

Why are we crowdfunding for fusion?

LPPPhysics' scientific research team is completing experiments that will show how to:

Produce energy with no nuclear waste or pollution that is **far less expensive** than current systems, and develop a decentralized and safe local generator network more reliable than any in use today.

Why do we need cheap, clean, safe and unlimited energy NOW?

Existing energy sources are far too expensive:

In the US, the median person pays \$1 in 6 for energy; \$9,000/year, \$22 a day

Worldwide: \$1 a day for energy out of \$3 a day total income

They contribute enormously to the growth of debt:

Total energy costs: \$5 trillion a year

Global rate of increase in debt: \$5 trillion a year

Existing energy sources are far too dirty and deadly:

2.5 million deaths per year worldwide from fossil fuel air pollution

To replace these costly deadly energy sources we are developing a form of fusion energy. Fusion energy is the power that drives the universe; it powers our sun and all the stars. Scientists have been trying for years to harness fusion for energy. Our team is capturing that power in a device so small that you can hold its heart in your hands, so small that the whole device could fit in a truck. It is very different that the huge fusion devices, like the tokamak, that the government is spending billions on.

We call our approach Focus Fusion: Controlled Nuclear Fusion within a Dense Plasma Focus Device Running on Aneutronic Fuel

It has two big differences from the big fusion devices—first it uses aneutronic fusion.

What is aneutronic fusion?

Background: All atoms are made up of a heavy nucleus that contains protons (positively electrically charged particles) and neutrons (uncharged particles). The electrons are light negatively charged particles that orbit the nucleus. Neutrons that are by themselves can cause problems, because if a neutron is absorbed by a stable nucleus, the nucleus can become unstable—or radioactive. In aneutronic fusion, NO neutrons are released, so NO radioactive waste is produced. A proton (hydrogen nucleus) and a nucleus of boron join together, react and produce three helium nuclei, with an enormous release of energy and NO neutrons. The fuel is from common, easily obtainable elements.

Second, since energy is released in the form of moving charged particle—which is electricity—we can capture it with a very compact type of high-tech transformer. We don't need expensive steam turbines and generators.

The second big difference is that the big fusion devices are aimed at getting the plasma to be stable, to sit still like a good dog. But we are using the natural instabilities of the plasmas, not fighting them.

How can this work?

We're using a device called the dense plasma focus (DPF). Although it was invented decades ago, we've improve it considerably (US Patent number 7482607 and patents in China and Australia with 3 others pending.) It uses magnetic fields created by electric currents to compress heat and contain the fusion fuel. We're using the same process that occurs in solar flares and quasars but scaling it down to soccer-ball size.

When the DPF fires, a huge pulse of electricity from the capacitors flows from the outer to the inner metal electrodes. The current naturally compresses itself into filaments (vortices of current), and moves down the electrodes to form a single filament. It kinks itself up into a tiny ball, only microns (less than a ten-thousandth of an inch) across. The electric current creates huge magnetic fields that tightly grip the plasma, compressing it to generate the billions of degrees in temperature needed for fusion. We've already photographed and measured these tiny balls, called plasmoids, in thousands of shots in our lab in Middlesex, NJ and recorded the fusion reactions that they produce.

Not only is fusion fuel millions of times more energetic than oil and gas, it is also far greener because it produces no nuclear waste, pollution of any kind, nor greenhouse gases. It is safer than any existing energy source. It's also far more reliable. Remember the destruction that hurricanes Irene and Sandy left behind? Many of us were left without power for days if not weeks. Centralized power was easily disrupted. But decentralized fusion generators could power the infrastructure without interruption. They could provide power to towns and villages throughout the world, even in poor regions lacking any transmission grid. And unlike limited fossil fuels, fusion fuels are virtually infinite.

We can prove within a year that this new device, Focus Fusion-1, works and that it produces more energy than it consumes. With this scientific breakthrough completed we can proceed to engineer within another three years a generator which can provide energy for everyone. We can give power to the people and, with your help; it can be powered by the people.

Our ultimate goal is to show we can get more energy out from this device than is sent in (net energy). In last twenty months we have achieved and published in peer-reviewed scientific journals:

- The temperature we need for fusion - 200 times hotter than the center of the Sun
- The confinement time we need for fusion to be achieved.

With the help of this campaign we want to achieve the third and final condition needed for fusion yield:

- The density needed to create a fusion reaction which produces net energy.

We are raising money to buy the new electrodes necessary for the final push to net energy.

This is not science fiction. Unlike some “free energy” schemes, our results are based on well-verified scientific theories and are totally public. Our paper in 2012 was the most read paper that year in the number one journal in our field. A review committee of four senior scientists, led by the former head of the US government fusion program, concluded that our effort deserved "a much higher level of investment ... based on their considerable progress to date".

If we can get Focus Fusion implemented, then \$5 TRILLION per year not spent on energy will **100-150 million new jobs** globally creating schools, hospitals, mass transit infrastructure—like mag-lev trains in evacuated tubes that can take you anywhere in the world in 2 hours.

There will be no more wars to prop up the price of oil. Fission energy will be obsolete—we can lock up the uranium mines.

We can end deadly pollution from coal, diesel, gasoline; end oil spills, and mining devastation; implement total recycling with plasma torches.

Money released from overpriced energy can be used to end deforestation, and for environmental clean-up.

A fusion rocket could get to Mars in 2-4 weeks. A multistage interstellar fusion rocket could in theory attain 1/5 the speed of light.

To demonstrate that focus fusion works we are installing tungsten electrodes in May and expect a big boost in energy output. Tungsten is fine for impurity, but absorbs too many x-rays, so we need beryllium electrodes next to achieve our goals. It's expensive—we need \$250,000 for them—what we are crowdfunding to raise.

We're going to launch on crowdfunding on Earth Day, April 22. We need 1,000 volunteers to help publicize this effort on websites, social media and to their friends and colleagues. Please help us! Another World is Possible!