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http://wolfstone.halloweenhost.com/Lighting/lplbuy_CommercialPlasmaLamps.html

Commercial Plasma Lamps

By passing high voltage electricity through a container of rare gas, the gas can ionize to form a luminous plasma. Plasma-based lamps can be entertaining, fun to watch, as well as beautiful.

History and Technology

Basics

The plasma lamp is simply a modern, mass-market version of the gas-discharge lamp. The simplest form of gas discharge lamp just has two electrodes in a bottle full of gas.

When the bottle is long, skinny, and unencumbered by other material, the effect is much like a neon sign. You see a long fairly straight line of colored light, stretching from one side to the other.

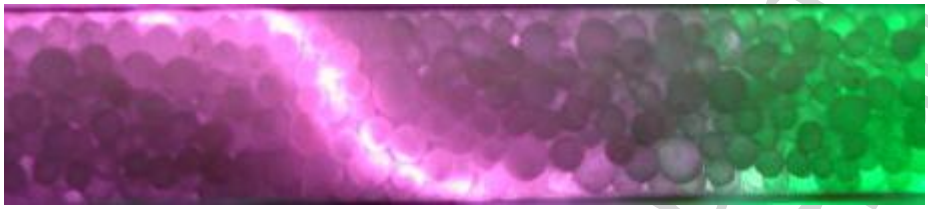
This is because the electricity will try to take the best path from one electrode to the other. The flow of electricity can be influenced by many things:

- The high voltage will seek to ground itself, and will seek out anything that has a connection to ground. Normally, it seeks the best way to get to ground, and that usually means the shortest path.
- If some of the gas in the lamp is already ionized (electrically charged), it becomes a better conductor and more electricity will flow along the existing path.
- Like electrical charges repel.
- The flow of electricity can be influenced by magnetic fields.
- The glowing plasma is hot, and can cause the gas in the lamp to move around.
- The shape of the containing "bottle".
- The plasma bottle may be filled with crackly bits that block the most direct flow of electricity.

Here are pictures of plasma flow in a crackle tube sold by Adams Apple.

The power supply turns on and off at a rate that you can set. Each time the power comes back on, the electicity finds a new best path to ground.

One moment it may look like this.



A moment later it might look like this.

Sometimes, the best path is not along the inner surface of the bottle, and the plasma flows within the column of beads.

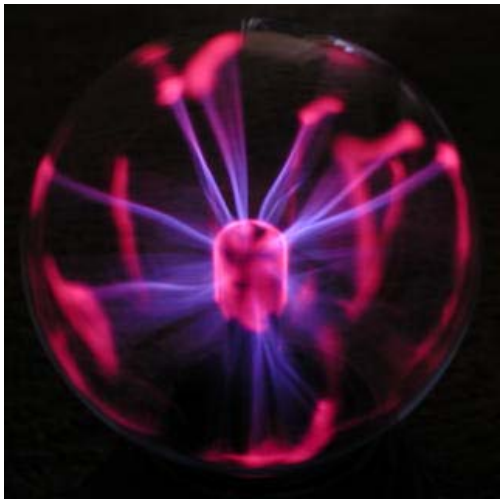
In this case, the plasma forks, having found two effective paths to ground.

Flat Plate Electrodes

Sometimes, the electrodes are flat metal plates, cut into interesting shapes, and parallel to each other.

This is a side view of such a lamp. The plates are only a small fraction of an inch apart.

With parallel plates, the ionization occurs around and between the plates. Seen from the front of a plate, the cutout shape is surrounded by, and covered by, a glowing light.

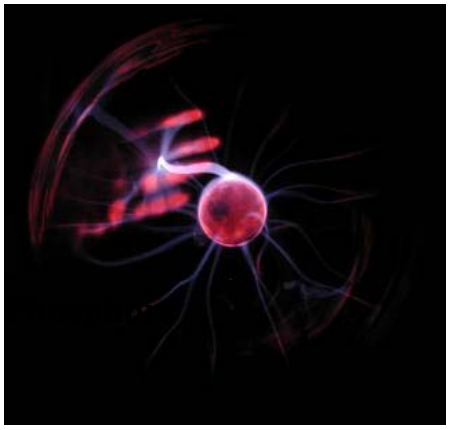


Single Electrode

Some plasma lamps are simply spheres with a single electrode in the center. This doesn't bother the electricity much, because it will still try to get to the best ground that it can find.

This is a classic "plasma sphere" or "plasma ball" effect. The high voltage from the center electrode sends out plasma tendrils, seeking to go to ground.

The unit is a small battery-operated sphere with a 3" diameter globe, marketed by Light Gear LLC [October 2003].



Placing your hand on the sphere attracts the electricity. Your body provides a mild path to ground.

The unit has a globe about a foot in diameter, circa 1987.

Sometimes the electrodes or the inner surface of the bottle are painted with phosphors that emit different colors when energized by the plasma.

Multiple Fill Gasses

Ordinarily, the color of the glowing plasma in a gas discharge lamp is a color characteristic to the gas that fills the glass envelope of the lamp. In this case, one would expect that same color throughout the lamp.

By mixing two or more gasses, one can achieve a single new color throughout most of the lamp and different colors in areas where the electrical charge density is different (near the electrodes).

Crackly Bits

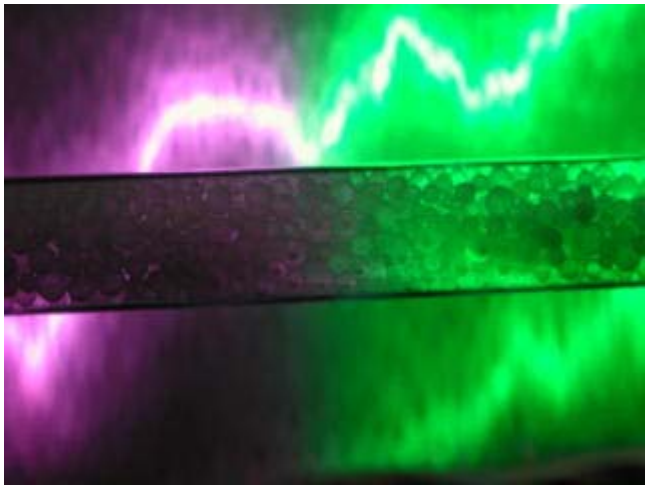
Some plasma lamps contain beads, bits and pieces of broken glass, or other material that impedes the shortest-path straight-line flow of the plasma. This generally causes the plasma to jump, crackle, and move around.

Some crackle tubes are filled with beads that are coated with phosphors that add different colors. A tube may contain beads that are all phosphor-coated, or uncoated beads. Uncoated beads are not necessarily clear.

These crackle beads are unimpressive under white light.

Mirrors

When the actual plasma part of a lamp is small, you can get a bigger display by surrounding the plasma bottle with mirrors.



This trick is quite effective with crackly bits because the plasma flow may be *in the back of the tube*, hidden by opaque bits.

Gallery of plasma lamps

We present pictures of plasma lamps, with a little descriptive info. Not to scale - picture sizes can be deceptive!

Static

This collection of plasma lamps provides a static display: they light up, but the glowing plasma doesn't move.

This display results from flat plate electrodes in the shape of a star.

This was one lamp of a string of Christmas lights for sale at Target and sold under their name in December 2003.

They also had a glowing snowflake design.

This display results from flat plate electrodes in the shape of a pumpkin, with cutouts for the eyes, nose, and mouth.

I bought this at Dollar Tree in October 2003.

They also had a skull face coated with phosphors to produce a greenish-white glow.

I bought this pretty little night light many years ago. I think it came from Sears, circa 1980.

The daylight image on the left shows the electrodes in the shape of a flower. The night image shows that they coated the electrodes with phosphors to give colors to the flower and stem.

Dynamic

This collection of plasma lamps feature dynamic action, as glowing tongues of plasma move and jump around.

My brother bought me this classic "plasma sphere" for Christmas in 1987. He got it at Price Club. [Thanks, Arthur!]

The sphere is about a foot in diameter. It has an intensity control, and responds to ambient sounds.

As of January 2004, it still works!

This is a small battery-operated sphere marketed by Light Gear LLC (Minneapolis, MN, 55311). I got on close-out at Target in October 2003.

- sphere diameter: 3"
- base diameter (widest point): 4"
- overall height: 5 3/4"
- printed circuit board: 2 1/4" square, 3/4" tall
- box copyright 2003

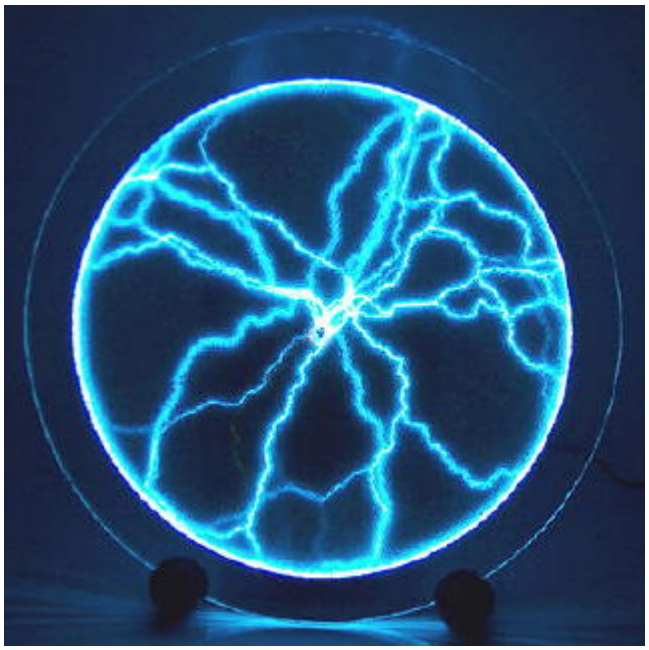
This clever toy from Can You Imagine forms the glass envelope into the shape of a mug. The mug is free to move around, and only lights up when it sits on a small battery-operated "coaster".

I got this on close-out at Spencer Gifts in October 2003.

This heart-shaped plasma lamp was made by LumiSource and purchased at Spencer Gifts in December 2003.

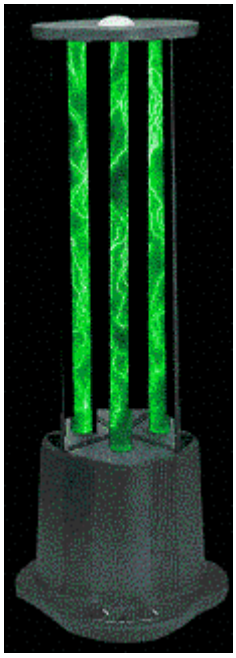
The envelope is made of red glass, coated inside with phosphors. In order to cut down on manufacturing costs, LumiSource uses a common base that contains the power supply. The sculpted sphere locks onto the base.

They also had lamps shaped like brains and mushrooms.



As of January 2004, Lumiglass is available in three colors: Blue, Green & Sunburst (an orange/yellow color, and three sizes: 12", 16", and 20".

The Electra Lamp contains a blend of gases and an inner phosphor coating. They make many permutations of size (Regular 7" W. x 18" H. x 5.5" D, Mini 6" W. x 12" H. x 4.75" D.), glass color (Blue, Green, Purple), and phosphor color (Red, Green, Blue, Purple).



This crackle tube is full of phosphor-coated crackly bits. It is available in several colors.

There is only a single tube, surrounded by mirrors to enhance the effect.

This crackle tube is made by Adams Apple. I bought it from American Science and Surplus in April 2004 for $20.

Overall, the unit is 16-1/2" tall x 4-3/8" diameter. The glass tube is 5/8" diameter, and about 1 foot long.

It is full of crackly bits. Different phosphors provide three distinct colors. I suspect that the phosphors are coated on the inside of the tube, not on the beads.

There is only a single tube, surrounded by mirrors to enhance the effect.

The Star Showers plasma lamp is made by Can You Imagine. It is in the form of an hourglass that you can actually turn over. When you do so, crackly bits tumble through the hourglass, making changing plasma patterns.

Comes with AC adapter cord. Measures about 13"H x 8"D.

This 6-inch disc clone appeared in Spencer Gifts and Spirit stores around Halloween 2004 [$19.99]

The box is marked "Spencer Gifts Product Development", but the power adapter is marked Can You Imagine.

Market Trends

Plasma lamps come and go, and have been doing so for a very long time. Tesla accidently took the first X-Ray photograph in the United States while taking a picture of his friend Mark Twain playing with a Geissler Tube plasma lamp.

The first examples the classic, spherical "plasma ball" I saw were used as special effects in the old television series *Lost In Space*. I suspect that they used big, heavy, iron-cored transformers for power. This would have made them expensive and klunky.

In the 1980s, spherical plasma balls about a foot in diameter became available as gadget, executive toys, and fancy lighting. This was probably due to the development of electronic power supplies that were smaller, lighter, and cheaper than the old transformers. I was thrilled when my brother bought me one for Christmas in 1987. He got it at Price Club, which is an indicator that they were becoming more common, but it still cost a lot!

The first time I saw plasma plates, two clear glass plates with gas and crackly bits sandwiched between them, was as a prop on television - I think it was *Star Trek Next Generation*. They soon became available to the general public.

The overall progression over time seems to be:

- spherical plasma balls
- Lumiglass-style plasma plates
- crackle tubes
- plasma balls with sculpted glass envelopes
- plasma balls with phosphors
- crackle tubes with phosphors
- crackle plasma in strange non-tubular shapes

The early 2000s seems to be a bit of a revival of plasma lamps, with various models available from Spencer Gifts, Target, and Wal-Mart.

During Halloween 2003:

- Target sold a $25 plasma ball in the shape of a large human skull, made by Can You Imagine.
- Wal-Mart sold a $12.88 plasma lamp that had a spherical globe, held by black claw. They also sold this item for Halloween 2002, but I don't remember the price then.