Brillouin Energy Corp.

August 2018

Brillouin Dynamic Model Calibration test Results

A comparison of active Q-Pulse™ in Helium to low voltage Q-Pulse™ in Hydrogen for calibration and verification of the Brillouin Energy IPB HHT™ system

The point of this document is to show that the same amplitude pulses that produce significant reaction heat when run in Hydrogen, produce a null result when run in Helium. This document also validates the concept of using high frequency low amplitude pulses to provide the same input energy but in a fashion that does not stimulate neutron production even in a Hydrogen atmosphere. Stimulating neutron production is the key to producing LENR reaction heat.

Brillouin Energy Corp. (BEC) completed a series of "Dynamic Model" Isoperibolic Hydrogen Hot Tube ("IPB HHT") tests in the 4th quarter of 2017 (please see related Milestone document attached). These test results later became a key focus of the 2017 SRI Technical Progress Report. The tests provided more proof of the accuracy of Brillouin Energy's calorimetry (measurement of input power vs. output power) by showing that applying pulses that would produce significant heat in the presence of Hydrogen, produced null results in helium.

The graphs below show both Hydrogen results, and Helium results. The results are displayed in a sine wave function where control parameters are being varied together with different repetition rates of Q-Pulse™ inputs, in order to control the generation of reaction heat in the presence of Hydrogen. The same larger impulse functions in Helium produce statistically insignificant heat. In addition, two different catalyst tubes #58 and #72 in two different IPB HHTs are being highlighted in these graphs (once again proving that multiple systems and materials can produce equivalent results, and thereby becoming the subject of the SRI Report).

We ran both catalyst tubes #58 and #72 in helium to drive out the Hydrogen purging with helium multiple times to remove as much Hydrogen as possible. The performance dropped off exponentially over time. In the interest of time it was decided to stop driving Hydrogen out of the catalyst tubes and just run the test. It is very difficult to get all of the Hydrogen out of the lattice and we believe that this is the reason there is still a small positive COP even in helium with large impulse functions run through the catalyst tube.

Presented below is data using active lower frequency large amplitude Q-pulses™ in helium. This type of pulse with Hydrogen present produces significant reaction heat. The graph also show high frequency low amplitude pulses in Hydrogen. The third graph below for each catalyst tube shows the tube in an active run in Hydrogen using active lower frequency large amplitude Q-pulses™. This data further supports the portion of the Brillouin Energy hypothesis that deformation of the lattice containing Hydrogen is what drives the electron capture reaction.

Lower amplitude pulses in Hydrogen but at higher frequency impart the same electrical energy to the catalyst tube but the individual pulses don't provide enough energy to drive the reaction. At the same time the active or large amplitude Q-pulses™ without Hydrogen fuel being present, do not produce the reaction heat seen when driving a system when Hydrogen is present.

It takes over 100 hours to calibrate a reactor, catalyst tube, gas combination, plus another 40 hours to verify all of the calibration. For this reason, after multiple verifications that are shown below, we have decided to use only low amplitude high-frequency pulses in Hydrogen for calibration. This is why Brillouin Energy does not have Helium results for every single catalyst tube that it has run to date.

See Figures below:

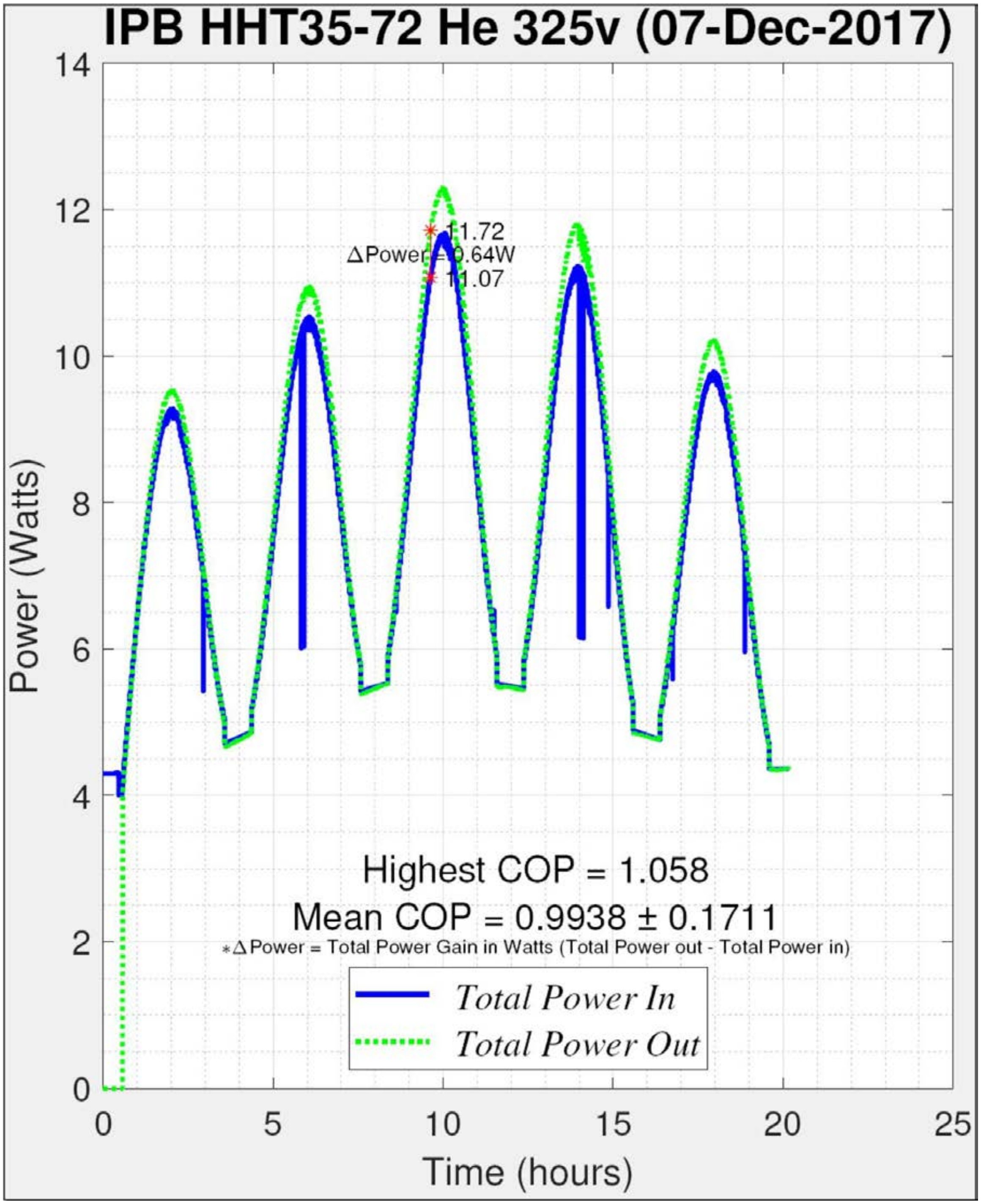

Figure 1 results of running active Q-pulses™ in helium produce a max 6% power gain (0.64W) after trying to drive all of the Hydrogen out of the catalyst tube. This excitation produces more than 5W of reaction heat in Hydrogen as seen in Figure 3 below. Same catalyst tube, same calorimeter unit.

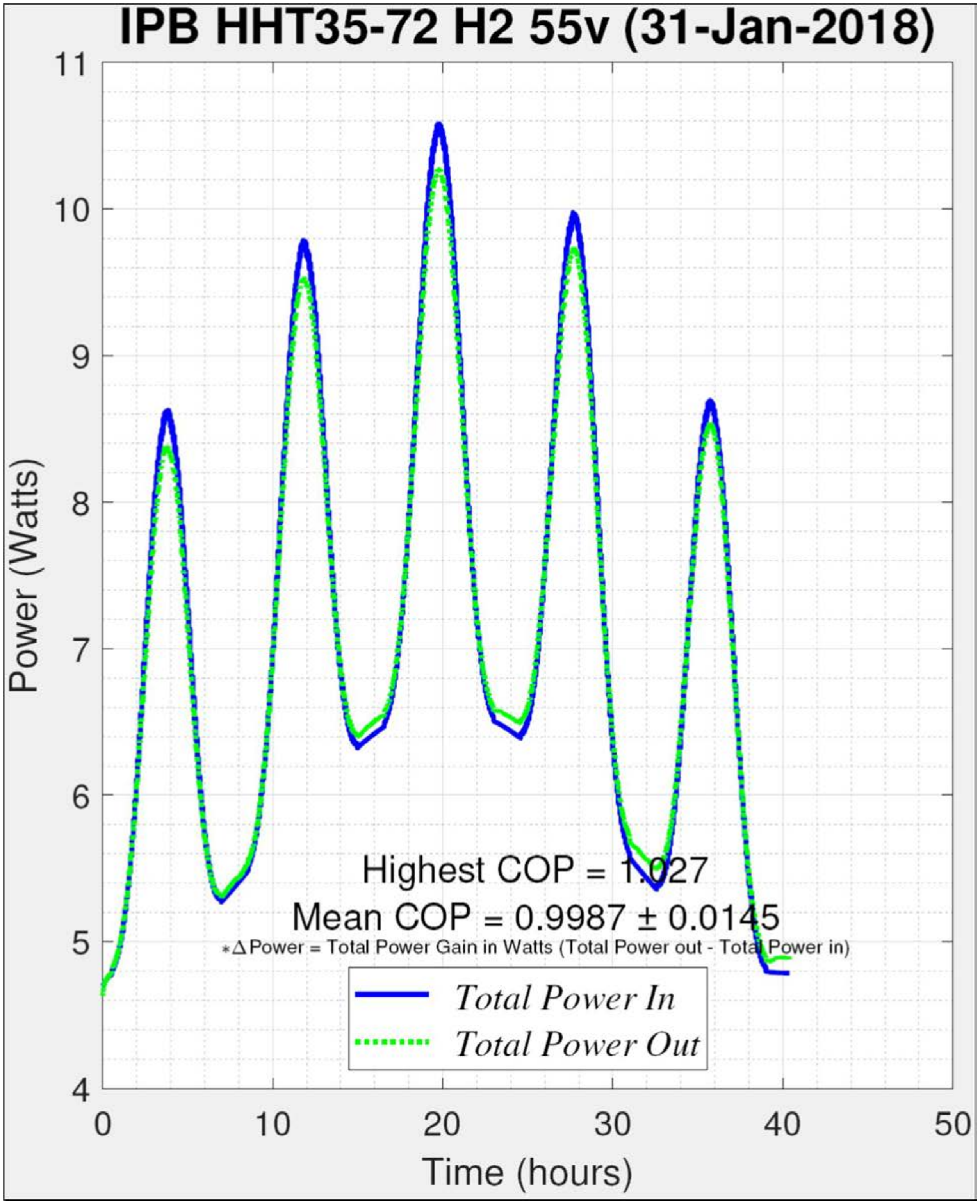

Figure 2 results of running high frequency low amplitude Q-pulses™ in Hydrogen produce statistically a gain of 1.

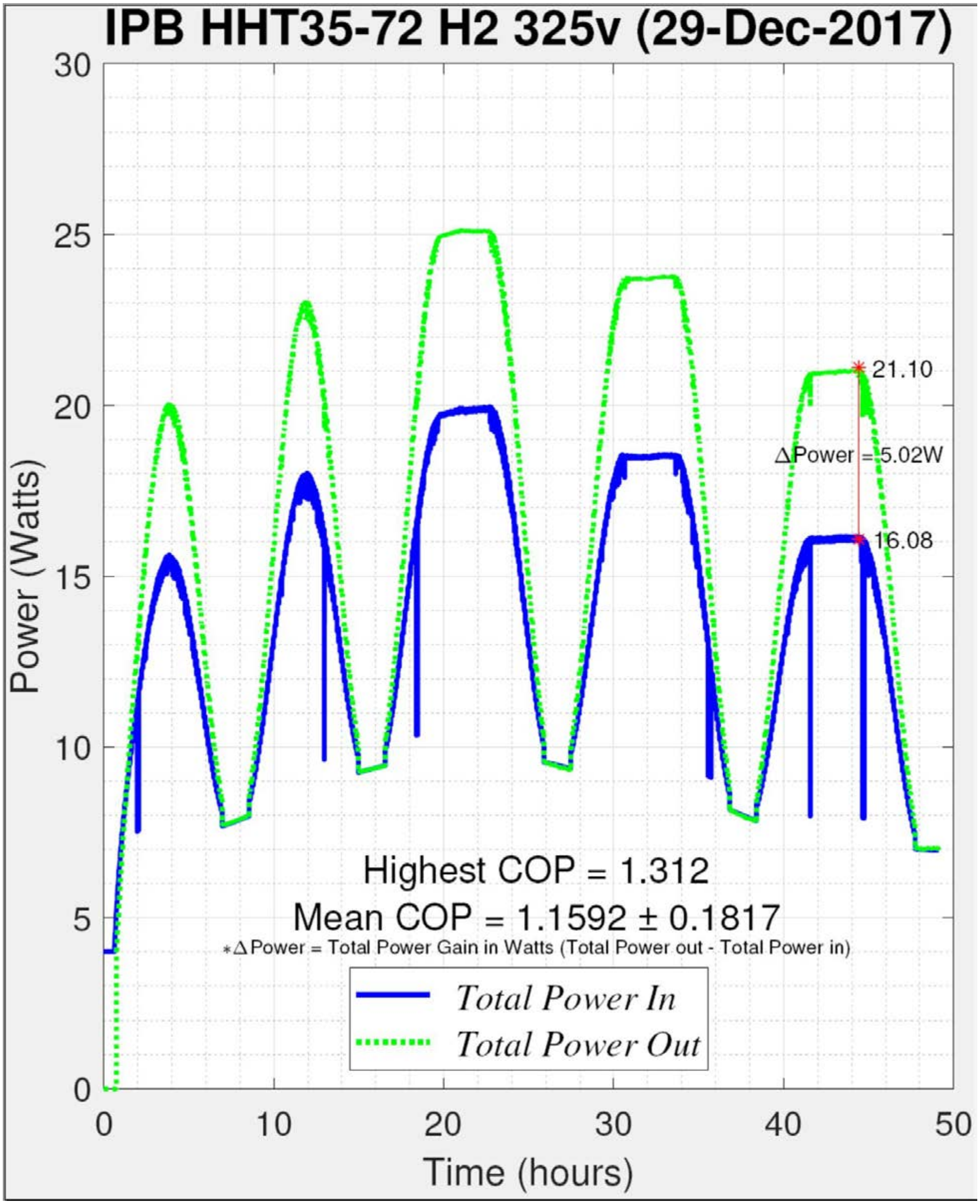

Figure 3 results of running active Q-pulses™ in Hydrogen above the threshold necessary to produce reaction heat. It produces more than 5W of reaction heat at the same excitation level that produces only 0.64W of power gain in helium as seen in Figure 1.

In Figure 3 above the sine wave is peaked for approximately two hours of maximum power, simply to show that longer control times can be run with stable output.

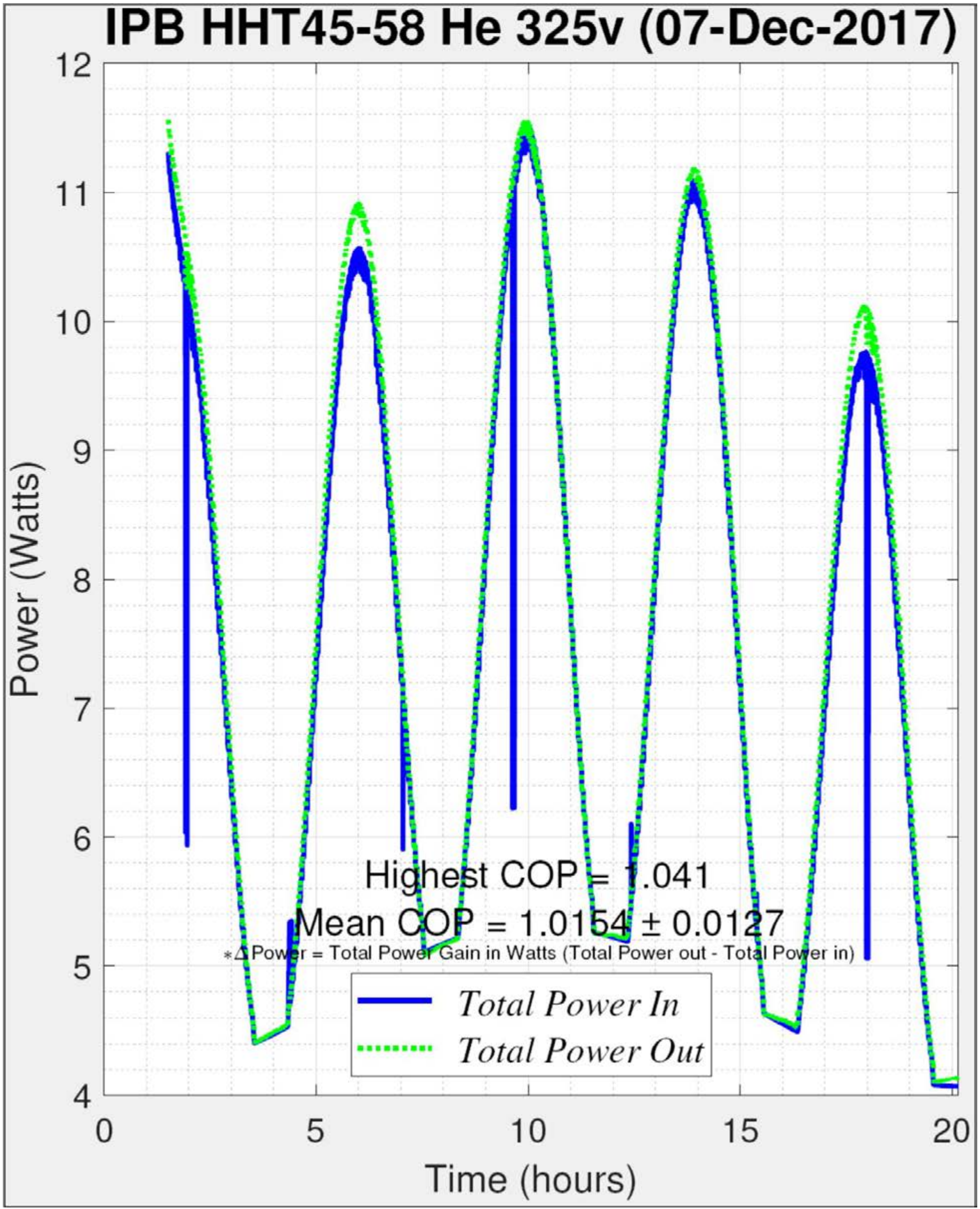

Figure 4 results of running active Q-pulses™ in helium produce a max 4% power gain after trying to drive all of the Hydrogen out of the catalyst tube. This excitation produces more than 5W of reaction heat in Hydrogen as seen in Figure 6 below. Same catalyst tube, same calorimeter unit.

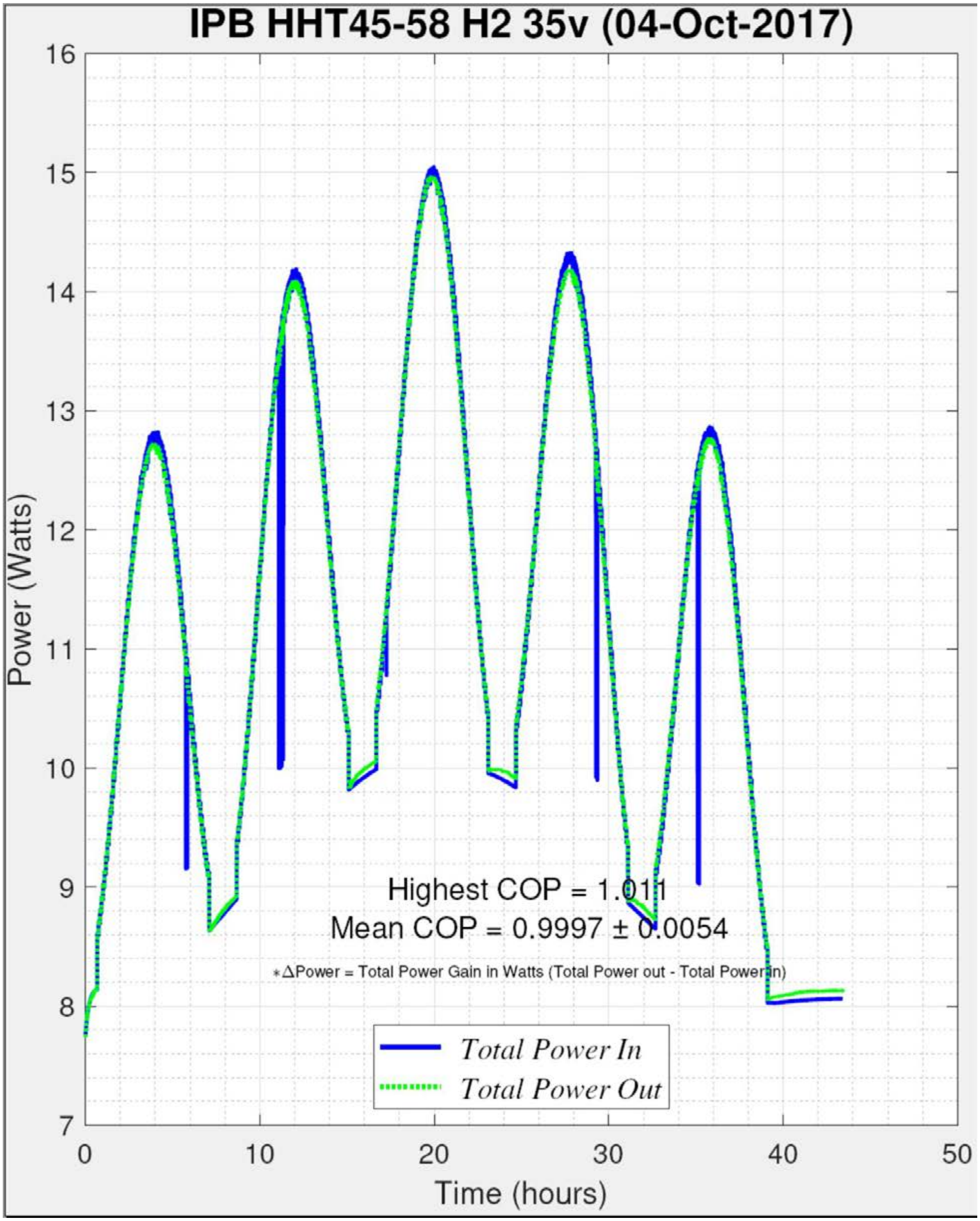

Figure 5 results of running high frequency low amplitude Q-pulses™ in Hydrogen produce statistically a gain of 1.

Again Figure 5 demonstrates the validity of using low voltage high frequency pulses to provide a null or calibration test of the Calorimeter.

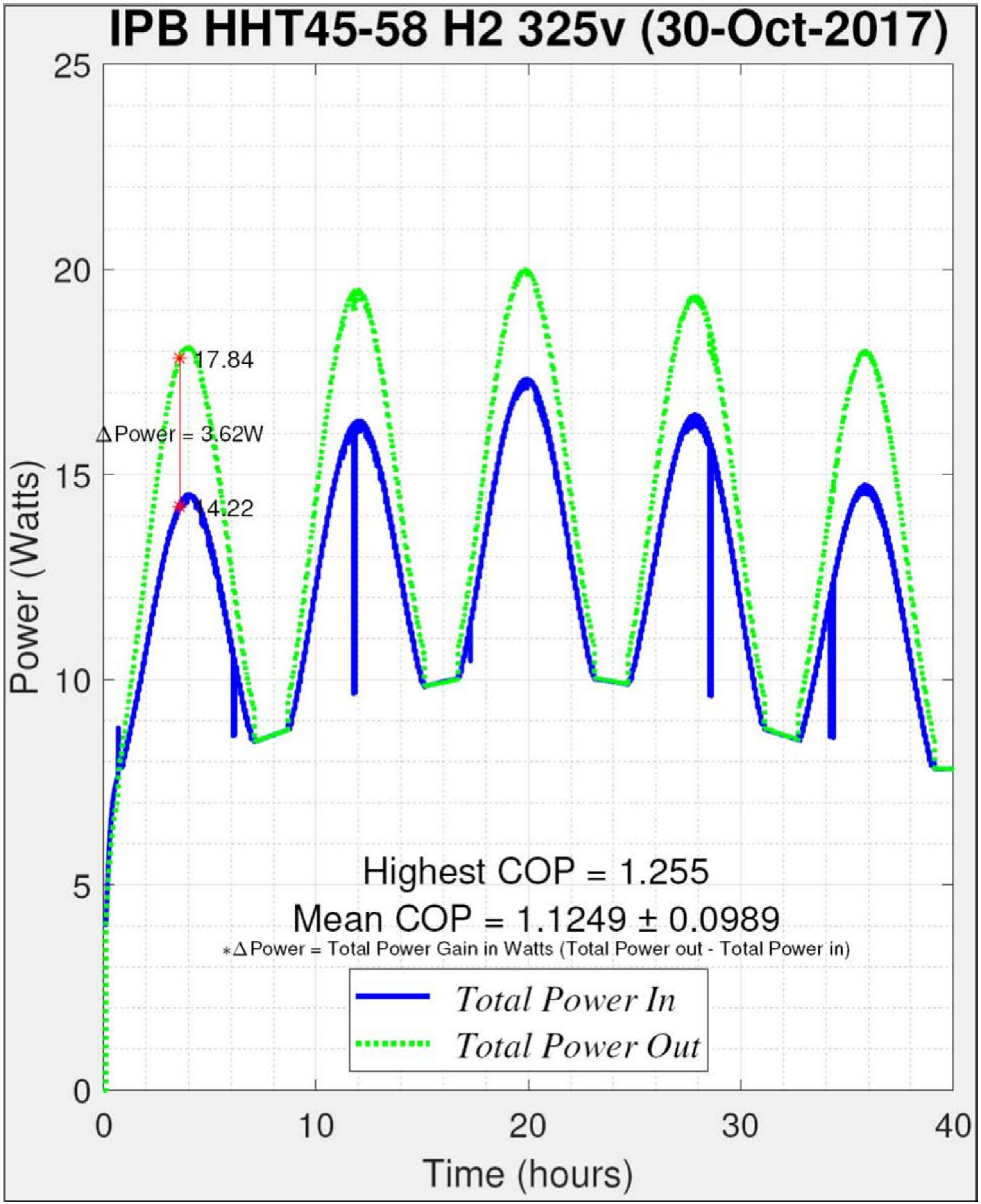

Figure 6 results of running active Q-pulses™ in Hydrogen above the threshold necessary to produce reaction heat. Active Q-pulses™ average more than 12% power gain at the same excitation level that produces less than 2% of power gain in helium as seen in Figure 4

Conclusion

These test results, clearly demonstrate that:

1. No matter what amplitude impulse functions are applied to the Catalyst tubes in helium there is no reaction heat generated.
2. The calorimeters are accurate and provide excellent accountability for all energy in and out of the system.
3. It is just as effective to use low voltage high frequency Q-Pulse™ excitation in Hydrogen as any run helium for calibration and verification of the calorimeters.
4. Below a certain threshold of excitation energy the reaction will not proceed even if Hydrogen is present.

The table below provides a summary of the source data used in the tests described above

All results provided as Mean COP rounded to 2 decimal places					
Low Amplitude High Frequency (LAHF)					
Catalyst Tube	Figure	Hours	gas	results	Excitation
72		100	He	Calibration	active
72	1	20	He	0.99	active
72		100	H	Calibration	LAHF
72	2	40	H	1	LAHF
72	3	50	H	1.16	active
58		100	He	Calibration	active
58	4	20	He	1.02	active
58		100	H	Calibration	LAHF
58	5	44	H	1	LAHF
58	6	40	H	1.13	active

Total hours for report data	614			

- BEC is measuring all of the core input and output powers on a dynamic basis to exacting standards of an independent entity.
- BEC can consistently produce a clearly positive COP, over and above any error bars that are conservatively factored into these measurements (these are the actual net inputs and outputs).
- BEC is clearly producing several Watts of gain in total thermal power output vs. total electrical power input on a repeatable and controlled basis (i.e., increasing the evidence of being clearly over unity, by design).
- This is the blueprint for a manufacturing technology that is scalable.

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