Report March 2, 2023

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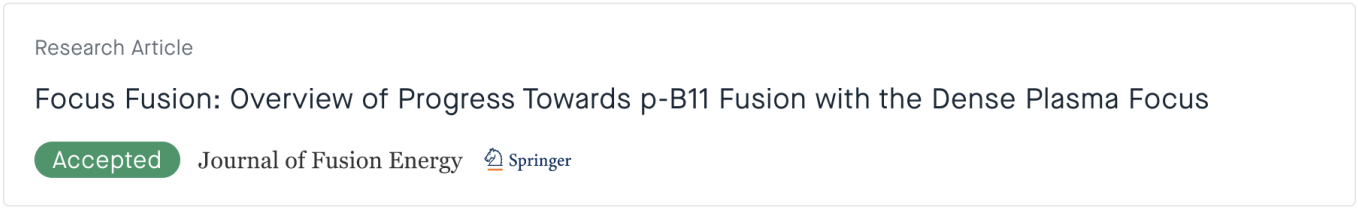
New LPPFusion Paper: Our Peers Confirm We Lead in Results



In a newly-accepted paper for the Journal of Fusion Energy, LPPFusion demonstrated in detail **our lead in scientific results among all private fusion efforts—and our peers and competitors agree!** The new paper, "Focus Fusion: Overview of Progress Towards p-B11 Fusion with the Dense Plasma Focus", was accepted on Feb. 18 for a special issue of the *Journal of Fusion Energy* devoted to private fusion projects. Importantly each paper, including our own, was reviewed by scientists from competing private fusion efforts, ensuring a credible review process. We'll circulate a link to all as soon as it is published.

Our new paper documents that " **among privately-funded fusion efforts, our experiments have achieved the highest ratio of fusion energy generation to device energy input (wall-plug efficiency) and the highest nτT product** " The nτT product - density multiplied by confinement time, multiplied by temperature, is a standard rough measure of the quality of our fusion plasma while the wall-plug efficiency is an even more important measure of **how close we are to getting useful energy out of our device.**

The paper also demonstrated that, compared with all fusion projects, including the giant government ones, we've achieved "the **highest confined ion energies of any fusion experiment** (>200 keV) as well as, **recently, the lowest impurities of any fusion plasma.**" These statements also passed JOFE's tough but fair peer review. A reviewer agreed that "**this paper contains very important experimental ideas** (filamentary structure, beryllium

electrodes, influence of impurities, energy of fast ions, influence of the possible azimuthal currents and poloidal magnetic fields)".

The paper was authored by the core LPPFusion team: Eric J. Lerner, Syed M. Hassan, Ivana Karamitsos-Zivkovic and Rudolph Fritsch. As we promised to do years ago, this paper acknowledged the vital contributions of those who have helped to fund our work, in particular LPPFusion's largest donors: Focus Fusion Society, Walter Rowntree, Robert Biegler, Peter Crabb, Andrew Kursar and Edward Peschko.

We hope that the circulation of this paper will lend major credibility and prominence to our statements that, measured in fusion yield results, Focus Fusion is First!

Board of Advisors Extends Share Offering

The LPPFusion Board of Advisors met on Saturday, Jan 28 and took the following unanimous decisions:

The existing Reg D offering, available to accredited investors, will be extended on the same terms ($2.4 million total, $200/share) until June 30, 2023. The Board alerts investors that in the event of major new results for our lab, the offering may be terminated before June 30 and another offering started at a higher price.

A new crowdfunding offering will be initiated as soon as new informational materials are completed in March. This offering will also be at the existing $200/share price.

On the basis of this BOA decision, LPPFusion is now raising $100,000 as minimum goal from accredited investors by March 31. We need this money to maintain our progress in the lab (see story below) . **We urge investors to do their part to keep us rolling toward Focus Fusion as rapidly as possible.** We also feel that with the new credibility generated by our peer-reviewed paper, the fund drive presents a great opportunity for investors to buy shares at our existing price.

We will be announcing the goals for the crowdfunding offering soon.

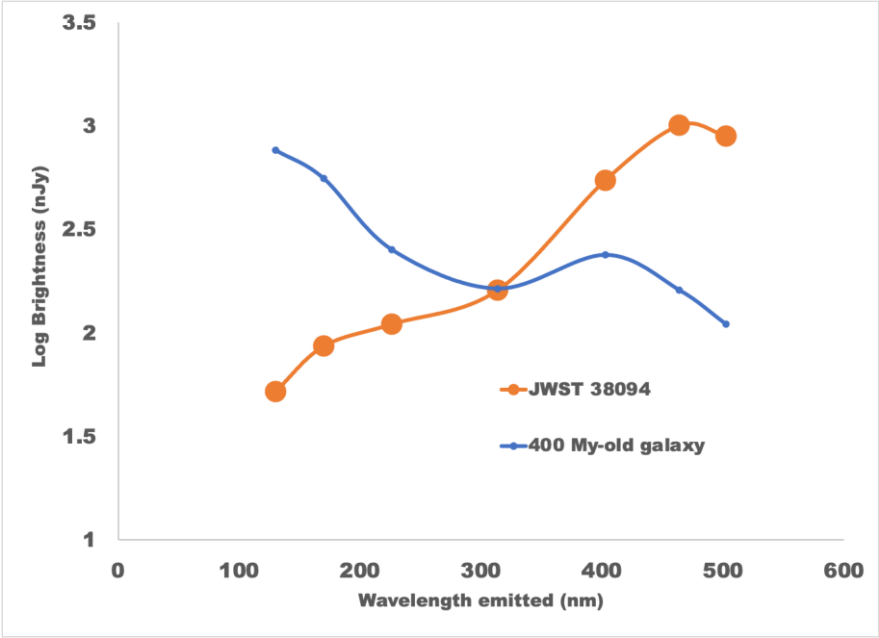
Theory-Breaking Galaxies Bury the Big Bang Hypothesis

Once again, images from the James Webb Space Telescope(JWST) have caused alarm and consternation among cosmologists. "We found something so unexpected it actually creates problems for science", exclaimed Dr. Joel Leja, assistant professor of astrophysics at Penn State, one of the authors of the new paper in Nature causing the latest cosmic kerfuffle. "We've been informally calling these objects ***universe breakers***", he continued in a statement released Feb. 22 by the Penn State university.

LPPFusion's Chief Scientist Eric J. Lerner, who, with colleagues, has been putting forward a different take on JWST's results, commented in a statement, "Actually, these new results are just fine for science and the universe won't be hurt by a few new images. Not to worry! What these objects can rightly be called is ***"theory-breakers"*** **because they deliver more big blows in breaking up the theory of the Big Bang, and the idea of an expanding universe. I congratulate Dr. Leja, Dr. Ivo Labbe, first author of the paper, (Swinburne University of Technology) and their co-authors on their discoveries, but they were to be expected and in fact we predicted them -- on the basis of rejecting the Big Bang hypothesis."**

Dr. Leja and colleagues, and many other cosmologists around the world were shocked because the properties of these **remote galaxies are similar to the ones of the Milky Way and other big nearby galaxies.** According to the Big Bang hypothesis, no such galaxies should exist at such an early epoch, only hundreds of millions of years after the supposed birth of the universe. Only extremely young tiny proto-galaxies should exist, *according to that theory*. But the new JWST images show "mature" galaxies, made of billions of stars similar to the one observed in our own galaxy, including lots of yellow and reddish stars which had been shining for **billions of years**. (See Figure 1 for how the images indicate how old the stellar populations of the galaxies are.)

But Lerner and colleagues, basing their published predictions on the hypothesis of a non-expanding universe, with no Big Bang, were not surprised at all. In fact, in a paper published online in June, 2022 before the release of any of JWTS's images, Dr. Riccardo Scarpa of the Instituto de Astrofisica de Canarias and Lerner **correctly predicted that with JWST as with its predecessor the Hubble Space Telescope, images would show that "distant galaxies are found to be similar to local galaxies".**



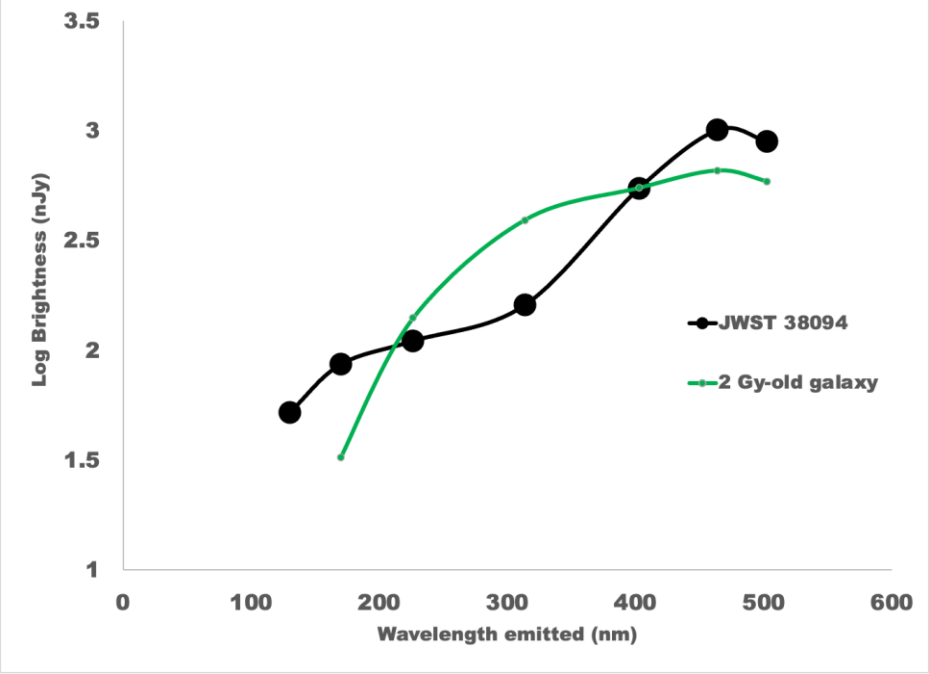


Fig. 1 The spectrum of massive galaxy JWST 38094 (black points) does not at all look like that of a 400 million year-old galaxy (blue line, top graph), blazing with ultraviolet stars. (UV is to the left, green to the right in these spectra). But it does look a lot like a 2 billion-year old galaxy (green line, bottom graph) glowing with yellow stars. For comparison, the sun's spectrum is brightest at 500 nm, almost the same green wavelength as the JWST 38094 peak. Light at 450 nm looks blue to our eyes, 400 nm violet and shorter wavelengths are ultraviolet. JWST data from new Nature paper, 400 million year model from Bruzal and Charlot and 2 billion-year model from Vazdekis .

Why then did these perfectly ordinary, but very distant, galaxies generate such surprise and consternation among most cosmologists? Exclusively because, once again, they contradicted the clear, repeated, published predictions of the Big Bang hypothesis. According to that hypothesis, the entire universe sprung into being in an extreme dense hot state 13.7 billion years ago and remained for 400 million years too hot and chaotic to form even stars, let alone large galaxies. Thus, according to Big Bang formulae, the galaxies in the new JWST images should not exist at all. Large mature galaxies at these distances would imply the existence of objects **older t**han the Universe itself and therefore are "impossible galaxies". But the new observation showed that not only did these "impossible galaxies" exist, they are common at these great distances. Hence the great surprise at…. **the wrong predictions of the Big Bang hypothesis.**

For more on the "theory breakers" see our press release here.

Control Test Completed, Switch Assembly Underway

The LPPFusion research team has now obtained all the new parts needed for our revised small switches and has begun assembly of the switches. We've also completed the planned control tests, using the old larger switches. We are now expecting the first tests of the new switches during March.

The tests of the old switches succeeded in getting them to fire in good synchrony, as they had in 2016-17 when they were used with the tungsten electrodes. However, the switches functioning was notably different than it was seven years ago. The switches took twice as long to initiate the maximum rate of rise of the current as they did before . The turn-on time increased from 80 ns to nearly 160 ns. In addition, they now delivered only 30 kV, not the full 40 kV, to the electrodes. This slow turn-on resulted in a broader current sheath and larger, lower density pinches, with only a quarter the maximum fusion yield in 2023 as compared with 2016.

By a process of elimination, Lerner concluded that the primary reason for the old switches' deterioration was the contamination of the switches with adhesives which he had mistakenly used in them in 2019. References on the use of sulfur hexafluoride, the gas used in the switches, warned that adhesives could degrade over time by exposure to the moisture in the atmosphere. This created compounds that could be vaporized and broken apart by SF6 breakdown products during the switch firing. Such a disassociation process robs energy from the switch currents, slowing the process of turning on and reducing delivered voltage.

Although the control shots could not provide a one-to-one comparison between the tungsten and beryllium electrodes, they did emphasize the need for avoiding all contamination in the new switches. The team is taking good precautions to avoid this and it should not be a problem going forward.

In other tests, the team obtained images of what the breakdown process looks like with the current state of the beryllium electrodes (see fig.2) The images, obtained by only firing the weak trigger pulse, not the full capacitor bank, showed good symmetry, indicating that the electrodes remain in a good shape and are ready for the shots with the new switches.

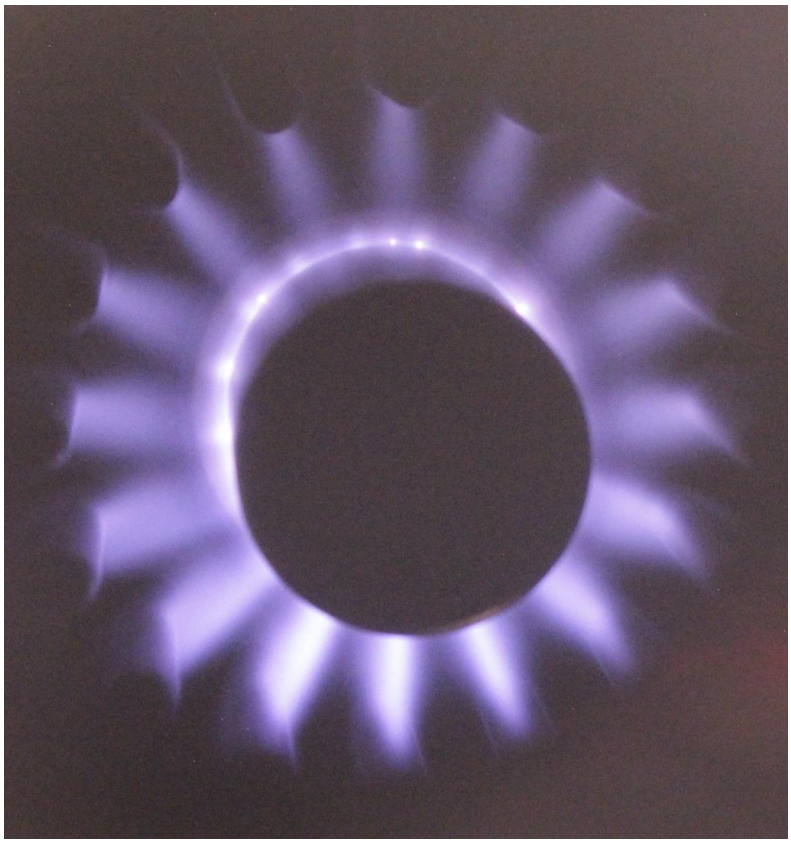


Fig. An image of the electrodes during a discharge of the weak trigger pulse alone shows the good symmetry of the breakdown. It is important to achieve good symmetry during the pinch and high density. Similar results will be expected with the full capacitor-bank current firing. The off-center look of the image is caused by the off-axis location of the viewing window at the bottom of the vacuum chamber. The violet plasma from the breakdown currents start from the cathode vanes on the outside and go to the central anode on the inside. The ring of light near the anode outlines the lower edge of the insulator.

Alvin Samuels (1934-2022)

We have the sad duty to report that Alvin Samuels, long-time member of the Board of Advisors of LPPFusion, early investor, and friend has died December 30, 2022 of influenza. Al was one of our first investors, starting in 2006, before we even had the funds to build our experimental facility. Together with his wife Madilyn, who survives him, Al continued to invest over many years. He early on became active in sharing his business wisdom with our company, becoming a founding member of the Board of Advisors. Among many other contributions to the company, Al in 2012 encouraged LPPFusion President Eric Lerner to launch the Fusion for Peace call together with colleagues in Iran. In a short, but highly effective video that we continue to feature, Al explained why he invested in LPPFusion.

Al’s support for fusion came after a long career in the fossil fuel industry. Joining Shell Oil as a deep drilling engineer in the 1960’s he and his family moved to New Orleans, where he was involved in some of the deepest drilling in the Gulf of Mexico. Concerned with some industry practices, Al warned of the dangers that would eventually lead to the Deepwater Horizon oil spill of 2010. In 1972, he developed a process for treating hydrogen sulfide in oil and later in natural gas, thus forming the Ironite Products Company, and later the SulfaTreat Company.

Al contributed much and will be sorely missed.