size. In Fig. 7, beside the main pit there are small pits less than a micrometer in size, and even smaller pits too.

Energy can leave a transmutation experiment as electricity or motion or as plasmoids, but are there other ways that aren't understood? Many researchers have used thermometers to measure energy production, but they didn't measure energy loss in other ways. Quantum Mechanics would explain BL evaporating water or transmuting atoms in certain ways, but doesn't take into account the anomalous behavior of ball lightning. Can even time change in a BL environment?

Many questions remain about these phenomena. But there is much evidence that the MBL objects share the anomalous characteristics of natural BL. More evidence is explained in my other articles such as "Traces of Ball Lightning in Apparatus" submitted to the ISUP and "Microscopic Ball

Lightning" to the ISBL. Further information may be found on my web site: www.sciencejunk.org.

5. Conclusion

We can see from the similarity of the natural and experimental effects that MBL exists and is similar to larger BL, and that these kinds of plasmoids are involved in transmutation, energy production, and anomalous effects involving atoms and the transport of materials.

Acknowledgment

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