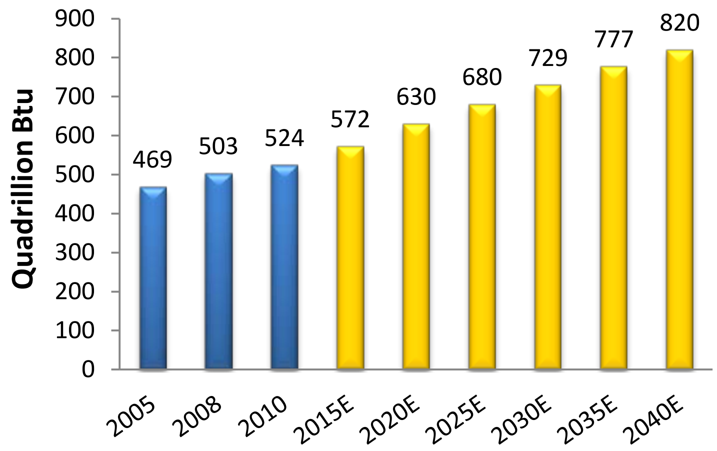
SunCell

Confidential Technical Presentation

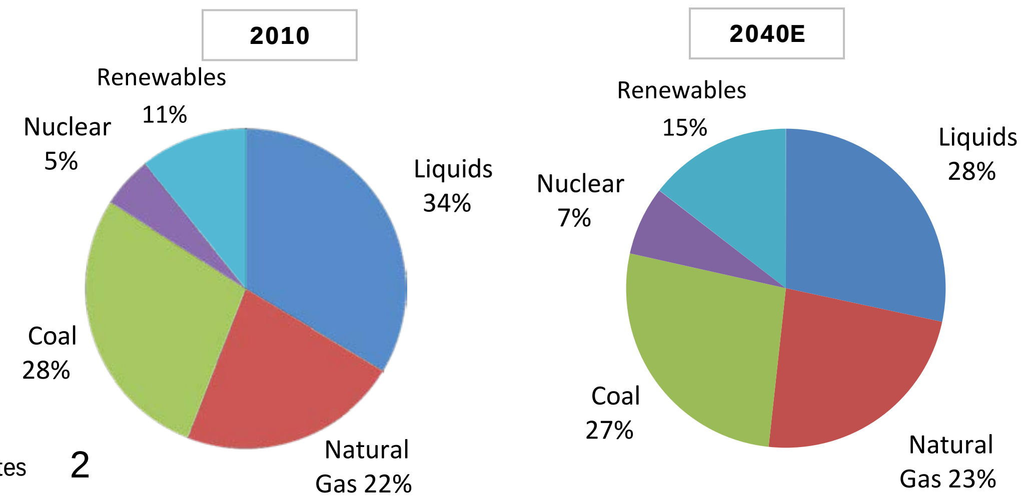
The Opportunity

- Established energy sources are expensive, polluting and unsustainable
  - ~$8 trillion currently spent globally on fossil fuels; ~$2 trillion in the U.S.
  - Each year, tens of billions are spent on energy R&D in search of alternative solutions
- Over $1 trillion annually expected to be spent on global energy infrastructure through 2030
- Global energy demand has nearly doubled over the past 20 years, and is projected to increase 56% between 2010 and 2040
- Existing sources of renewable energy are expected to satisfy only a small portion (~15%) of 2040 demand
  - Wind and solar are relatively poor sources of baseload power
  - The remainder will be supported primarily by fossil fuel consumption, which is expected to increase nearly 46% over the same time period

Global Energy Consumption



Global Energy Use by Fuel Type



Sources: EIA IEO 2013, International Energy Agency and management estimates

The Solution - BlackLight Power

- BlackLight Power has developed a new, sustainable nonpolluting energy technology.
- BLP's technology and science have been validated by independent third parties in their own laboratories.
- "SunCell" has been validated.
- "SunCell" appears very competitive with a clear path to market.
- Additionally, advanced thermal power source with Licenses in place with seven firms to offer up to 8,250 MW of power.

The BlackLight Process could be the most important energy technology of our generation

Unit Costs: BLP vs. Competitors

BRILLIANT LIGHT POWER

Table 1. Capital and Generation Costs Comparisons of BlackLight Power Sources Versus Other Primary Energy Sources or Power Converters.

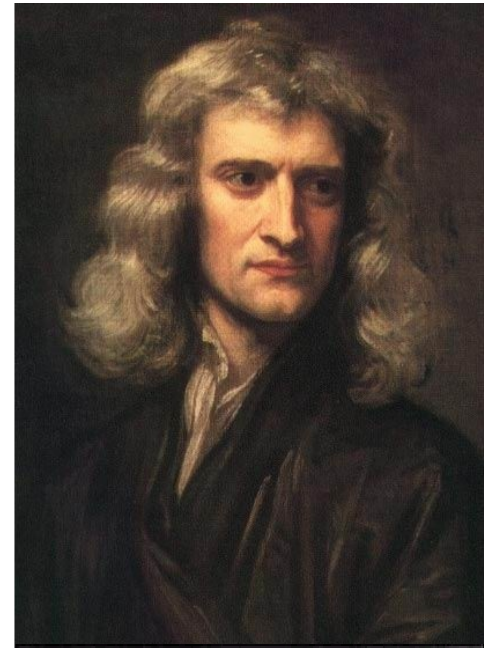
	Average Generating Capacity (MW)	Installed Cost ($/kW)	Levelized Cost of Electricity ($/kWh)	CO_2 Emission (lb per MWh)
CENTRAL GENERATION				
BLP Thermal	**1+**	**1,000**	**<0.01**	**0**
Natural Gas Combined Cycle	550	1,000	0.06	800
Coal	600	3,000	0.065	2,500
Nuclear	1,100	5,400	0.12	
DISTRIBUTED GENERATION APPLICATIONS				
BLP SunCell™	**<10**	**<100**	**<0.01**	**0**
Solid Oxide Fuel Cell	2.4	5,000	0.21	850
Wind	100	2,000	0.10	
Photovoltaic	10	3,000	0.20	

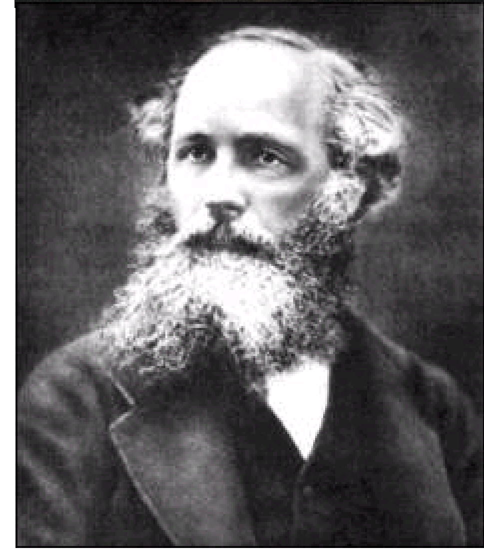
Sources: EIA, Lazard 7.0 and Management estimates

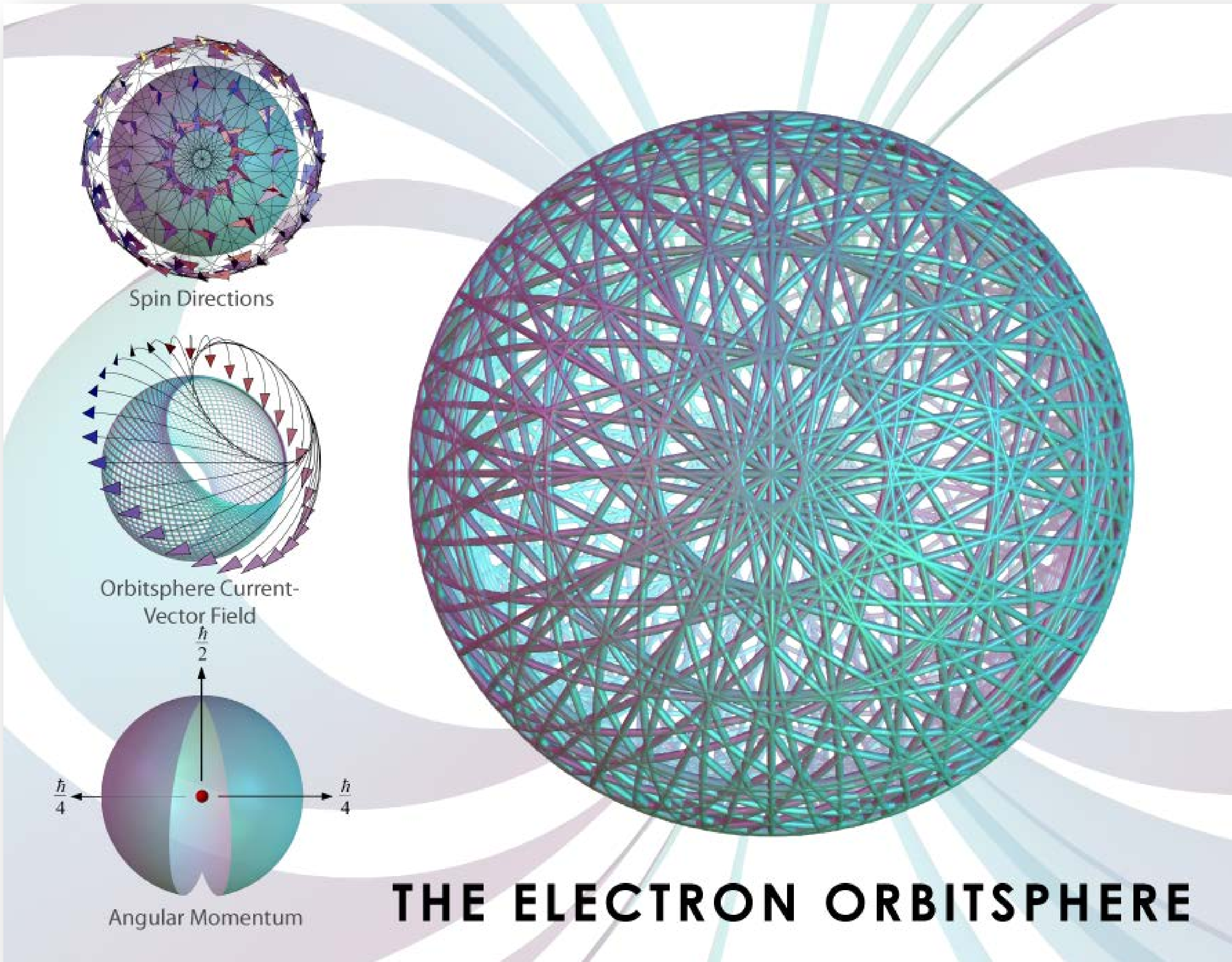
Background

Review of Theory

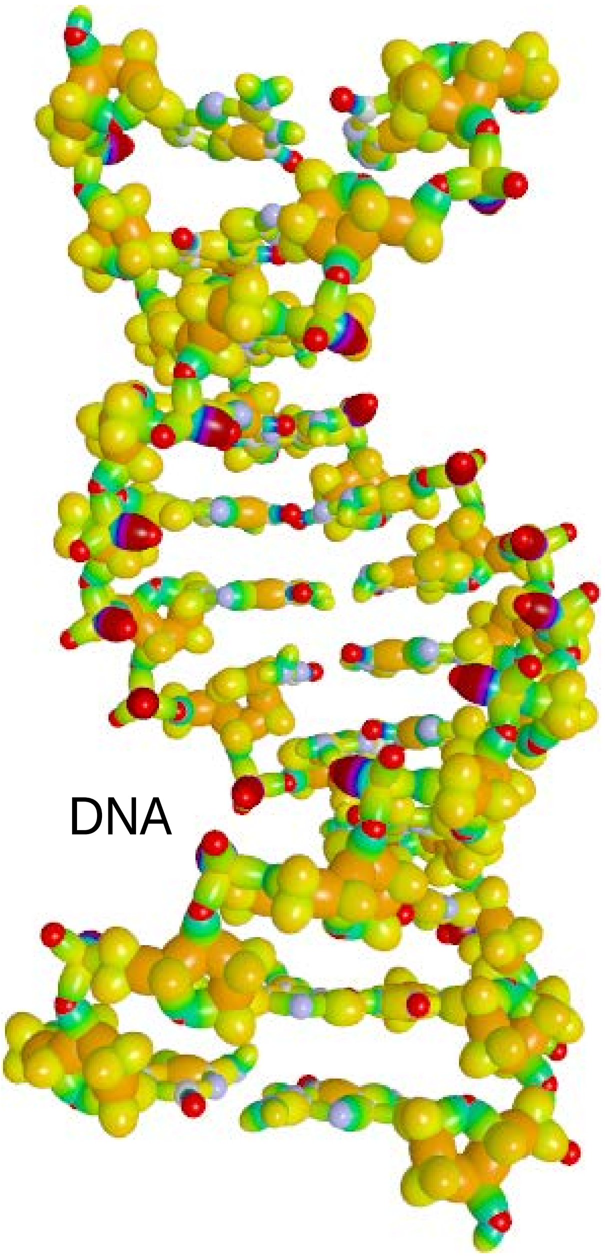
- Founder, Dr. Randell Mills, proposed a new model of the electron that was used to predict our novel energy technology
- Assume physical laws apply on all scales including the atomic scale
- Start with first principles
  - Conservation of mass-energy
  - Conservation of linear and angular momentum
  - Maxwell's Equations
  - Newton's Laws
  - Special Relativity
- **Highly predictive**– application of Maxwell's equations precisely predicts hundreds of fundamental spectral observations in exact equations with no adjustable parameters (fundamental constants only). Correctly predicts the fundamental observations of chemistry and physics in exact equations over a scale (largest to smallest) of 1 followed by 85 zeros.



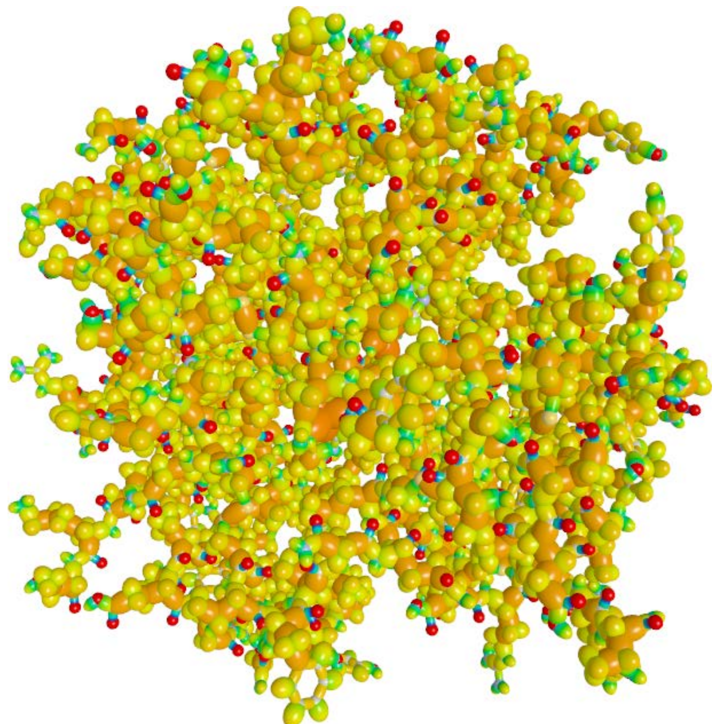



Spin Directions
Orbitsphere Current-Vector Field
$\frac{\hbar}{2}$
$\frac{\hbar}{4}$
$\frac{\hbar}{4}$
Angular Momentum
THE ELECTRON ORBITSPHERE

Millsian 2.0: Modeling Molecules

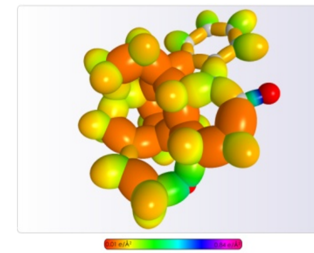


DNA

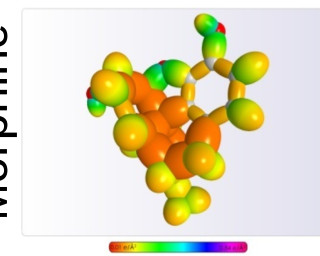


Insulin

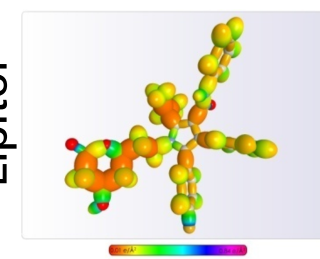
Strychnine



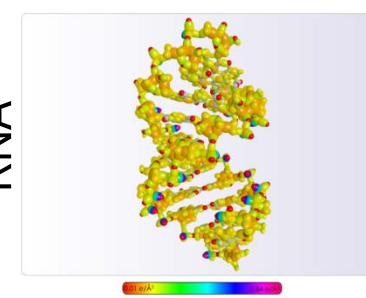
Morphine



Lipitor



RNA

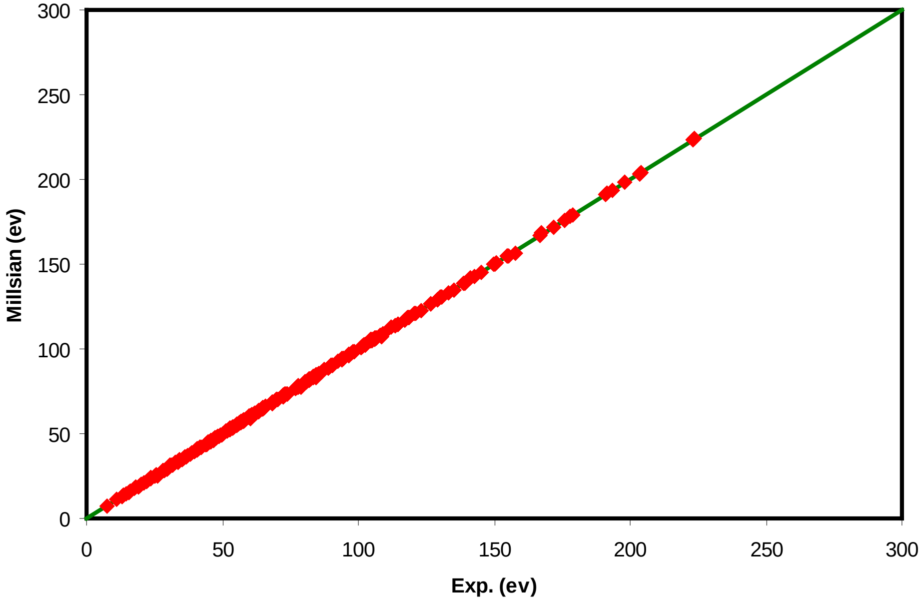


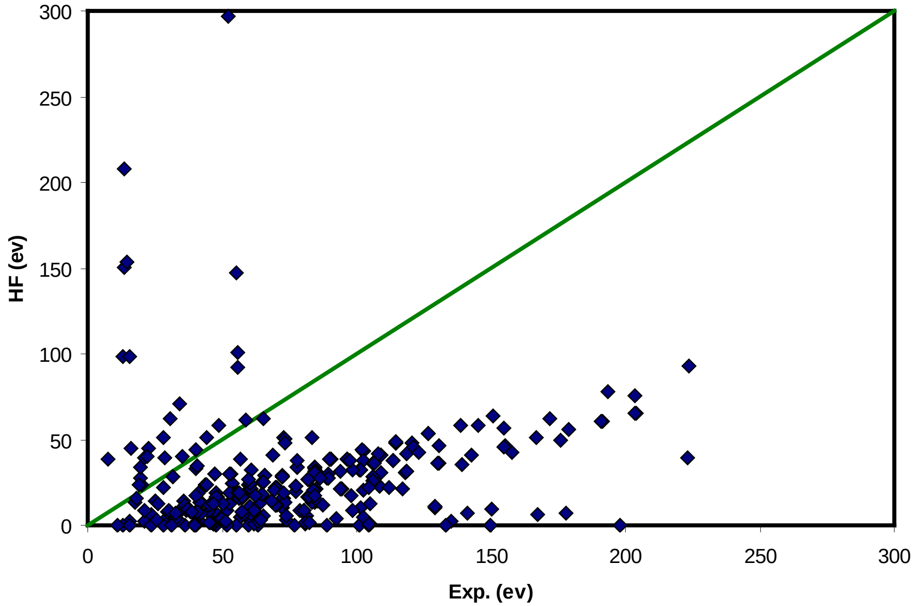
millsian.com

Comparison of Classical to Quantum Mechanical Performance

The total bond energies of exact classical solutions of 415 molecules generated by Millsian 1.0 and those from a modern quantum mechanics-based program, Spartan's pre-computed database using 6-31G* basis set at the Hartree-Fock level of theory, were compared to experimental values.

Millsian vs. 6-31G*





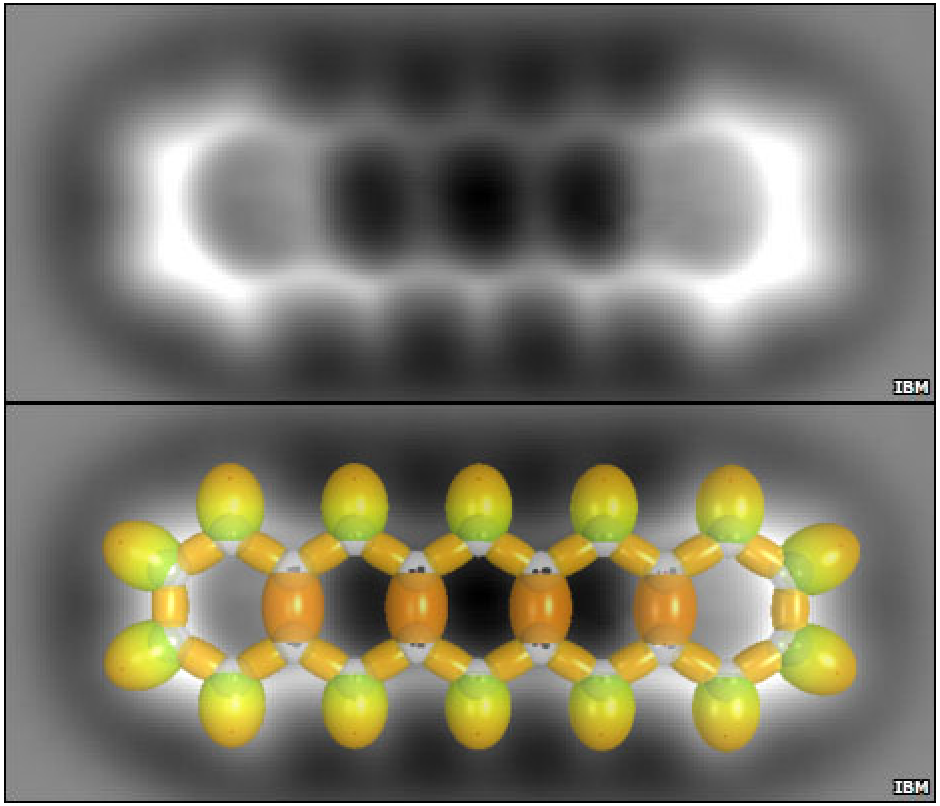
R. L. Mills, B. Holverstott, W. Good, A. Makwana, J. Paulus, "Total Bond Energies of Exact Classical Solutions of Molecules Generated by Millsian 1.0 Compared to Those Computed Using Modern 3-21G and 6-31G* Basis Sets," Phys. Essays 23, 153 (2010); doi: 10.4006/1.3310832

Physical Image Compared to Physical Solution

BRILLIANT LIGHT POWER

The polycyclic aromatic hydrocarbon pentacene was imaged by atomic force microscopy using a single CO molecule as the probe. The resulting breakthrough in resolution revealed that in contrast to the fuzzy images touted by quantum theoreticians as proof of the cloud model of the electron, the images showed localized bonding MOs and AOs in agreement with the classical solution.

Top, atomic force microscopy image of pentacene by Gross et al. Bottom, the superimposed analytical classical solution that matches the physical structure.



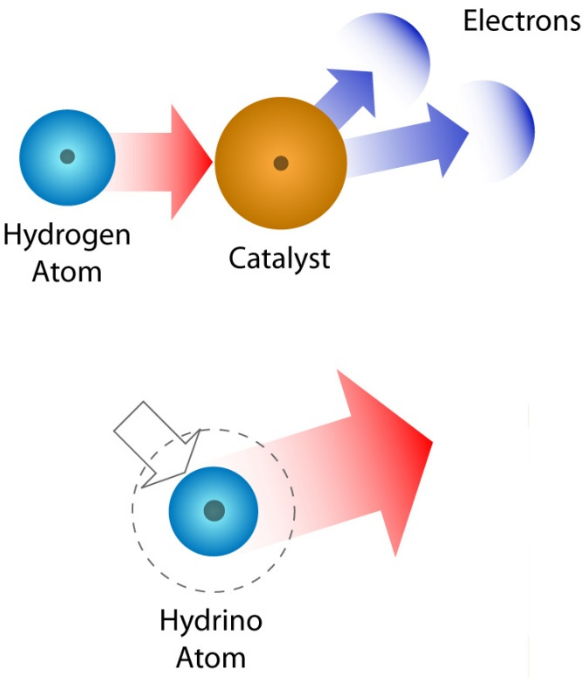
[L. Gross, F. Mohn, N. Moll, P. Liljeroth, G. Meyer, “The chemical structure of a molecule resolved by atomic force microscopy”, Science, Vol. 325, (2009), pp. 1110-1114.]

The BlackLight Energy Process

Hydrino Reaction (“BlackLight Process”)

BRILLIANT LIGHT POWER

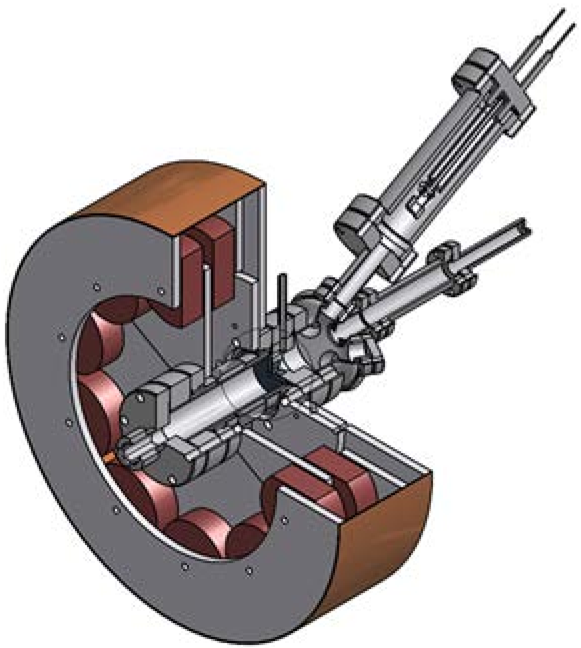
1. Atomic hydrogen reacts with an energy acceptor called a catalyst wherein energy is transferred from atomic hydrogen to the catalyst which forms an ion due to accepting the energy
2. Then, the negative electron drops to a lower shell closer to the positive proton to form a smaller hydrogen atom called a “hydrino” releasing energy that ultimately is in the form of heat
3. The catalyst ion regains its lost electrons to reform the catalyst for another cycle with the release of the initial energy accepted from hydrogen. With the imposition of an arc current condition, the limiting space charge of the ionized electrons is eliminated and the rate becomes massively high.

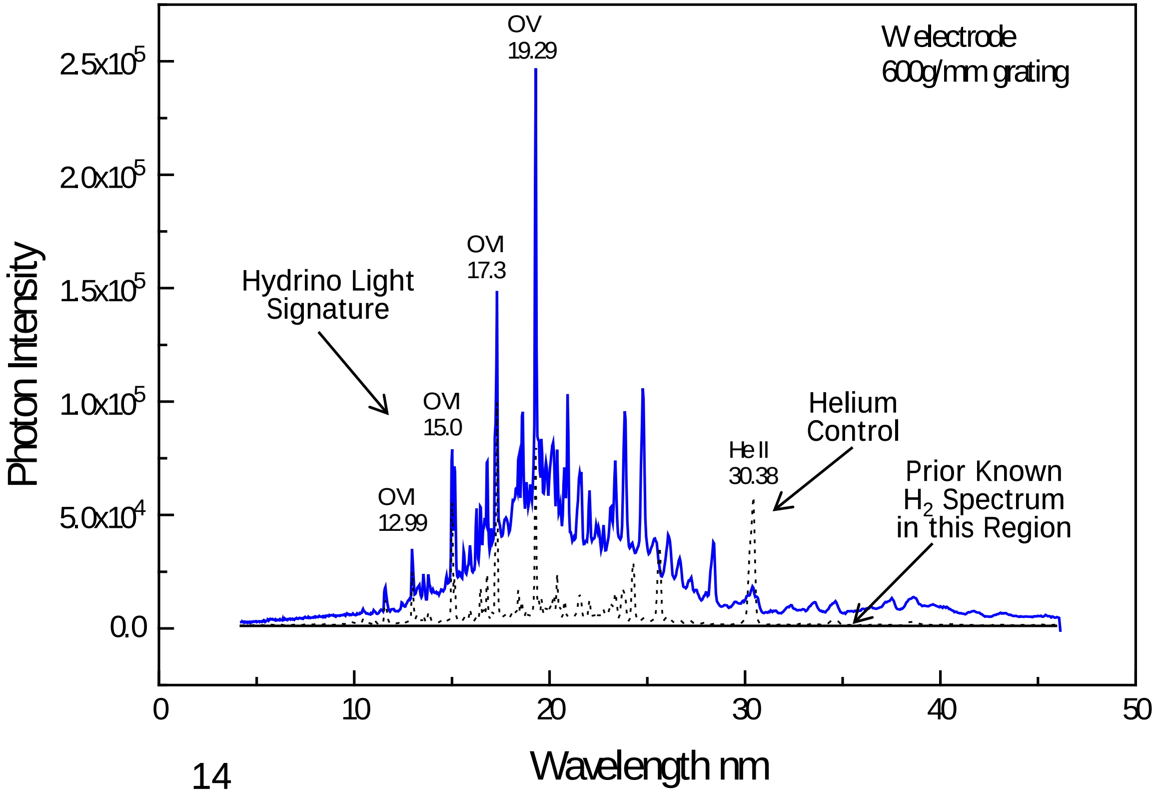


Hydrino Transition Continuum Soft X-Ray Emission

Hydrino Light Signature

- Experimental Setup for the Observation of the Hydrino Light Signature
    - Light signature from pure hydrogen at much higher energy than deemed possible for this element in any known form
    - Continuum radiation showing H going below the level previously thought to be the "Ground State"

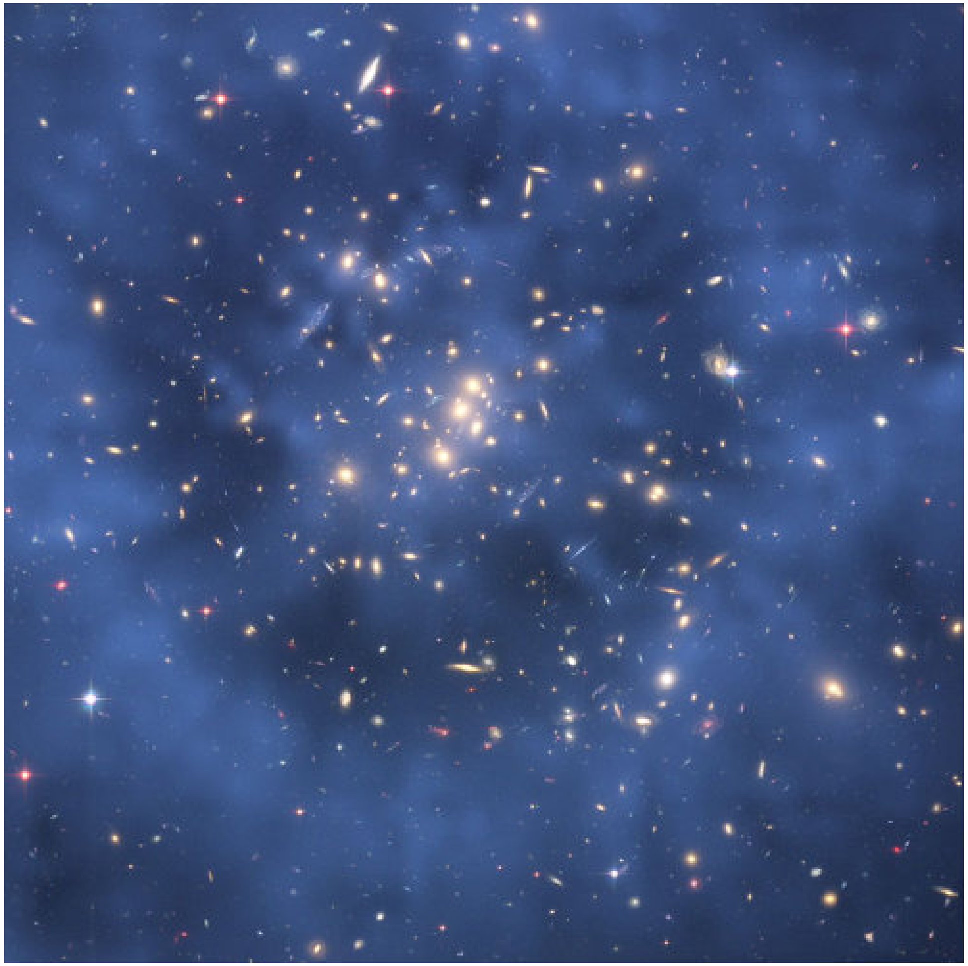




Dark Matter Ring in Galaxy Cluster

This Hubble Space Telescope composite image shows a ghostly "ring" of dark matter in the galaxy cluster Cl 0024+17. The ring is one of the strongest pieces of evidence to date for the existence of dark matter, a prior unknown substance that pervades the universe.

Characteristic EUV continua of hydrino transitions following radiationless energy transfer with cutoffs at $\lambda_{\left(H \to H\left[\frac{a_H}{p=m+1}\right]\right)} = \frac{91.2}{m^2}\ nm$ are observed from hydrogen plasmas in the laboratory that match significant celestial observations and further confirm hydrino as the identity of dark matter.



M. J. Jee et al., Discovery of a ringlike dark matter structure in the core of the galaxy cluster C1 0024+17, Astrophysical Journal, 661, (2007) 728–749.

R. L. Mills, Y. Lu, K. Akhar, Spectroscopic observation of helium-ion- and hydrogen-catalyzed hydrino transitions, Cent. Eur. J. Phys., 8, (2010) 318–339, DOI: 10.2478/s11534-009-0106

R. L. Mills, Y. Lu, "Time-Resolved Hydrino Continuum Transitions with Cutoffs at 22.8 nm and 10.1 nm," Eur. Phys. J. D, 64, (2011), pp. 65, DOI: 10.1140/epjd/e2011-20246-5.

R. L. Mills, Y. Lu, Hydrino Continuum transitions with cutoffs at 22.8 nm and 10.1 nm, Int. J. Hydrogen Energy, 35 (2010) 8446–8456, doi: 10.1016/j.ijhydene.2010.05.098.

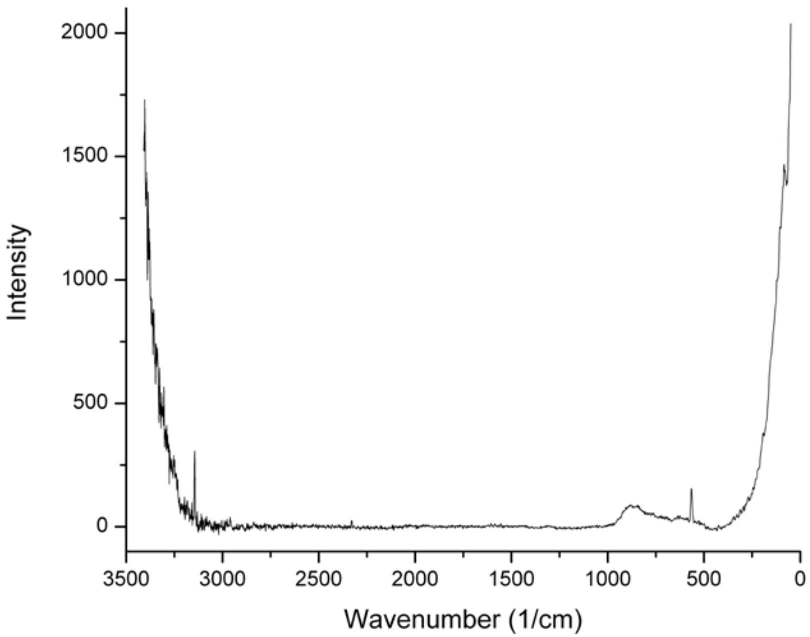
F. Bournaud et al., Missing mass in collisional debris from galaxies, Science, 316, (2007) 1166–1169.

Hydrino Identification

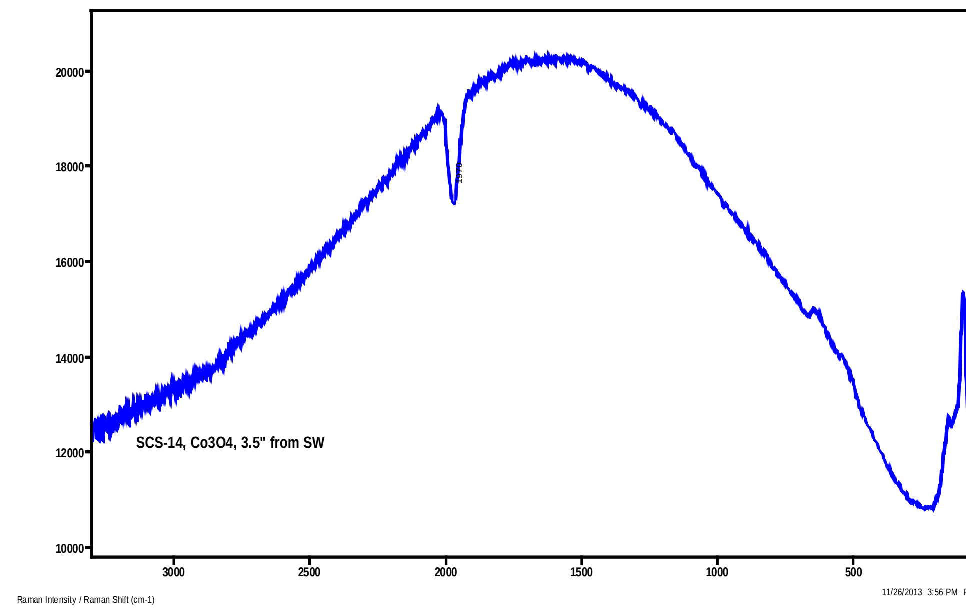
- GUT
- Molecular modeling
- H(1/2) and H(1/4) hydrino transitions observed by continuum radiation
- Astronomy data verifying hydrinos such as H(1/2), H(1/3), and H(1/4) hydrino transitions
- H^-(1/2) hyperfine structure
- H_2 (1/4) XPS binding energy
- H_2 (1/4) ro-vib spectrum in crystals by e-beam excitation
- H_2 (1/4) FTIR
- H_2 (1/4) Raman
- H_2 (1/4) Photoluminescence spectroscopy
- Fast H in plasma including microwave and rt-plasmas
- Rt-plasma with filament and discharge
- Afterglow
- Highly pumped states
- H inversion
- Power with multiple solid fuels chemistries
- SunCell energetic plasma
- ToF-SIMS and ESI-ToF identification of hydrino hydride compounds
- Solid H NMR
- H (1/4) spin-nuclear hyperfine transition
- Electricity gain over theoretical in CIHT cells

Raman Spectrum of $H_2(1/4)$

The Raman spectra obtained on MoCu witness foils using a Thermo Scientific DXR SmartRaman spectrometer and the 780 nm laser showing a new inverse Raman effect absorption peak starting at 1950 cm^{-1} that matches the free rotor energy of $H_2(1/4)$ (0.2414 eV) to four significant figures.

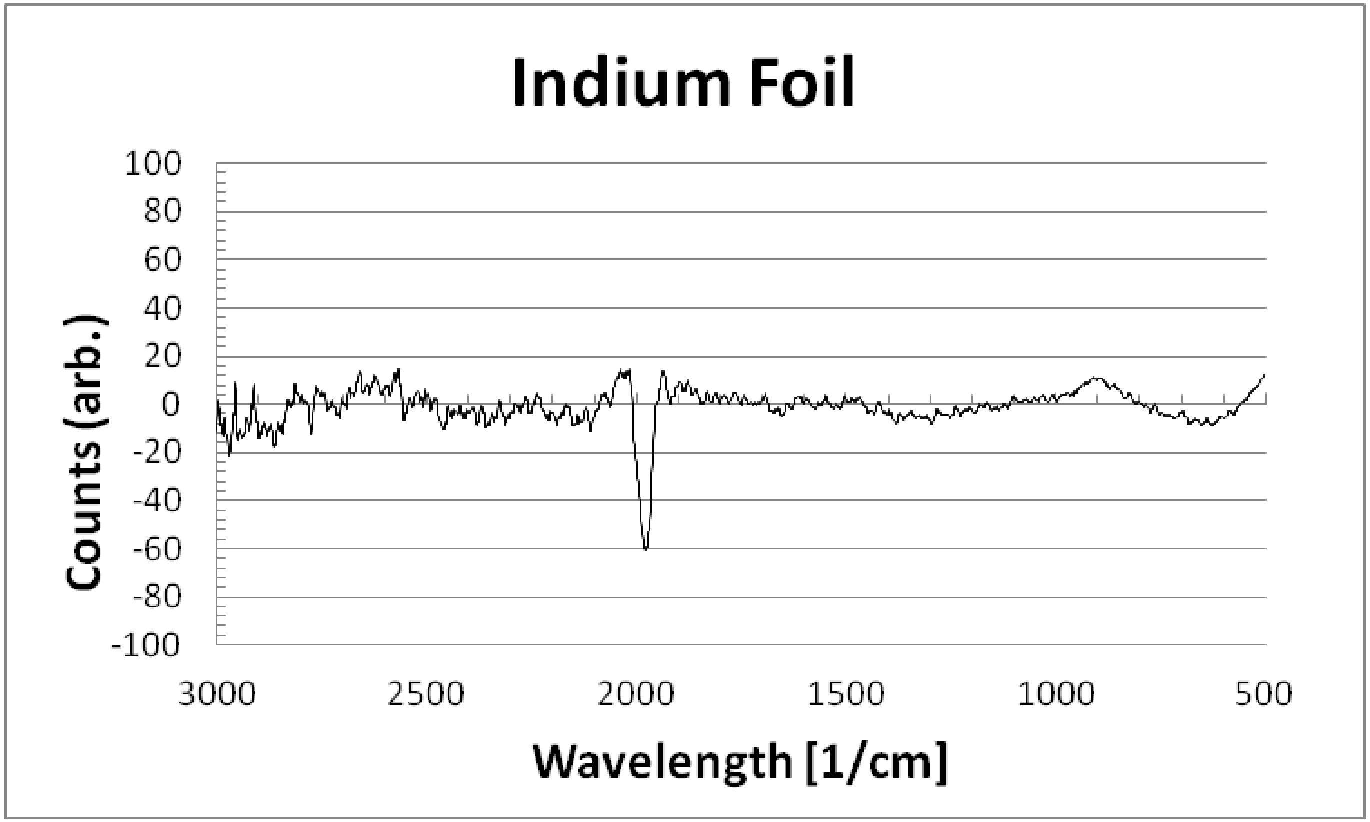


MoCu starting material showing no peak



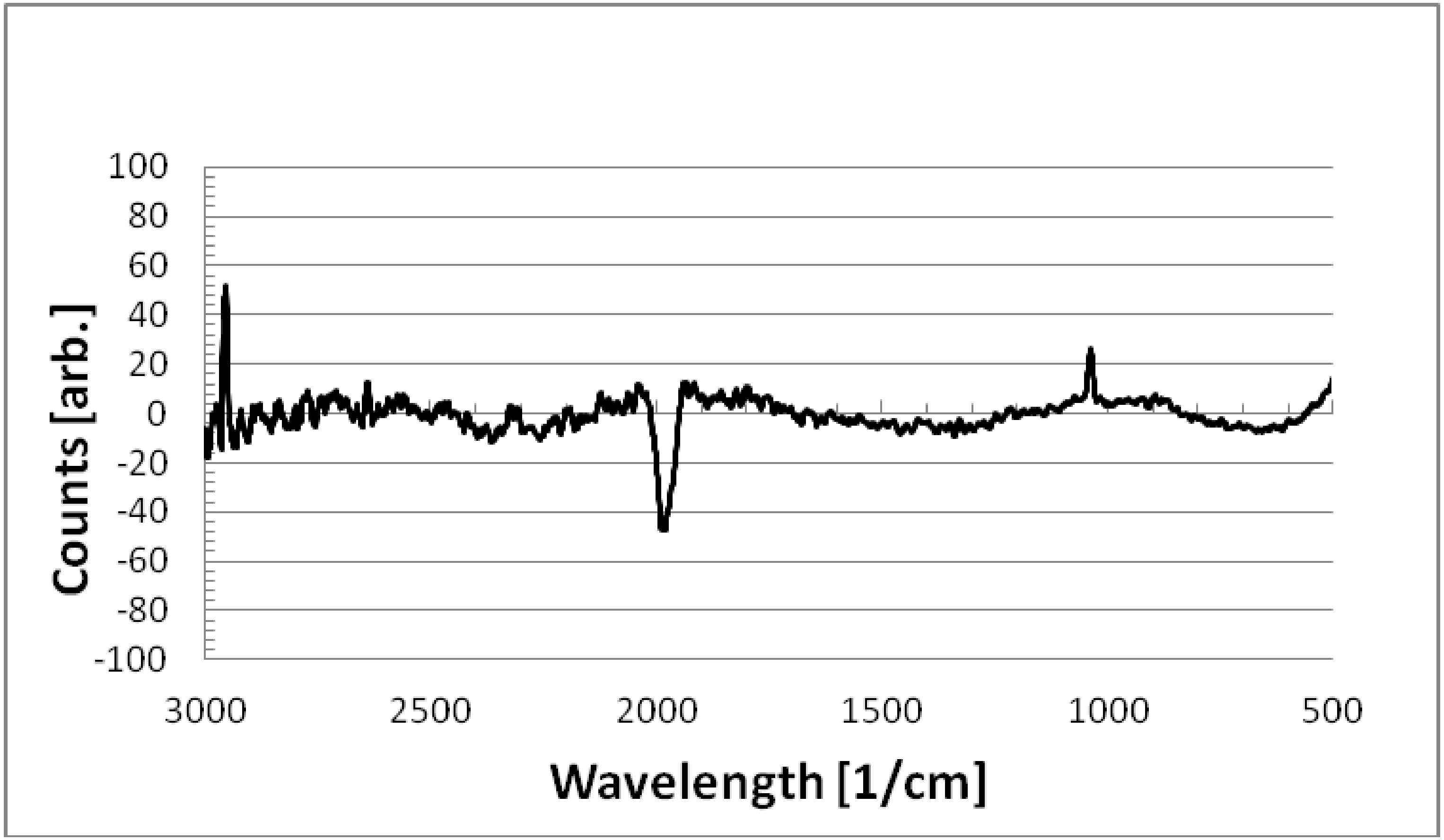
MoCu witness foil exposed to solid fuel plasma.

Raman Spectrum



The Raman spectrum obtained on a In metal foil exposed to the product gas from a series of solid fuel ignitions under argon, each comprising 100 mg of Cu mixed with 30 mg of deionized water. Using the Thermo Scientific DXR SmartRaman spectrometer and the 780 nm laser, the spectrum showed an inverse Raman effect peak at 1982 cm^{-1} that matches the free rotor energy of $H_2(1/4)$ (0.2414 eV) to four significant figures.

Raman Spectrum



The Raman spectrum recorded on the In metal foil exposed to the product gas from the argon-atmosphere ignition of 50 mg of NH_4NO_3 sealed in the DSC pan. Using the Thermo Scientific DXR SmartRaman spectrometer and the 780 nm laser the spectrum showed the $H_2(1/4)$ inverse Raman effect peak at 1988 cm^{-1}.

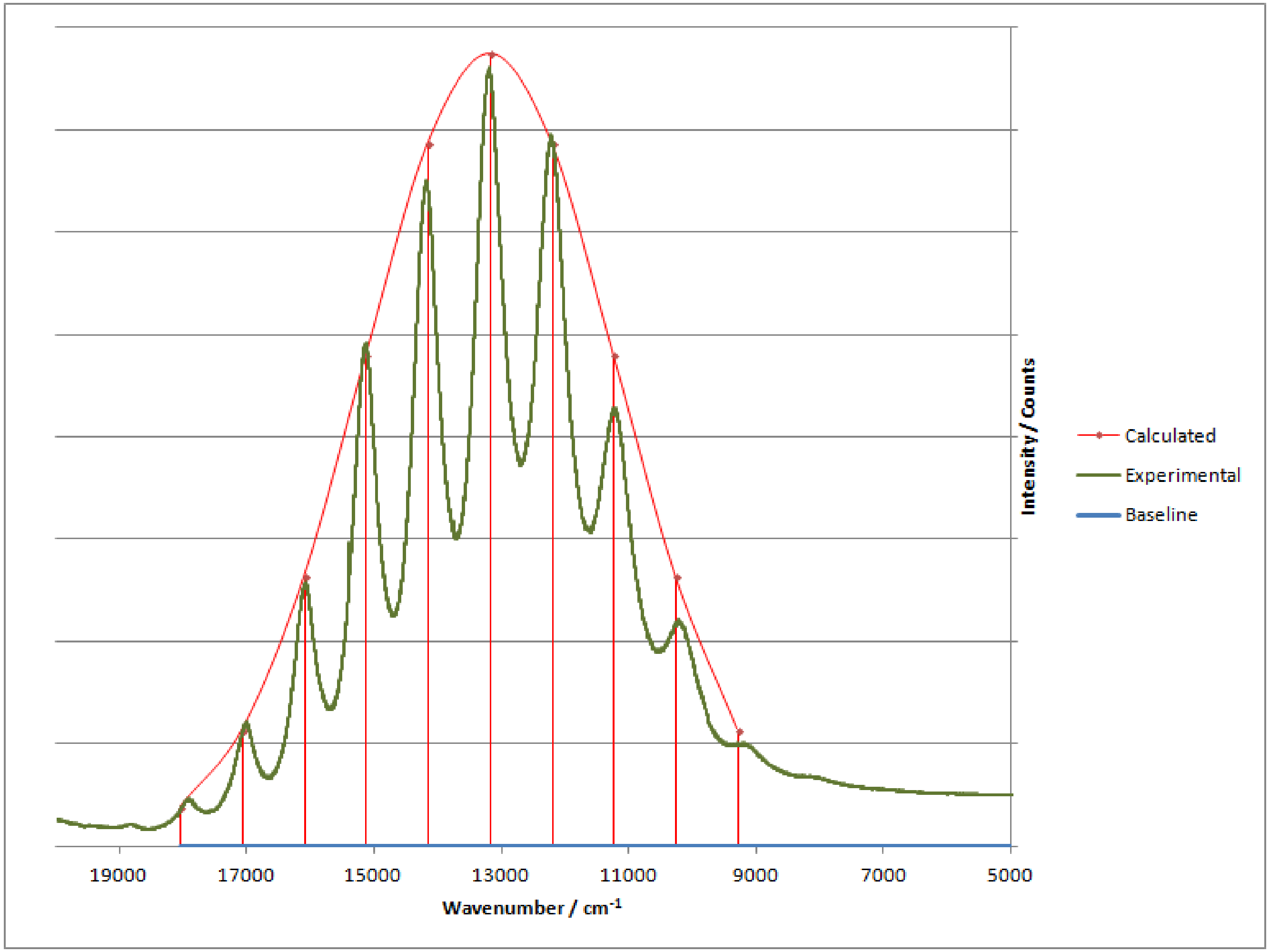
Data Comparison

Comparison of the theoretical transition energies and transition assignments with the observed Raman peaks.

Assignment	Calculated (cm^{-1})	Experimental (cm^{-1})	Difference (%)
P(5)	18,055	17,892	0.91
P(4)	17,081	16,993	0.52
P(3)	16,107	16,064	0.27
P(2)	15,134	15,121	0.08
P(1)	14,160	14,168	-0.06
Q(0)	13,186	13,183	0.02
R(0)	12,212	12,199	0.11
R(1)	11,239	11,207	0.28
R(2)	10,265	10,191	0.73
R(3)	9,291	9,141	1.65
R(4)	8,318	8,100	2.69

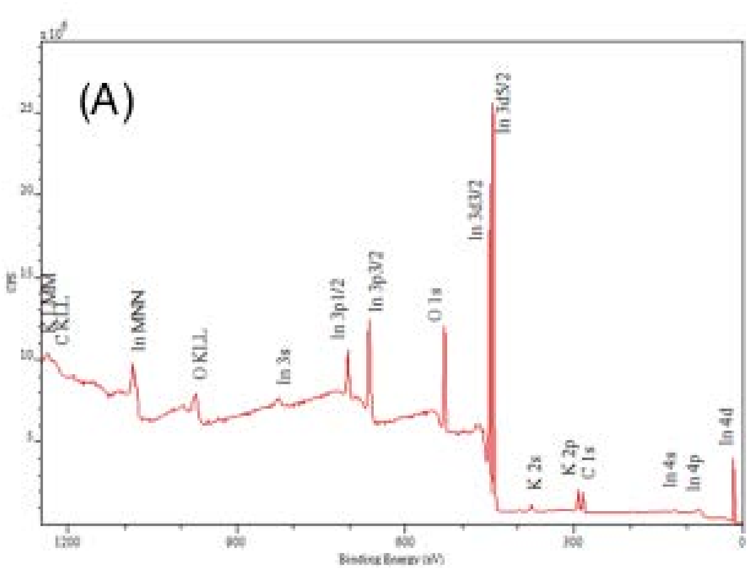
Data Comparison

A plot comparison between the theoretical energies and assignments given on the previous slide with the observed Raman spectrum.

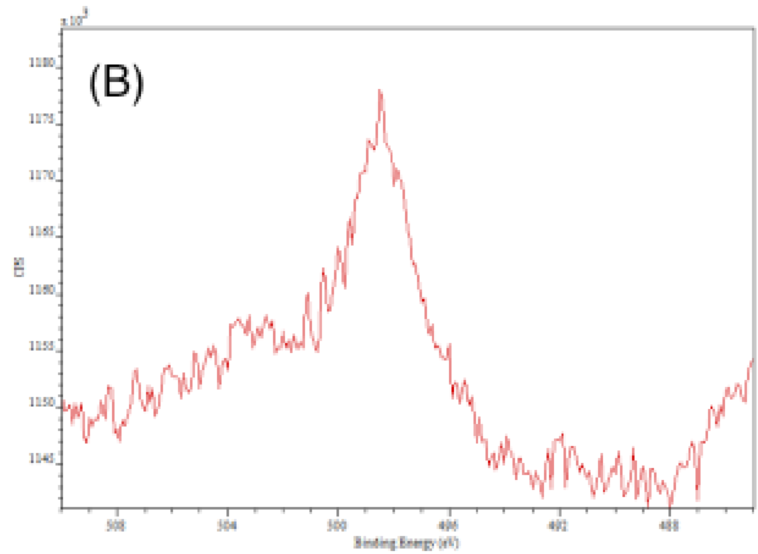


XPS Spectra

XPS spectra recorded on the indium metal foil exposed to gases from sequential argon-atmosphere ignitions of the solid fuel 100 mg Cu + 30 mg deionized water sealed in the DSC pan.



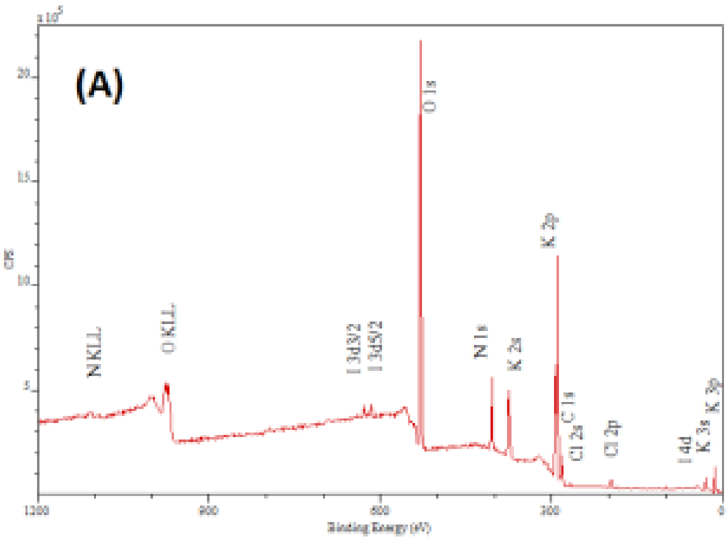
(A) A survey spectrum showing only the elements In, C, O, and trace K peaks were present.



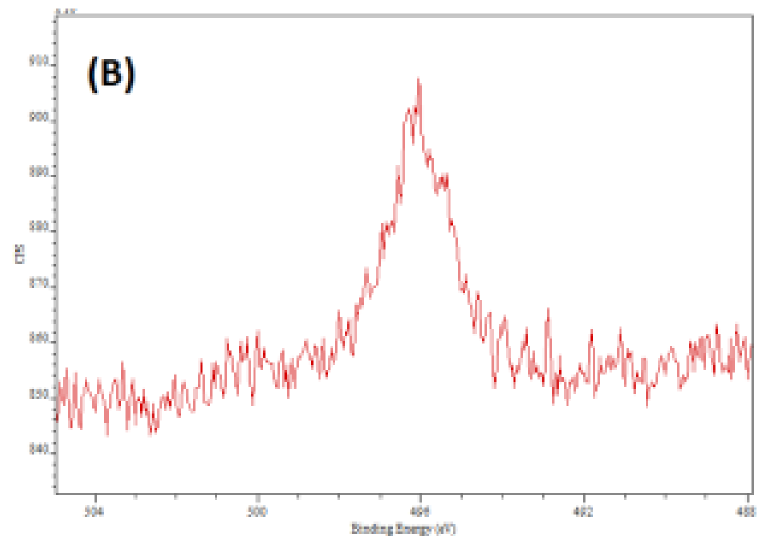
(B) High-resolution spectrum showing a peak at 498.5 eV assigned to $H_2(1/4)$ wherein other possibilities were eliminated based on the absence of any other corresponding primary element peaks.

XPS Spectra

XPS spectra recorded on KOH-KCl (1:1 wt%) getter exposed to gases from sequential argon-atmosphere ignitions of the solid fuel 85 mg of Ti mixed with 30 mg of deionized water sealed in the DSC pan.



(A) A survey spectrum showing only the elements K, C, O, N, and trace I peaks were present.



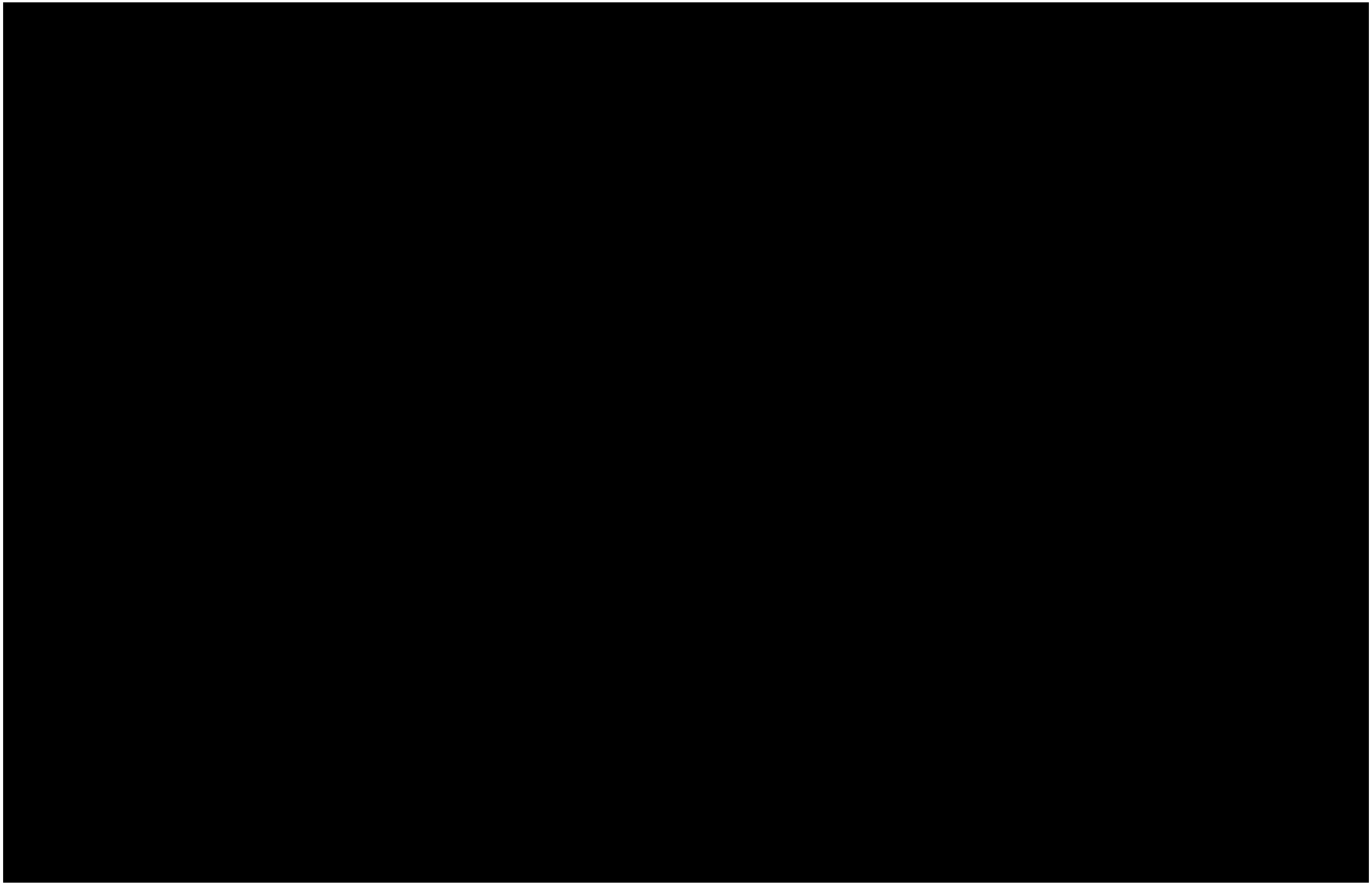
(B) High-resolution spectrum showing a peak at 496 eV assigned to $H_2(1/4)$ wherein other possibilities were eliminated based on the absence of any other corresponding primary element peaks.

Solid Fuel Plasma

Solid Fuel produces plasma power at billions of watts per liter from the formation of hydrinos using H_2O as the only source of fuel.

(Recorded Ignition Plasma at 18,000 frames per second)

BLP Plasma at Billions of Watts per Liter for a Duration of Ten Times Longer than when the Electrical Power Decays to Zero and No Theoretical Chemical Power is Possible.



SunCell

Photovoltaic Conversion of Optical Power Into Electricity

BRILLIANT LIGHT POWER

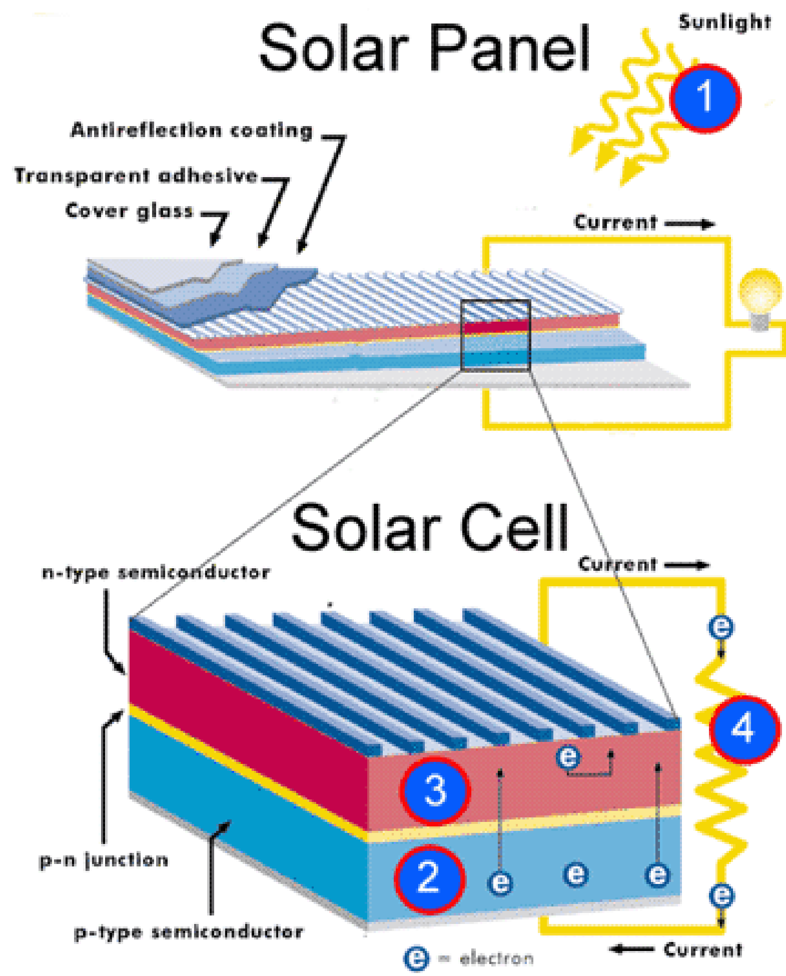
A solar cell comprises at least two wafer layers of differentially doped semiconductor material that exhibits the photovoltaic effect, the production of electrical power when irradiated with light of the solar spectrum.

Certain materials such as silicon are doped with trace amounts of atoms that exchange electrons between at least two bands that have different dopants, one electron acceptor or p-type and one electron donor or n-type, to cause a gradient between them at their interface called a p-n junction.

When the cell is struck by light **1**, electrons reverse the natural diffusion gradient and are transferred between the layer of p-type semiconductor material having excess electrons **2** to the layer of n-type semiconductor material having a deficiency of electrons **3** to create electrical power **4** delivered to an external load.

All photovoltaic have metal added at the bottom and top of the flat panel to collect and deliver electrons to allow the current flow through an external circuit to harness this power. An antireflective coating is also added to make the silicon better absorb photons.

Concentrator solar cells that typically comprise triple junctions responsive to different regions of the solar spectrum convert incident radiation of high intensity such as 2000 Sun equivalent to electricity at high efficiency such as >40%.



SunCell Electrical Power

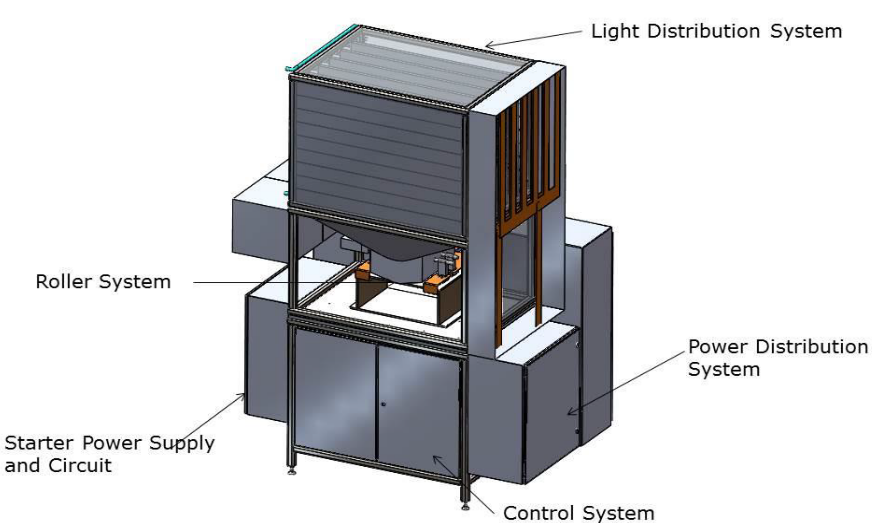
SunCell produces plasma power at billions of watts per liter from the formation of hydrinos using H_2O as the only source of fuel. The plasma power is directly converted to electrical power by a photovoltaic power converter.

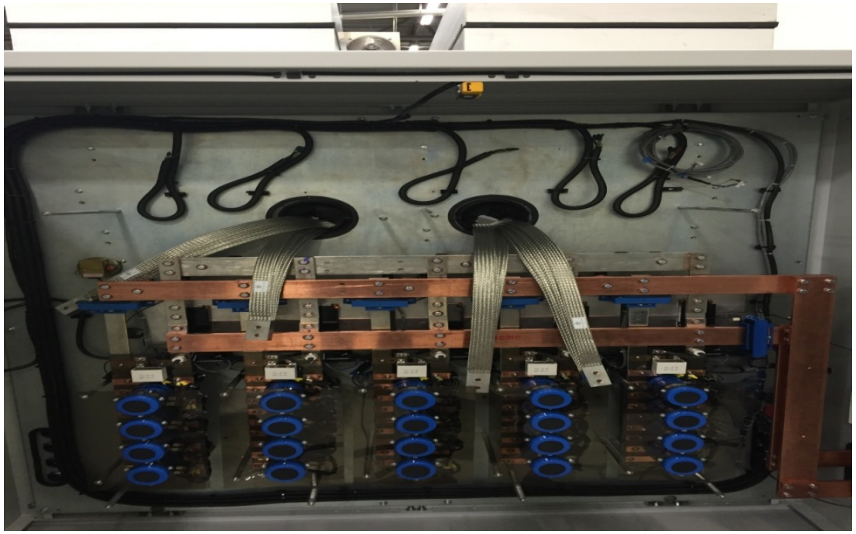
Electricity Demo

BRILLIANT LIGHT POWER

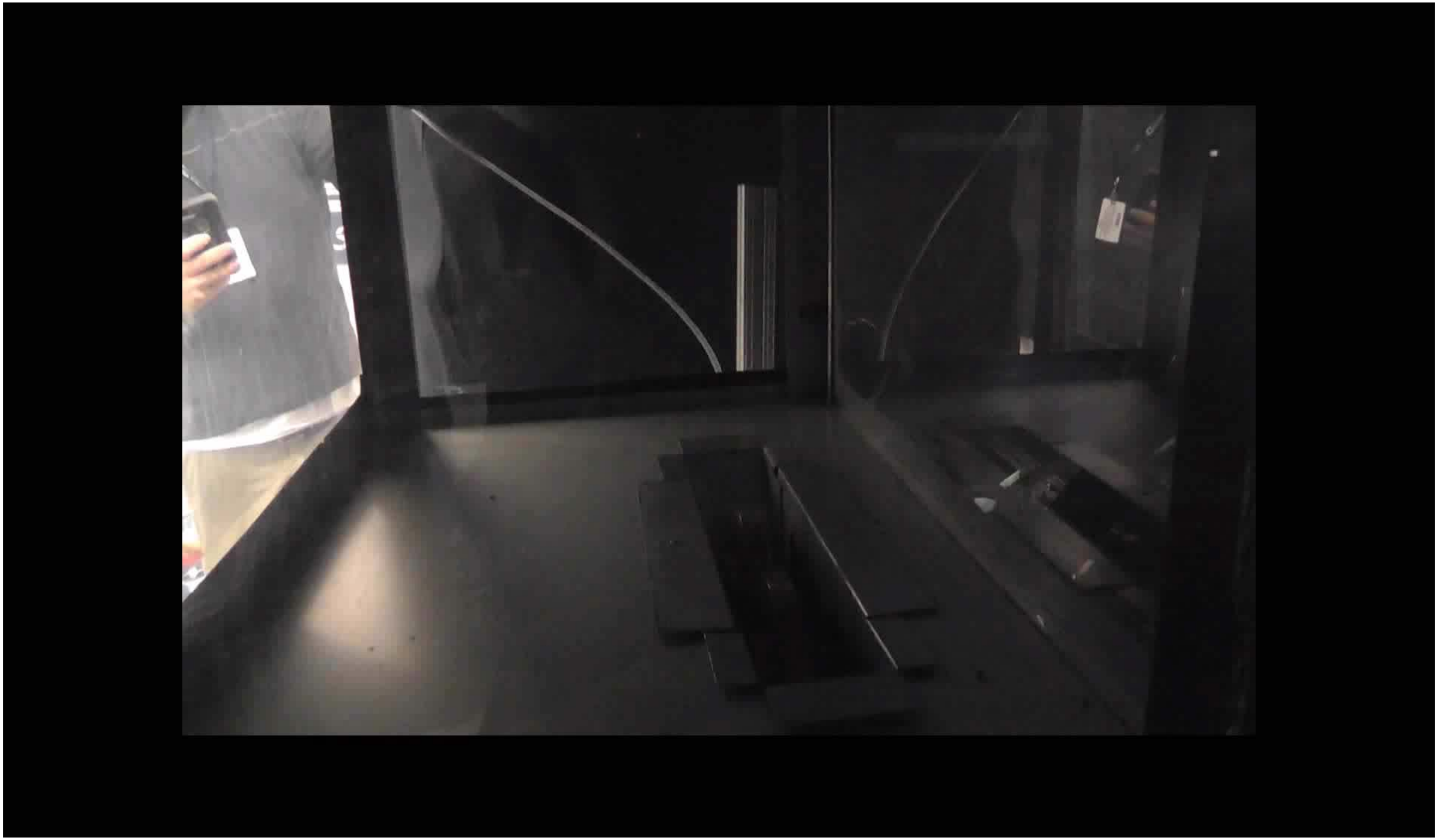
We are sequentially igniting H2O-based solid fuel pellets of one hundred thousandth of a liter volume that each releases millions of watts of power at billions of watts per liter power density from the conversion of hydrogen to hydrinos, a more stable form of hydrogen. The power is in the form of light that is being converted into electricity by solar cells. The fuel detonations are concealed by an opaque structural enclosure upon which the photovoltaics (solar cells) are mounted. The unscreened, non-converted flashes of power can be seen here.

Commercial SunCell Engineering



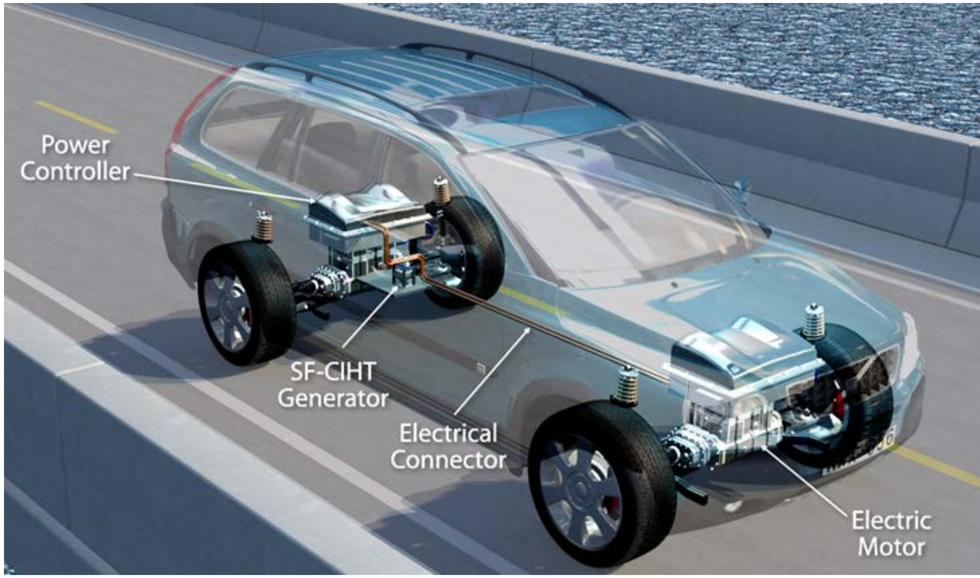


SunCell Plasma Chamber



SunCell Power System

- Over 1000 miles per liter of water.*
- Projected cost of less than $100 per kW electric.
- One third the weight of an internal combustion engine (ICE).
- Projected 200kW (267 HP) SunCell and electric drive system is less than that of a comparable combustion system.
- Has the potential of unsurpassed capability in terms of range, capital cost, power, logistics, and pollution abatement to zero including zero carbon dioxide emission.



Calculations: H_2O to $H_2(1/4) + 1/2O_2$ (50MJ/mole or 2.78 GJ/kg, 2.78 GJ/liter)

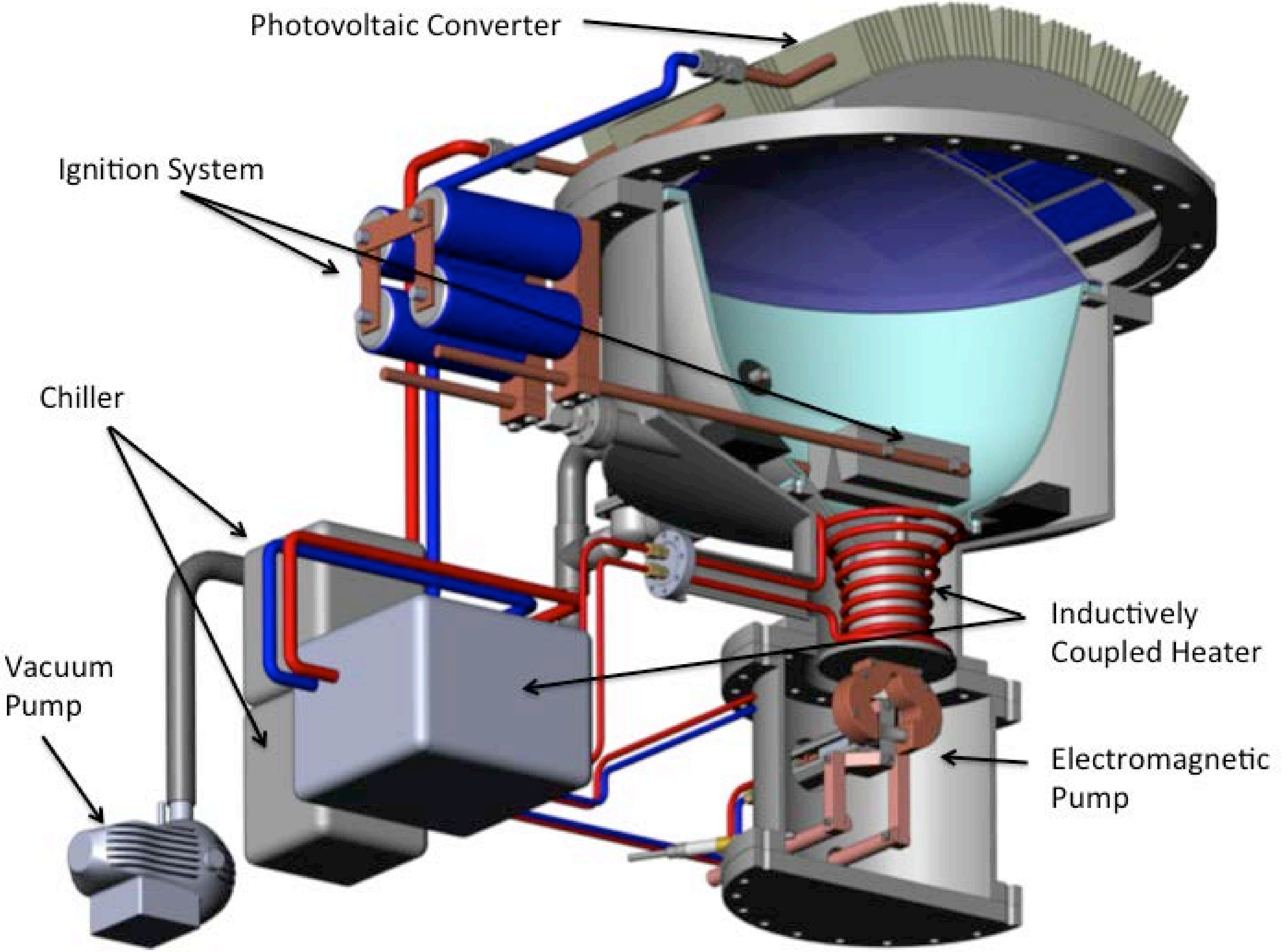
Model S energy consumption rate of 291 Wh/mile (http://www.teslamotors.com/goelectric#savings)

1 Whr = 3600 J

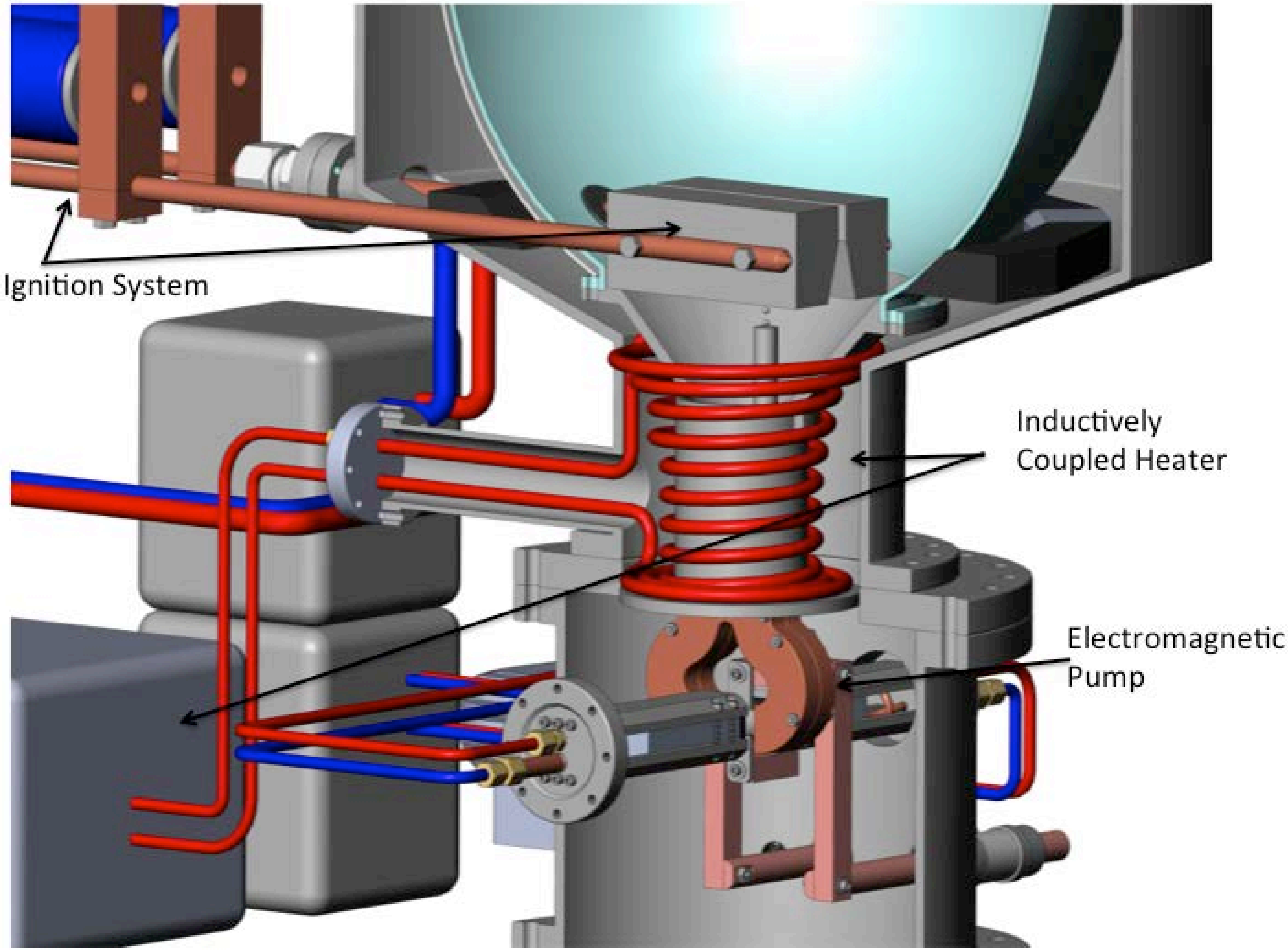
Model S energy consumption rate of 1 MJ/mile

2780 MJ/liter /(1 MJ/mile) X 0.4 (PV efficiency) = 1112 miles/liter

Commercial Prototype SunCell Engineerring



Photovoltaic Converter
Ignition System
Chiller
Vacuum Pump
Inductively Coupled Heater
Electromagnetic Pump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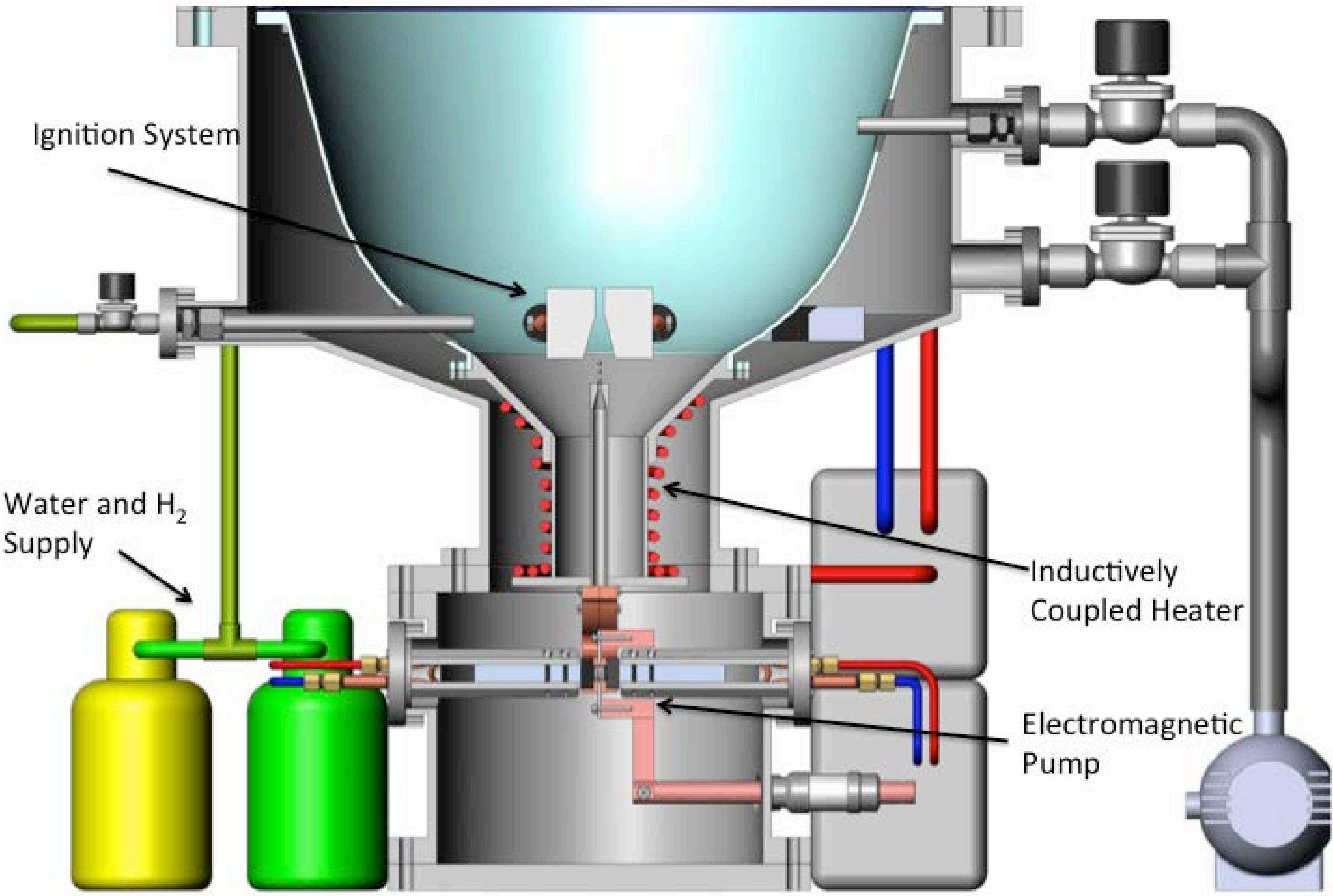
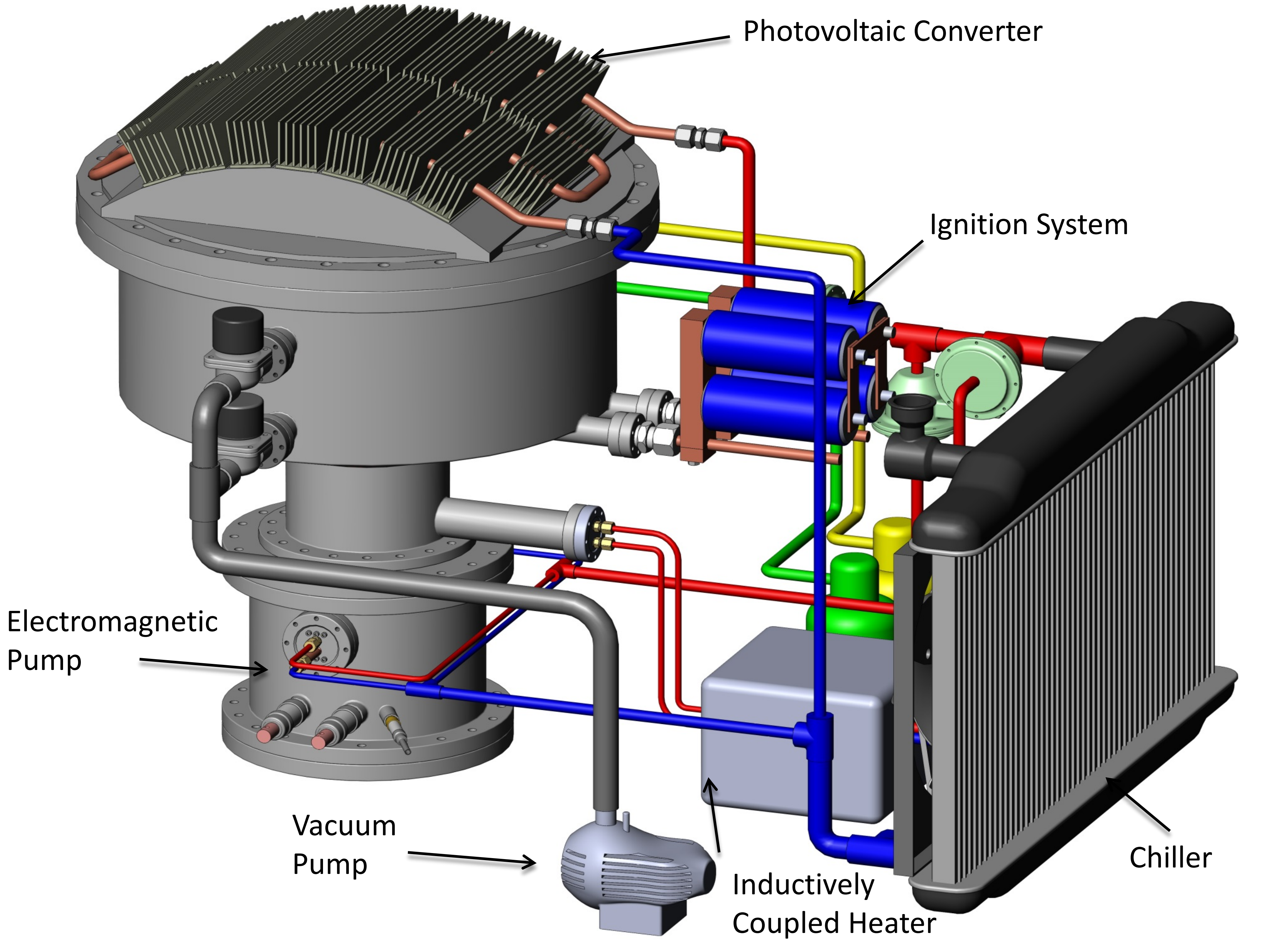
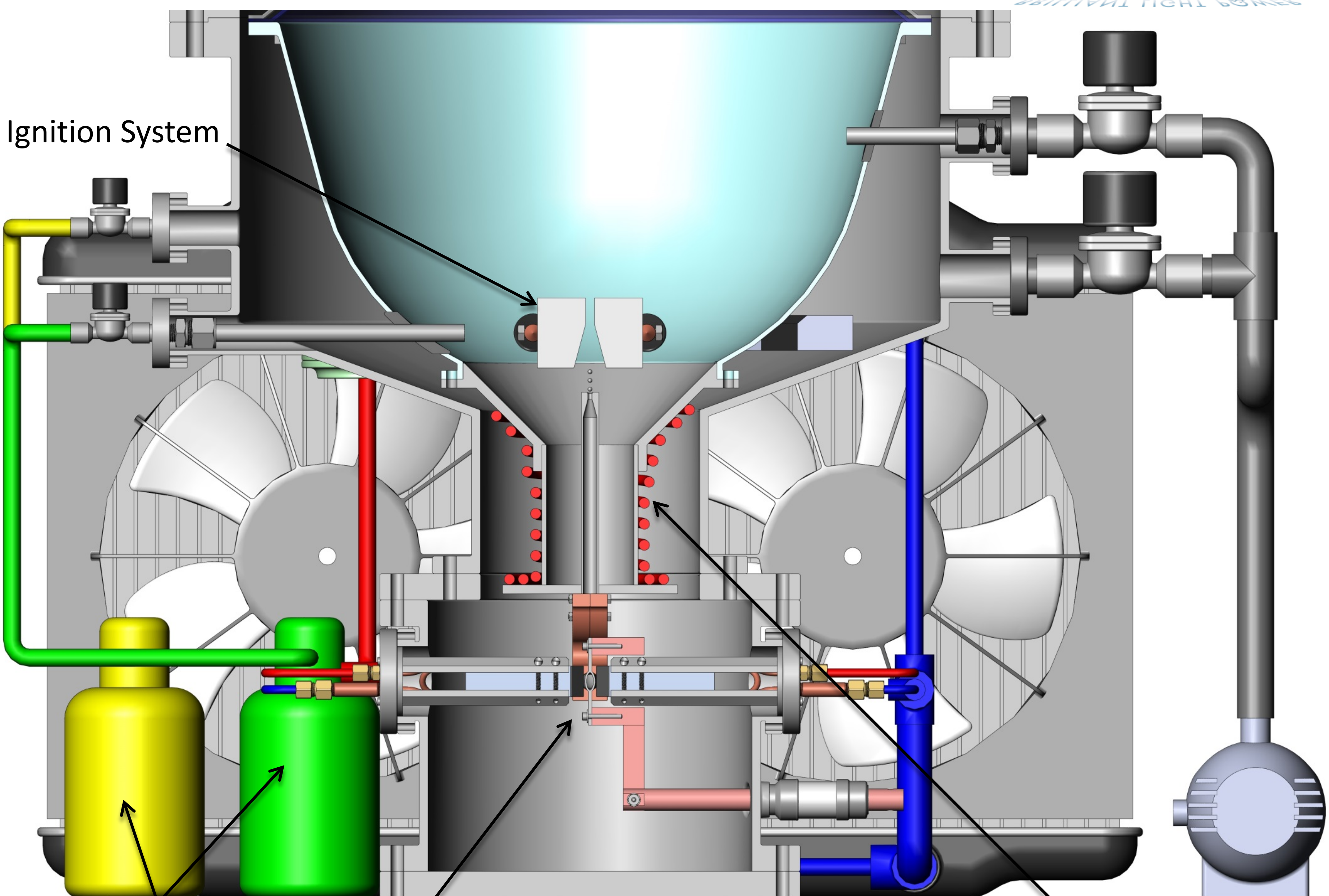
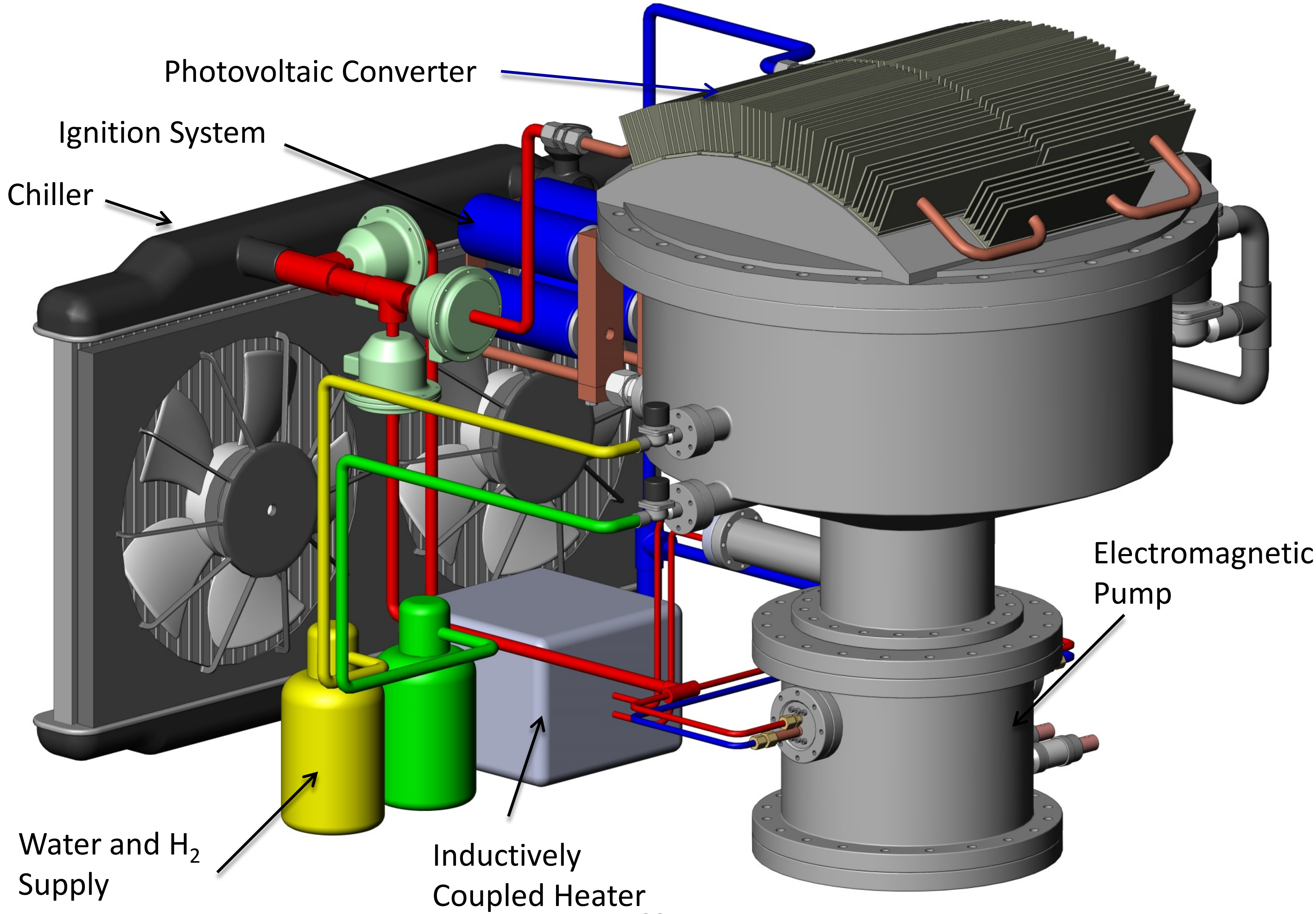
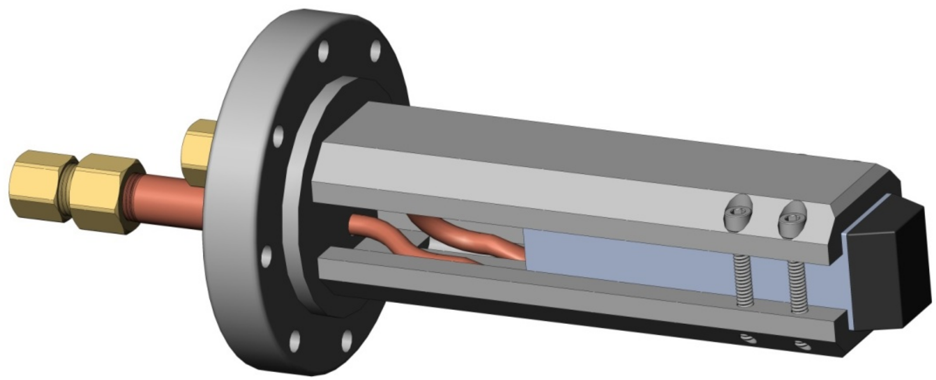

Ignition System
Water and H_2 Supply
Inductively Coupled Heater
Electromagnetic Pump

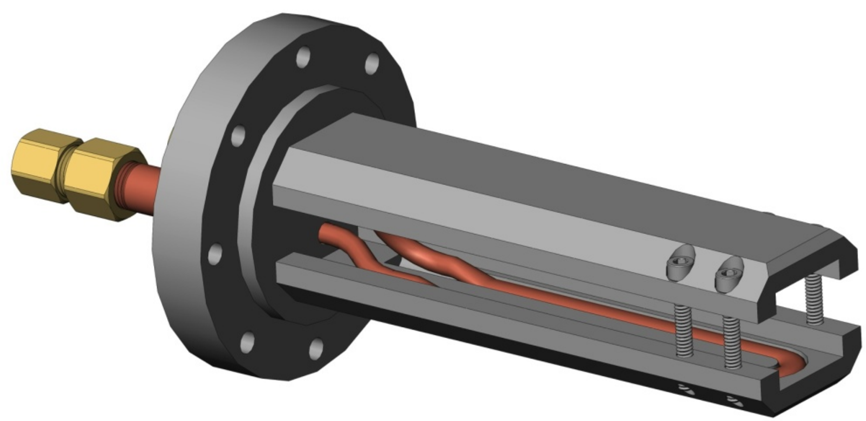

Photovoltaic Converter
Ignition System
Electromagnetic Pump
Vacuum Pump
Inductively Coupled Heater
Chiller


Ignition System
Water and H_2 Supply
Electromagnetic Pump
Inductively Coupled



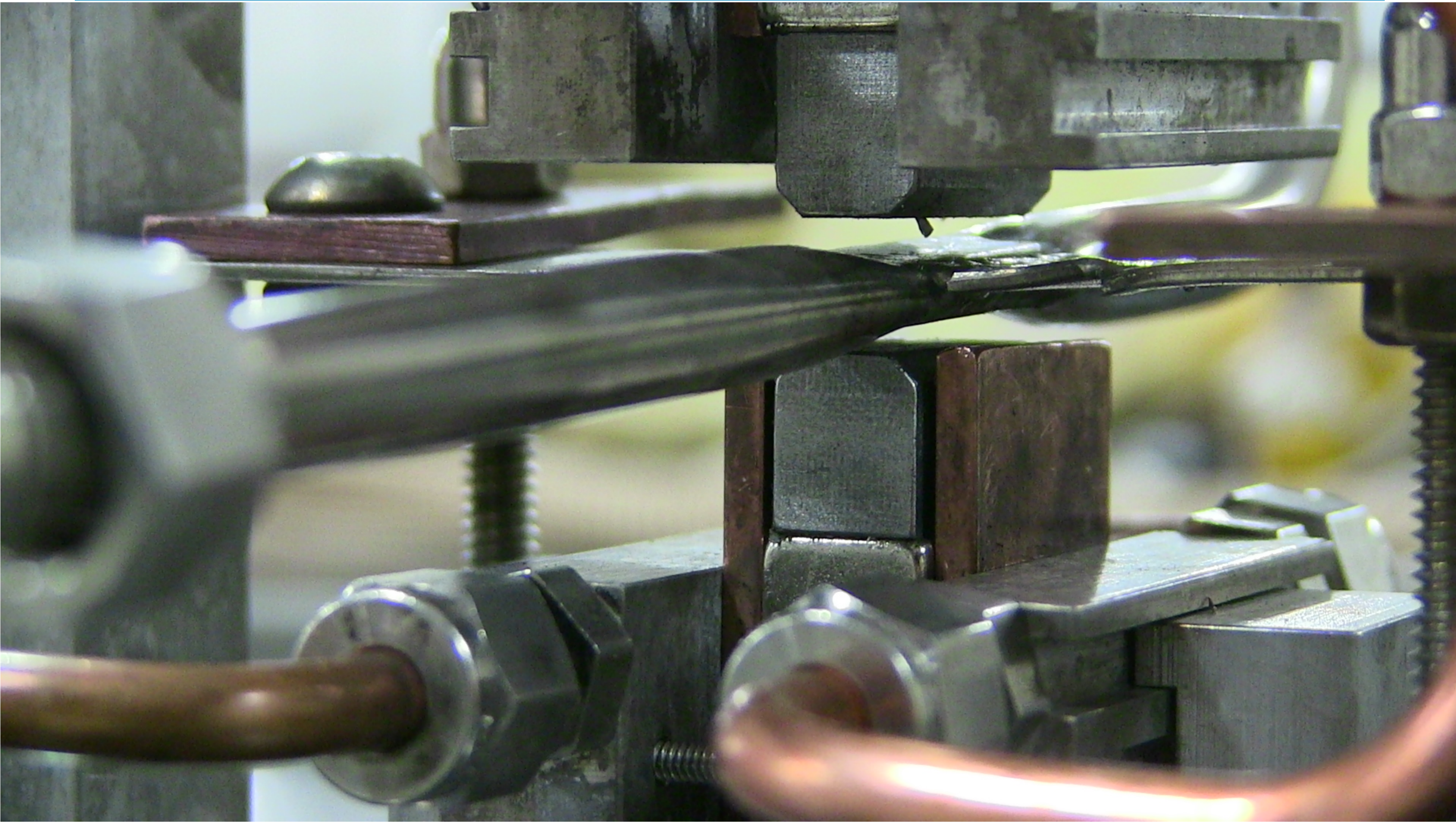
Photovoltaic Converter
Ignition System
Chiller
Electromagnetic Pump
Water and H_2 Supply
Inductively Coupled Heater

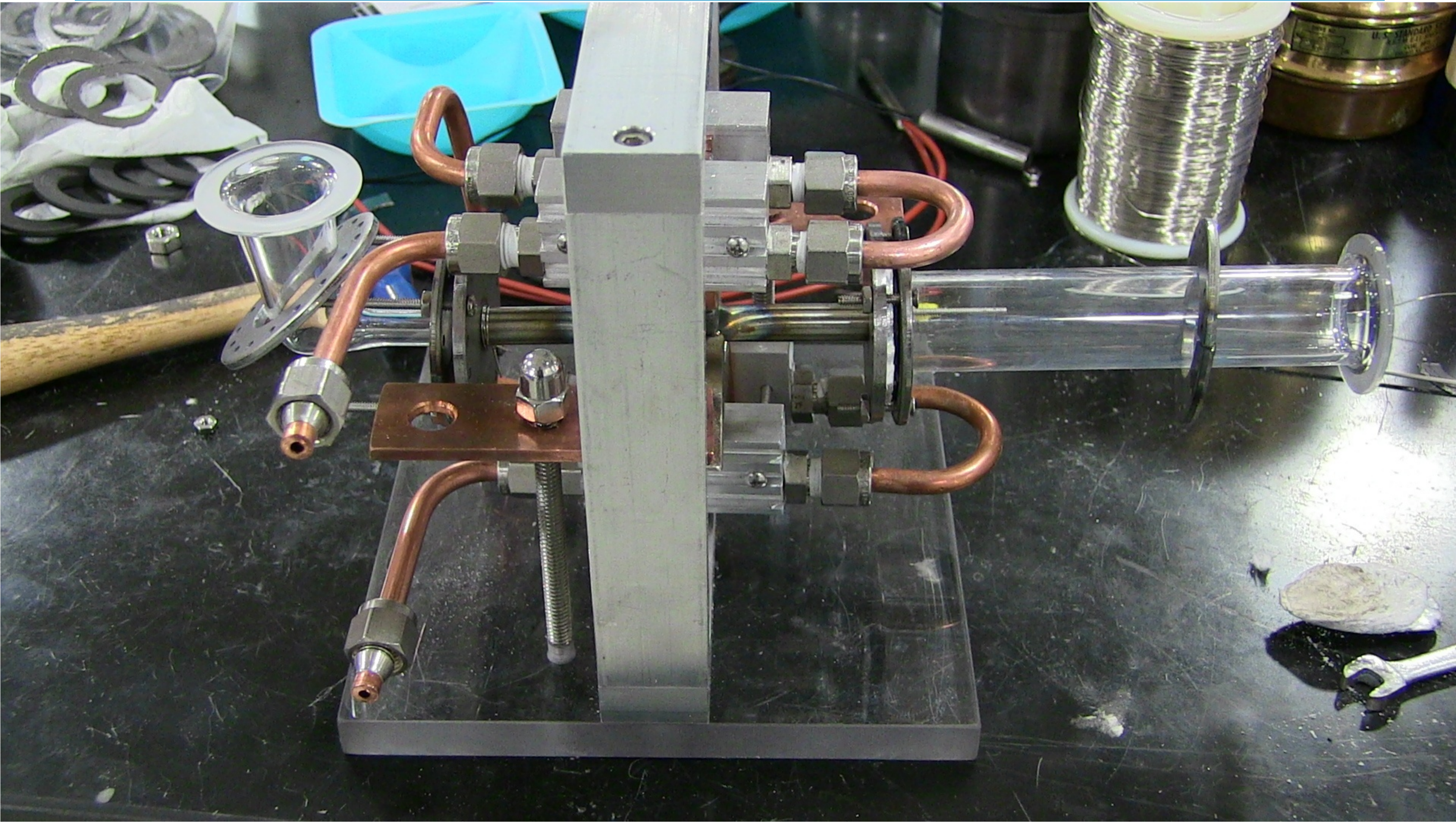


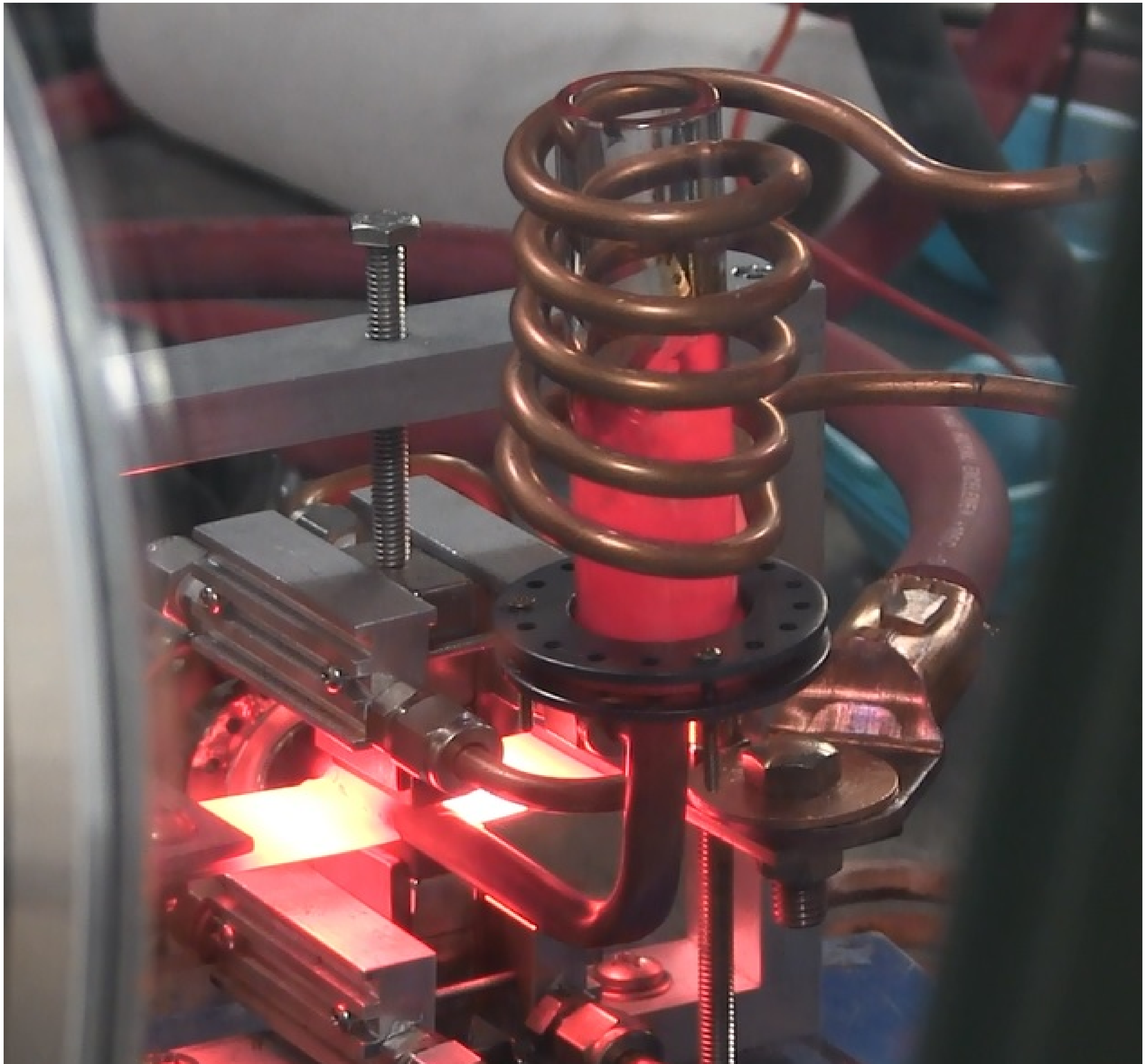


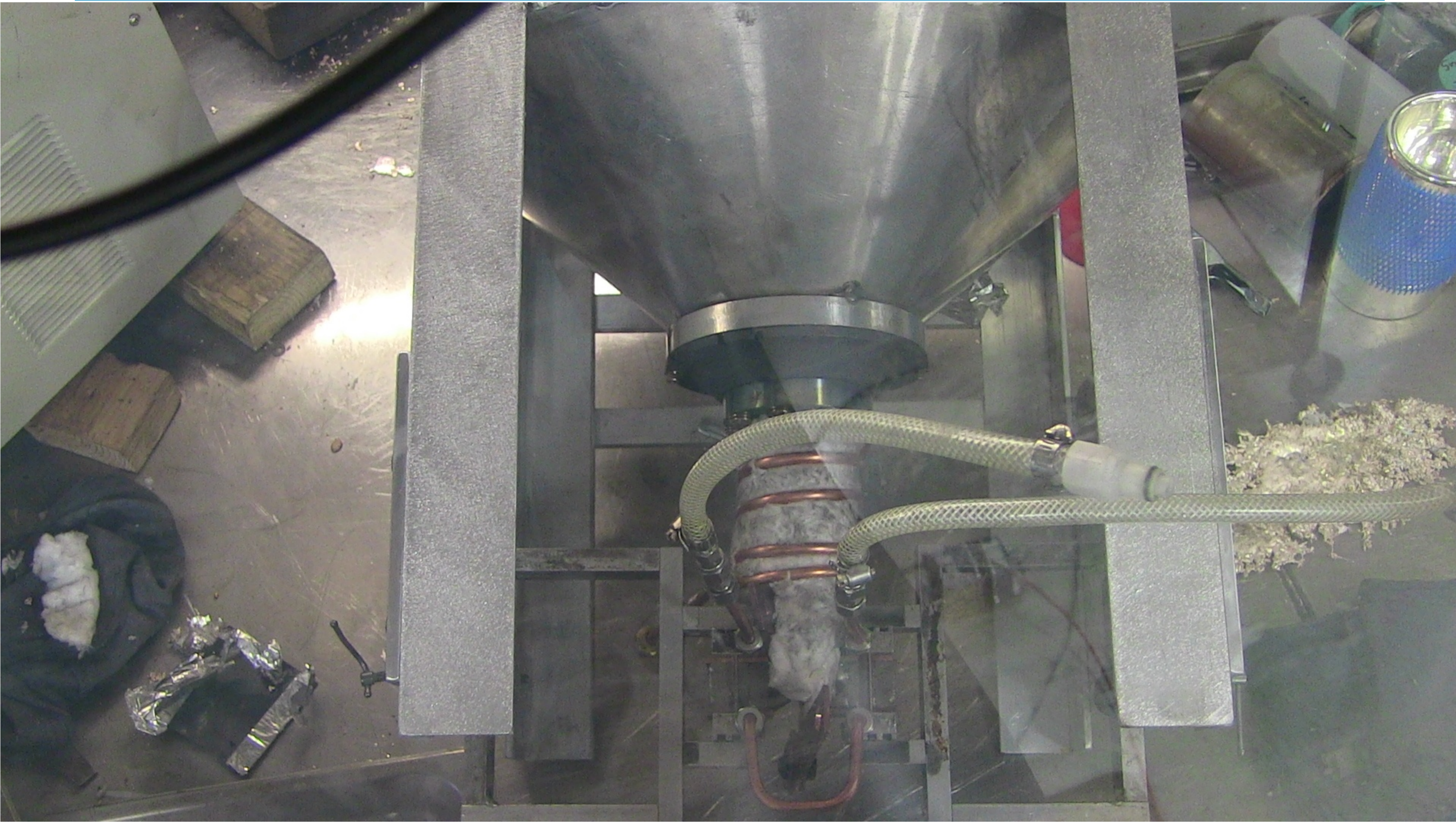
Electromagnetic Pump

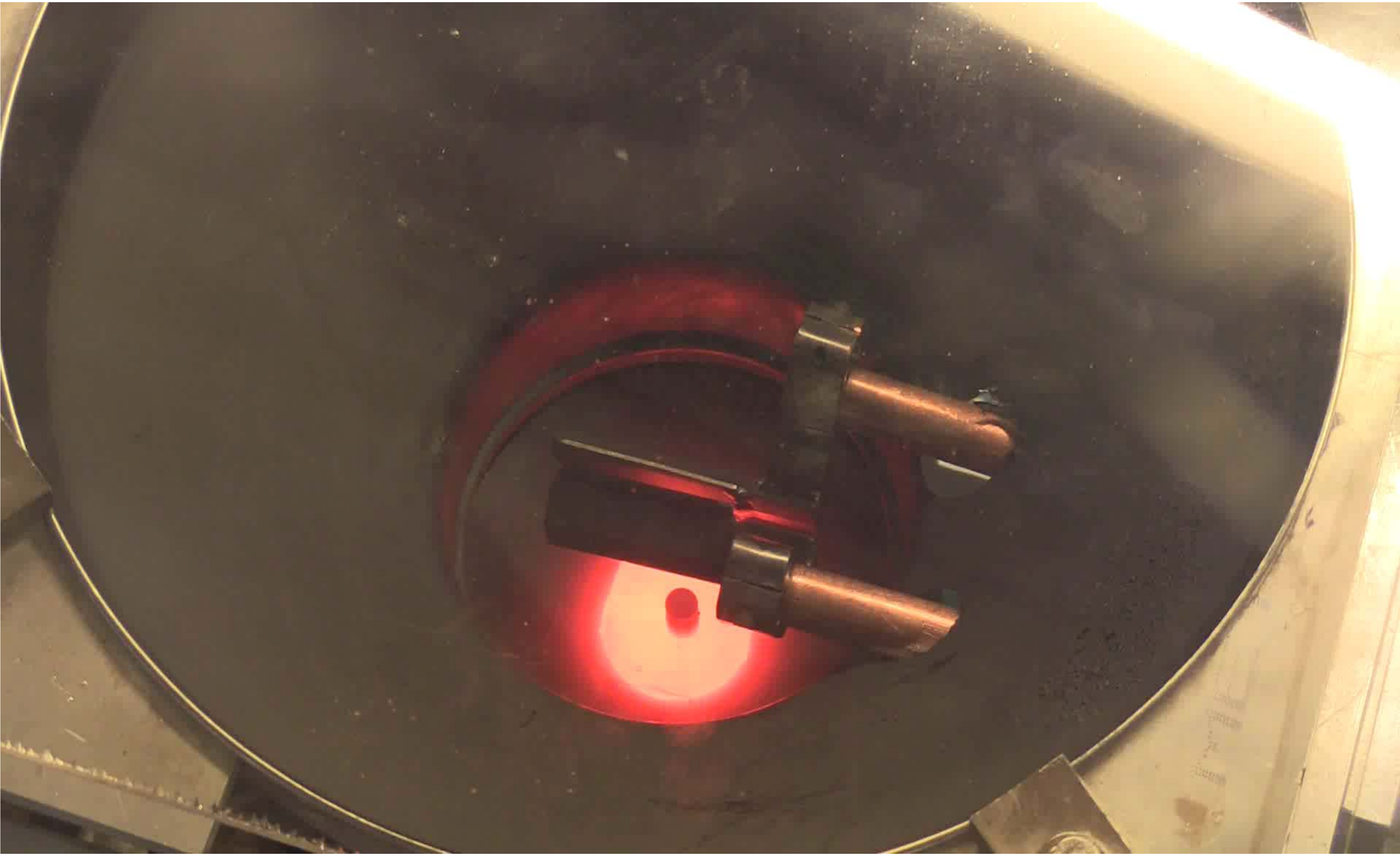
SunCell





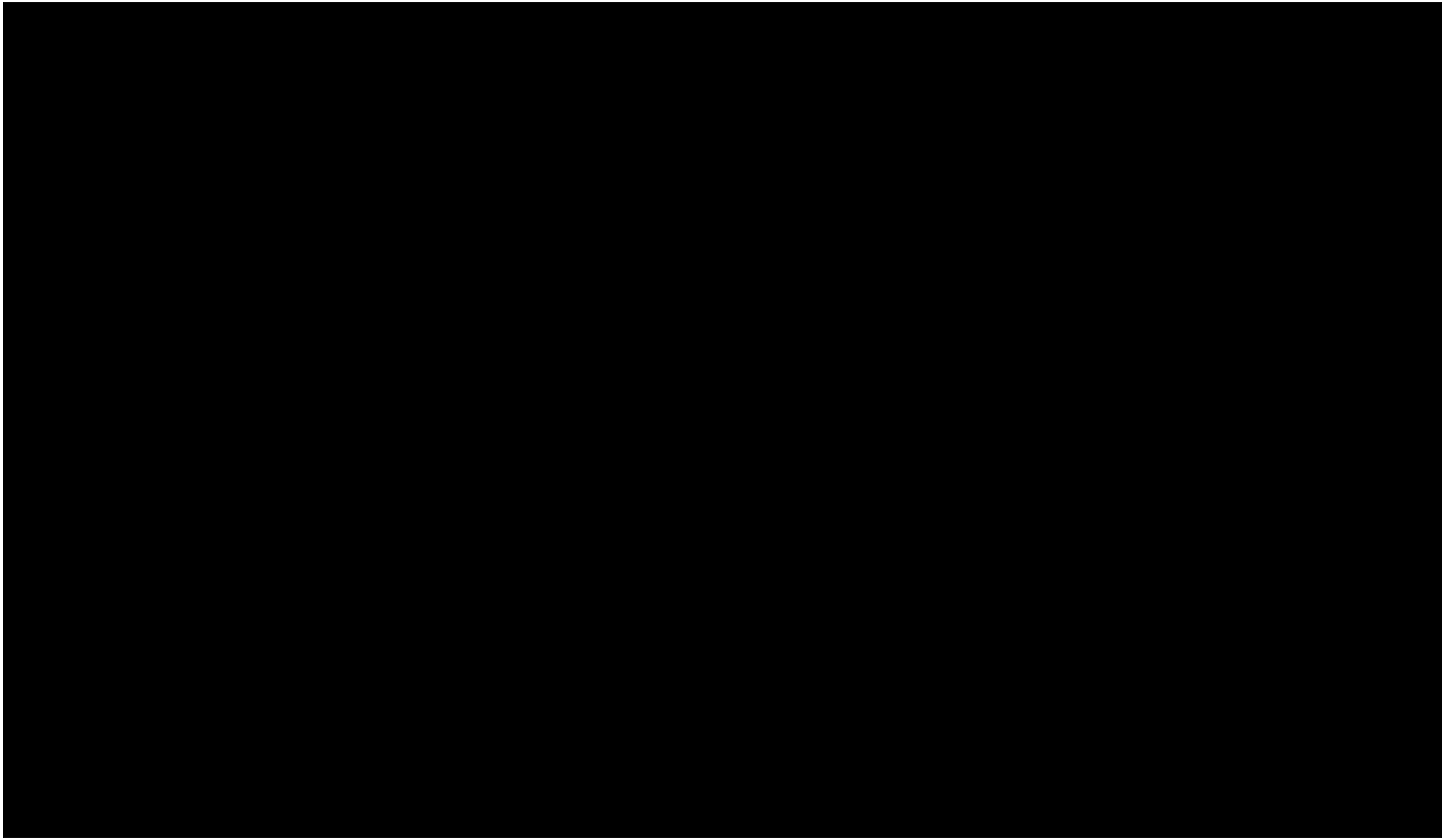




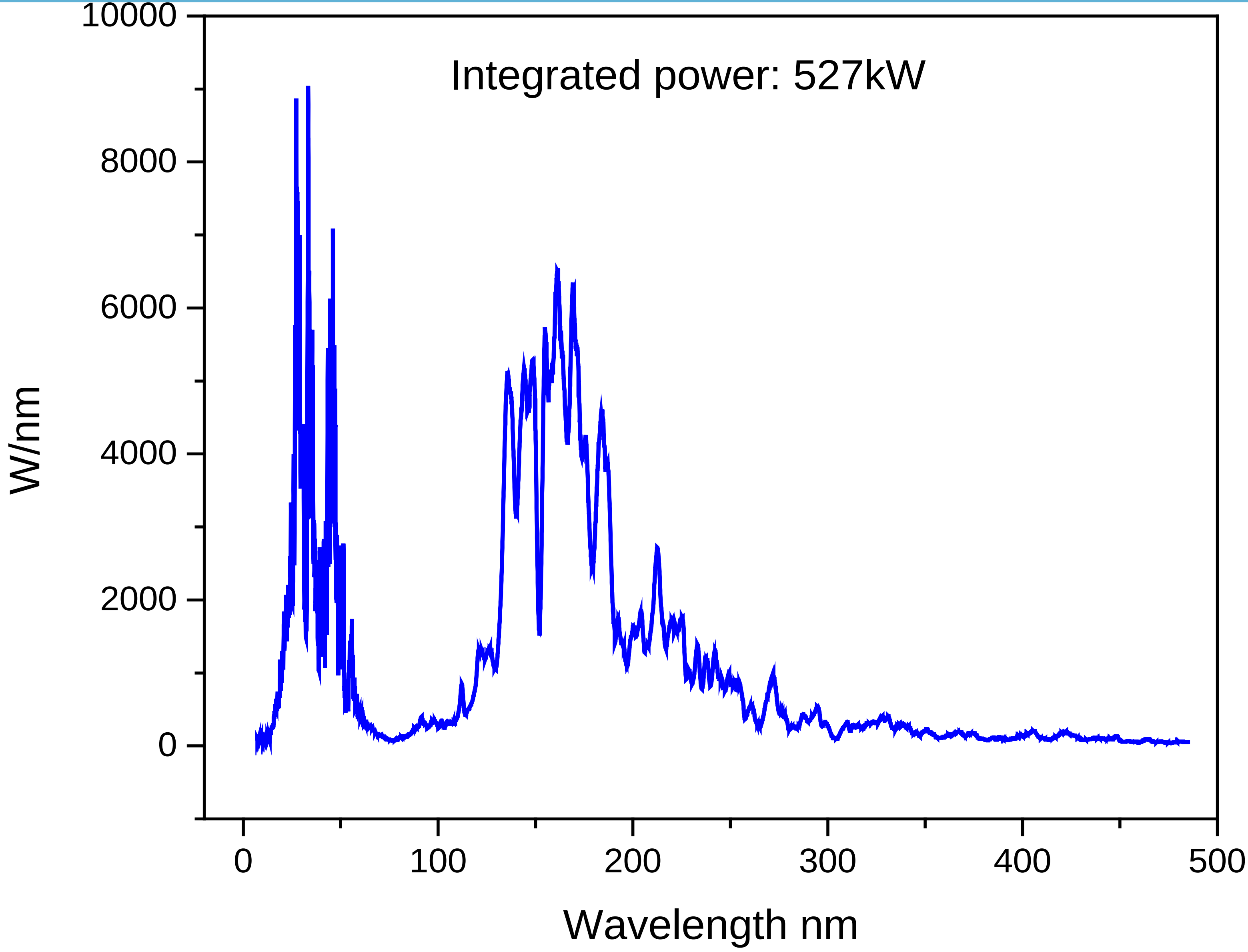


Continuous EUV and UV Emission with EM Pump Injection

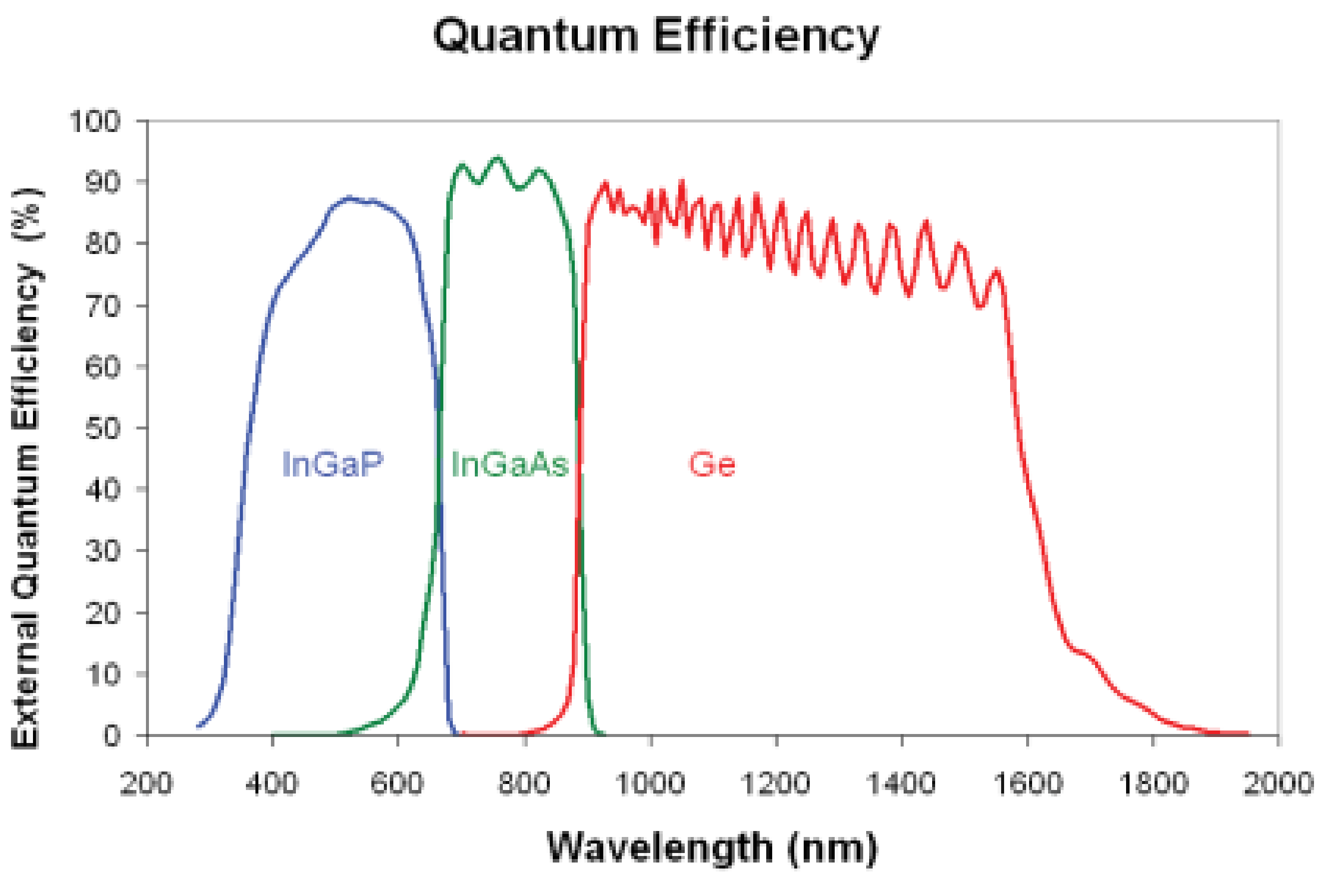
Continuous EUV and UV Emission with EM Pump Injection



Spectral Emission in the High Energy Region Only



Wavelength Region Selectivity of PV Cell Types

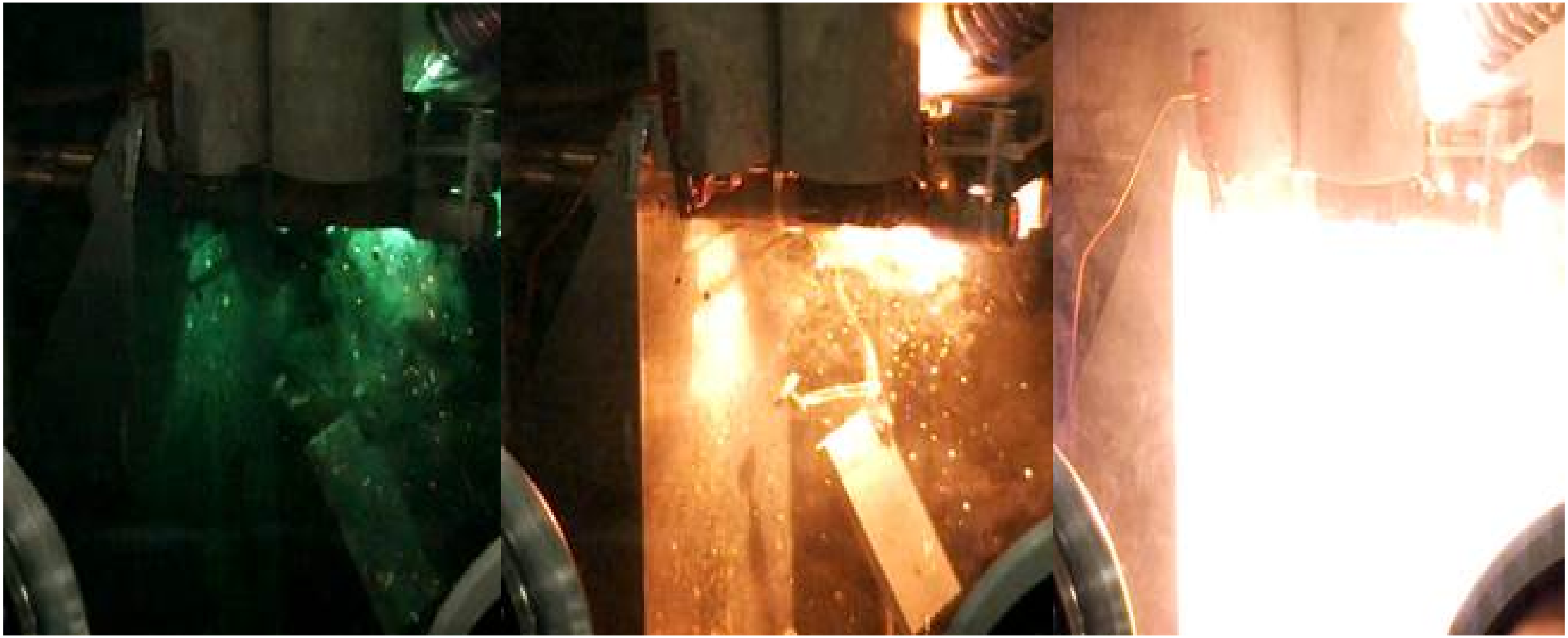


Transition from EUV and UV Mode to Blackbody Mode

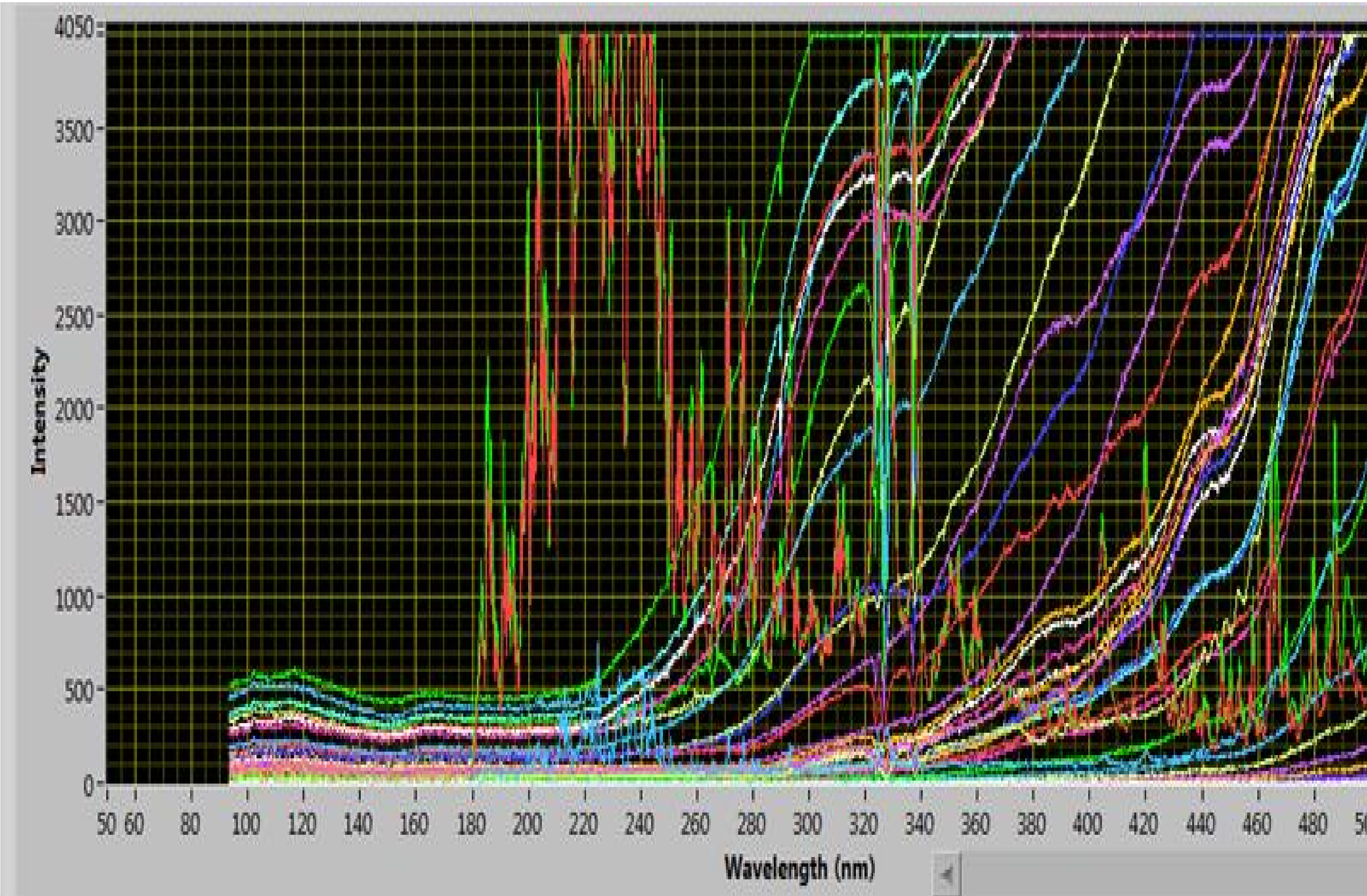
SunCell

EUV and UV to 5000K Blackbody Mode with Gravity Injection

BRILLIANT LIGHT POWER



Time Sequence of the Transition of the Spectral Emission from Short Wavelength Line Emission to 5000K Blackbody Emission



Continuous 5000K Blackbody Emission
Gravity Injection

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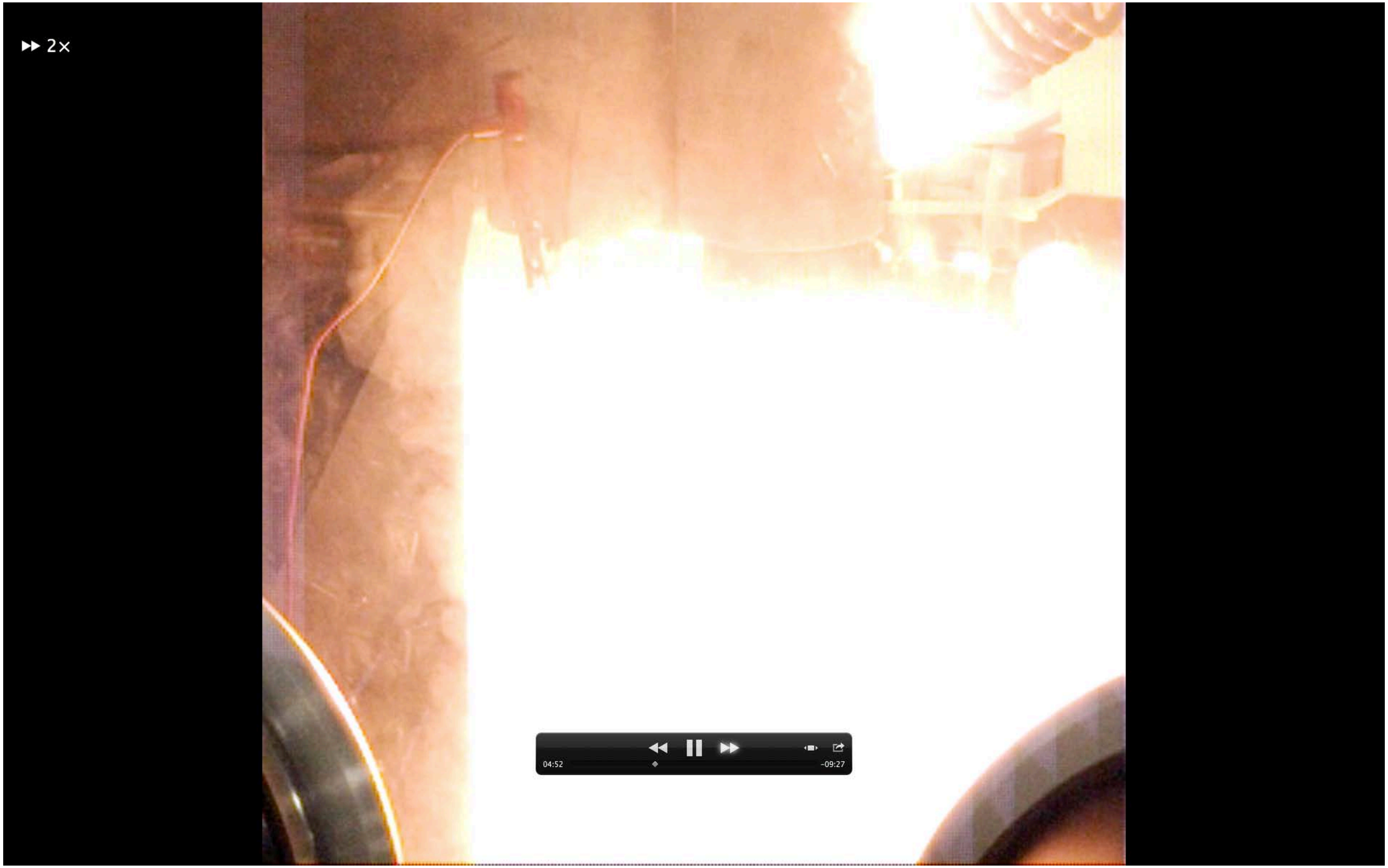
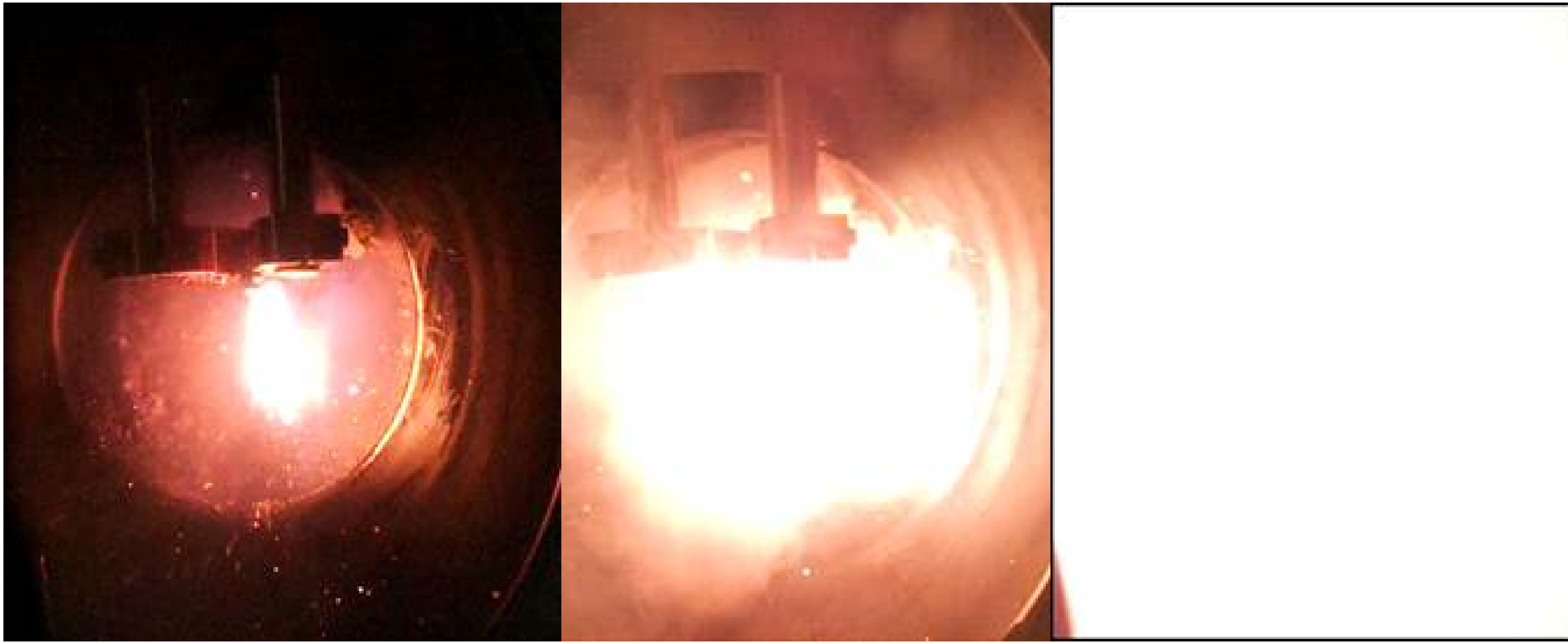
5000K Blackbody Mode



EUV and UV to 5000K Blackbody Mode with EM Pump Injection



Transition of the Spectral Emission from Short Wavelength Line Emission to 5000K Blackbody Emission

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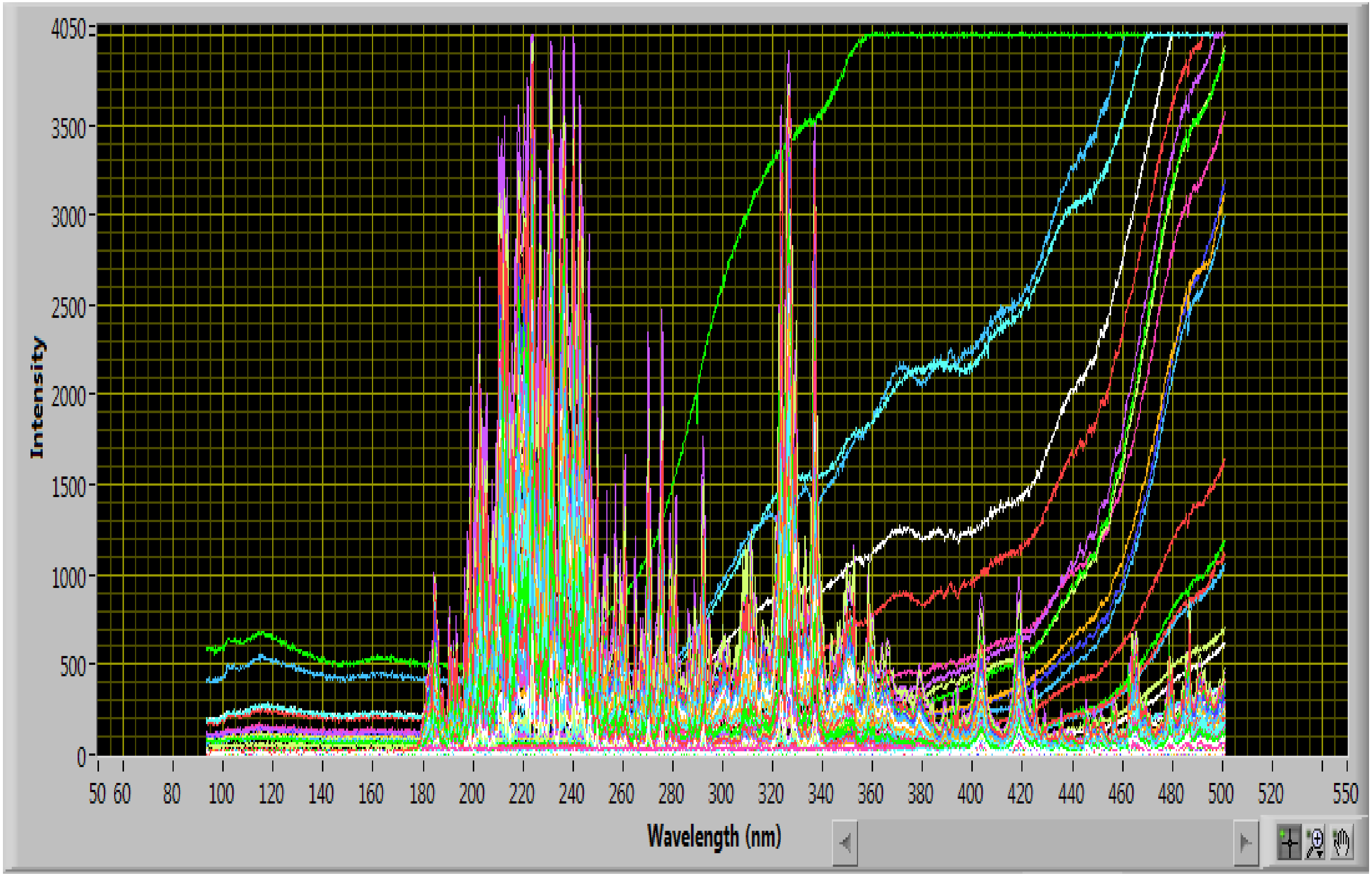
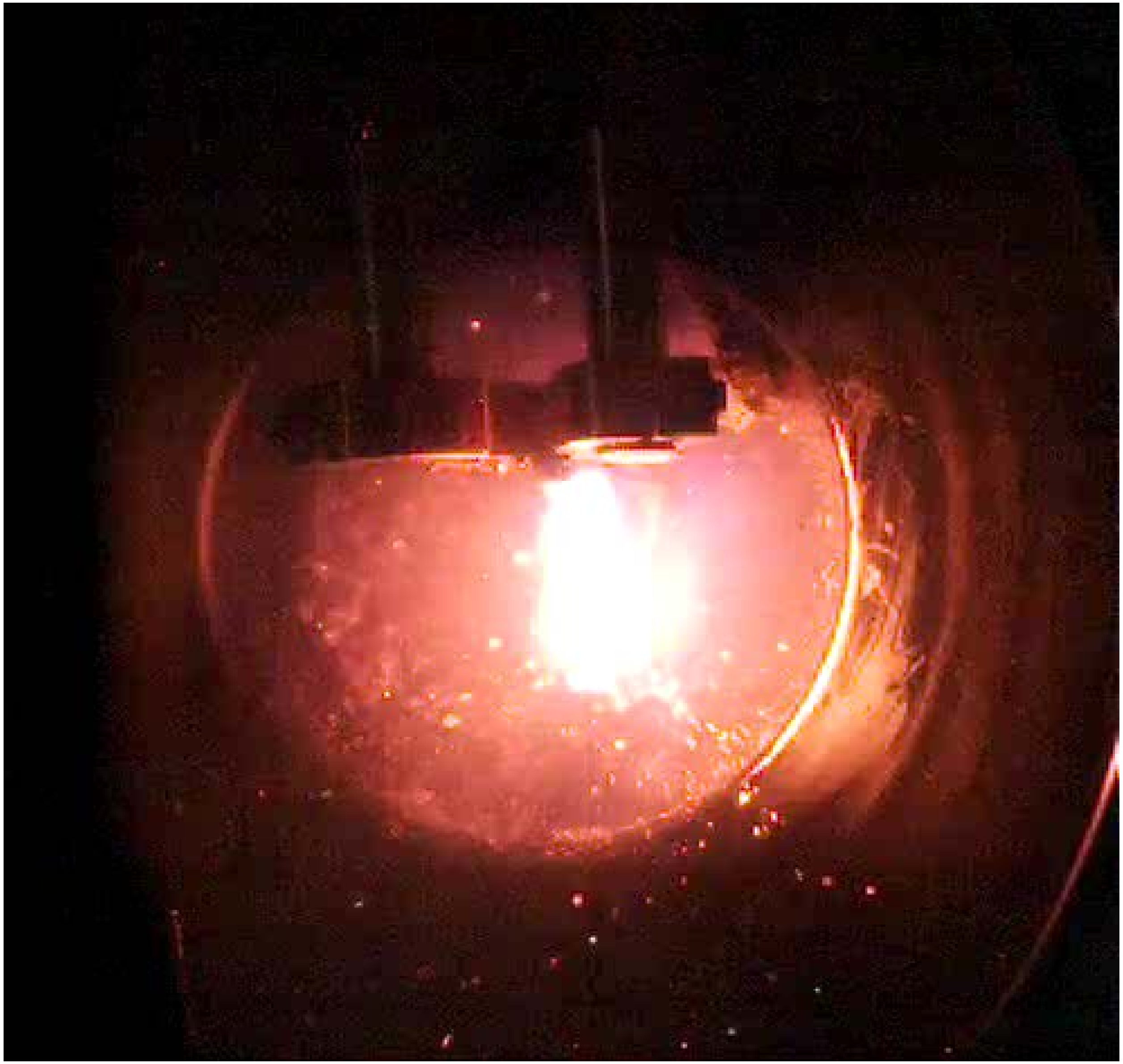
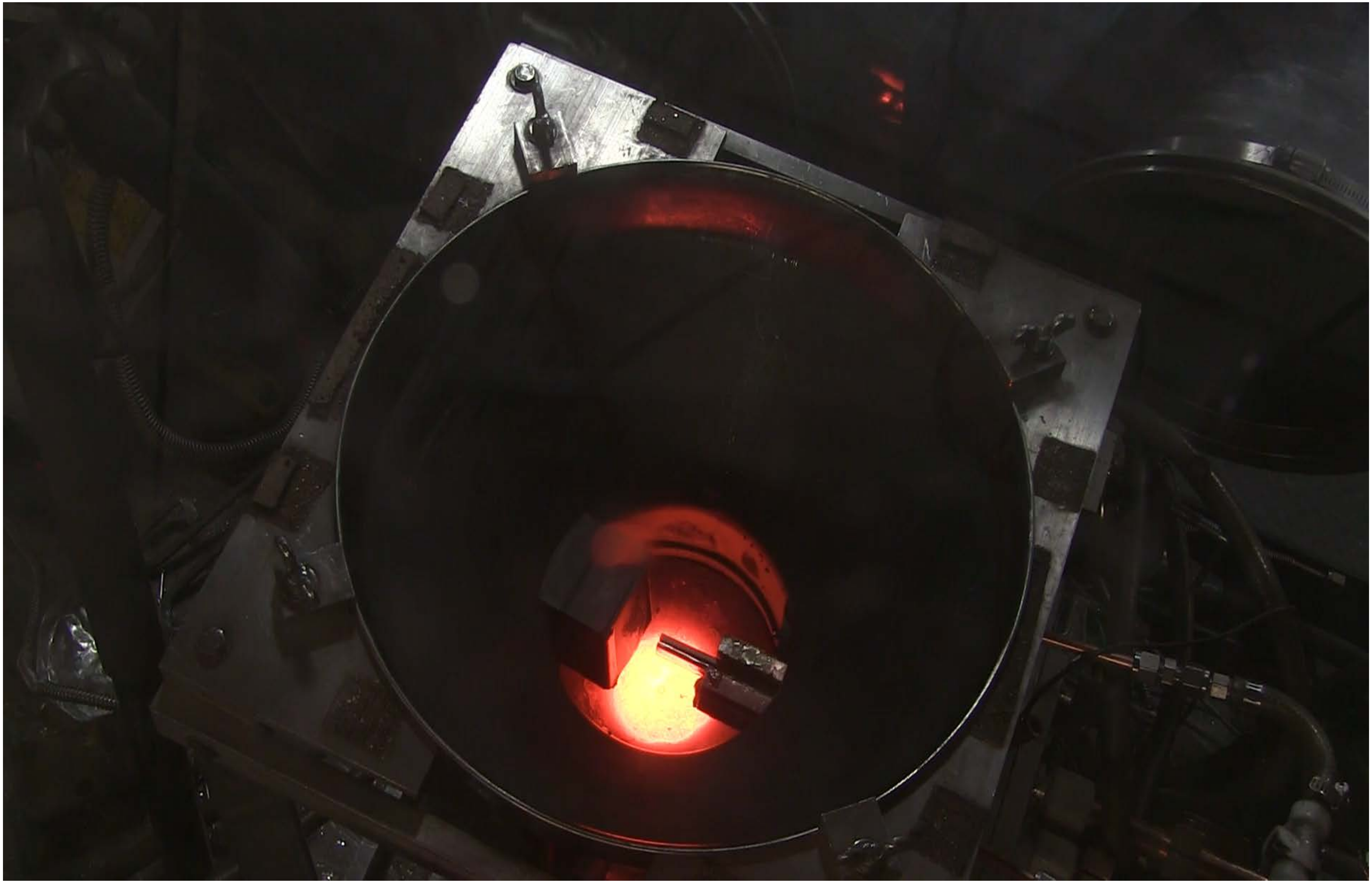


High-Speed Video Continuous 5000K Blackbody Emission with EM Pump Injection



Continuous 5000K Blackbody Emission with EM Pump Injection



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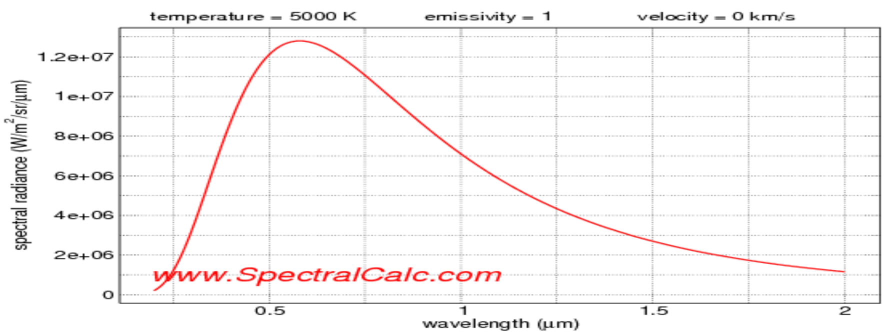
Spectral Calc.com
High-resolution spectral modeling

Blackbody Calculator

Inputs		Results	
Units:	K	Radiant emittance:	3.54408e+07 W/m^2
Watts		Radiance:	1.12811e+07 W/m^2/sr
Wavelength (µm)	km/s	Peak spectral radiance:	1.27994e+07 W/m^2/sr/µm
Kelvin		Wavelength of peak:	0.579551 µm
Blackbody Properties:			
Temperature:	5000		
Emissivity:	1		
Recession Velocity:	0		
Wavelength	0 µm	Spectral Radiance:	0 W/m^2/sr/µm (0 photons/J)
Lower Limit	0.2 µm	Band Radiance:	1.03091e+07 W/m^2/sr
Upper Limit	2 µm		

Calculate Help



Text File

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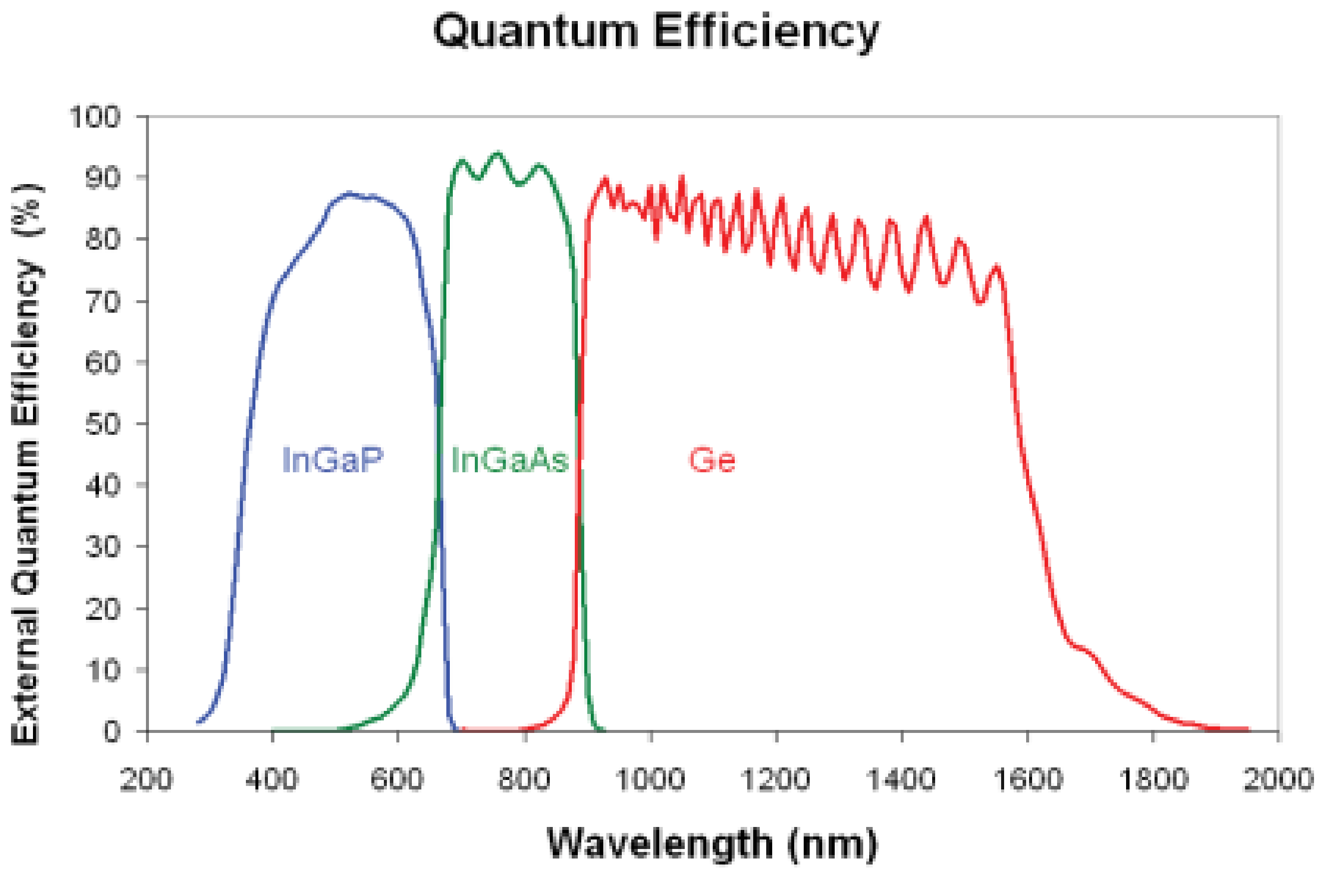
Wavelength Region Selectivity of PV Cell Types



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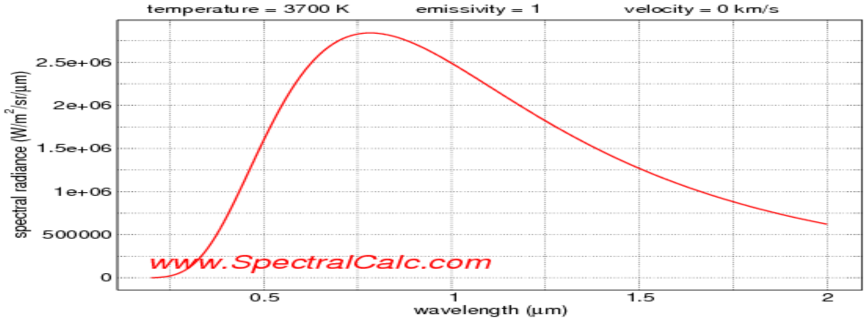
Blackbody Calculator

Inputs		Results	
Units: Watts; Wavelength (µm); Kelvin	K, km/s	Radiant emittance:	1.06275e+07 W/m^2
		Radiance:	3.38283e+06 W/m^2/sr
Blackbody Properties:		Peak spectral radiance:	2.8402e+06 W/m^2/sr/µm
Temperature:	3700	Wavelength of peak:	0.783176 µm
Emissivity:	1		
Recession Velocity:	0		
Wavelength	10 µm	Spectral Radiance:	2505.92 W/m^2/sr/µm (5.03412e+19 photons/J)
Lower Limit	0.2 µm	Band Radiance:	2.80602e+06 W/m^2/sr
Upper Limit	2 µm		

Calculate Help



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Triple Junction CPV Cell

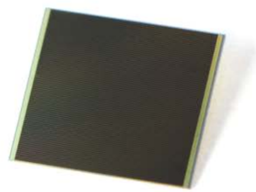
BRILLIANT LIGHT POWER

DRAFT - NOT FOR RELEASE

Solar Junction

DATA SHEET
SJ3 CPV CELL

SOLAR JUNCTION High Performance CPV Cells with 42.0% Mean Production Efficiency provide the highest efficiency solution for CPV systems. Solar Junction's single crystal structure, made with our proprietary material technology, ensures reliable superior performance throughout the lifetime of the CPV system. Specific system needs can be addressed on request through custom modifications designed by Solar Junction's in-house engineering and manufacturing teams.



FEATURES AND CHARACTERISTICS

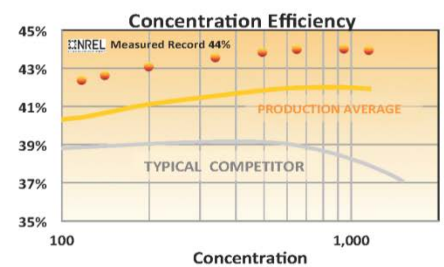
- Sustained efficiency at very high concentrations
- Fully lattice matched single crystal structure for reliable operation
- Silver metallization with gold finish front and back contacts
- Anti-reflective coating (ARC) matched to glass
- Rapid custom design available to meet your needs - all engineering in-house
- 100% flash testing available

SJ3-55 AVERAGE VALUES

100W/cm², 25° C, ASTM G173-03
AM1.5D DNI + Circumsolar Spectrum

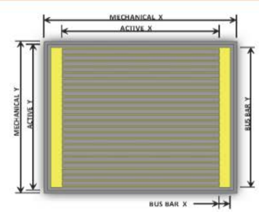
Parameter	Typical Value
Eff.	42.0 %
Eff. Sigma	0.5%
P_{max}	13.1 W
I_{SC}	4.35 A
V_{OC}	3.50V
FF	86 %

Parameter	Thermal Coefficient
Eff.	-0.055% abs./°C
V_{OC}	-4.5mV/°C



FORM FACTORS

Standard Prod. Type	Aperture (mm)	Active Area (mm²)	Mechanical (mm)	Busbar (mm)
SJ3-55	5.5 x 5.5	30.25	6.17 x 5.62	0.25 x 5.46
Other sizes available on request				



Solar Junction Corporation
401 Charcot Avenue, San Jose CA 95131 www.sj-solar.com TEL: 1.408.503.7000

Rev: Oct. 2012

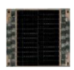
Triple Junction CPV Dense Array

AZURSPACE
SOLAR POWER GMBH

Advanced Dense Array Module (ADAM)
Product Type: Concentrator Triple Junction Solar Cell Module – 3C30M
Application: Concentrating Photovoltaic (CPV) Sytem for Dish Application

General

AZUR SPACE's **A**dvanced **D**ense **A**rray **M**odule (ADAM) is intended to be used in HCPV receivers with reflective optics, e.q. parabolic mirrors. It consists of a two-dimensional array of high efficiency solar cells mounted on a cooling element. Electrical protection of solar cells against reverse voltage is provided by bypass diodes. The solar cells and diodes within ADAM are completely interconnected and only electrical connection to the external circuitry and connection to cooling system shall be provided by system integrator. For requested thermal management of the module, an active liquid cooling system is necessary. The ADAM module has to be protected against all environmental influences (e.q. water, humidity, dust, pollution, etc.).



Design and Mechanical Data

Base Solar Cell Material	GaInP/GaAs/Ge on Ge substrate
Base Cooler Material	Copper and AIN Ceramic
AR Coating Solar Cell	TiO_x/Al_2O_x
Module Size	17,8 cm x 12,7 cm
Module Active Area	11,77 cm x 12,1 cm = 142,417 cm²
Cooler Thickness without fittings	ca. 0,9 cm
Cooler Thickness with fittings	ca. 2,9 cm
Total module thickness	ca. 3,4 cm
Electrical plus contact	suitable for clamp process
Electrical minus contact	suitable for clamp process

Typical Electrical Data

(Measurement condition: 1.5 AMd – 1000 W/m² (ASTM G 173-03), T = 25° C)

Sun concentration	I_{SC} [A]	V_{OC} [V]	I_{MPP} [A]	V_{MPP} [V]	P_{MPP} [kW_{MPP}]	FF [%]	η [%]
x 700	53	76	50	64	3,20	79,5	32,0

Values are valid for homogeneous illumination only!

Bypass diode protection is provided for each segment.
Inhomogeneous illumination, a lower light intensity or higher temperatures will reduce the power output.

Typical Temperature Coefficients of Solar Cell (@ 500 suns)

Temperature range (25 – 80°C)

Parameter	$(\Delta I_{sc} / I_{sc(25°C)}) / \Delta T$	$(\Delta V_{oc} / V_{oc(25°C)}) / \Delta T$	$(\Delta P_{mpp} / P_{mpp(25°C)}) / \Delta T$
value	0,074 %/°K	- 0,137 %/°K	- 0,106 %/°K

3C30M

Triple Junction CPV Dense Array Cont'd

AZURSPACE SOLAR POWER GMBH

Recommended Cooling Unit

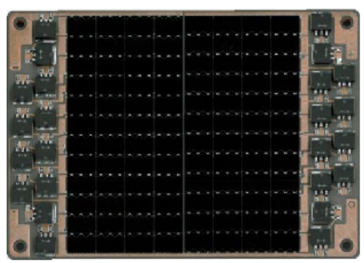
Wafer connection:	2 inlet and 2 outlet fittings on the rear side
Wafer flow rate:	14 – 18 l/min
Pressure drop:	0,3 bar @ 15 l/min
Max. water inlet temperature:	60° C
Max. system peak preassure:	3 bar

Failure of cooling unit or interruption of cooling flow has to be avoided; otherwise damage will result within seconds.

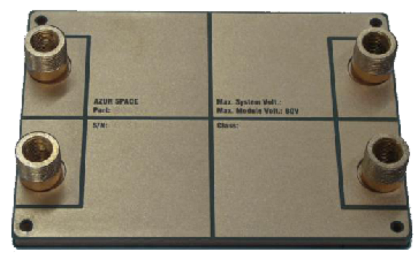
Thermal Power Output

At 700 sun concentration approximately ~ 6 kW

Picture of Front Side



Picture of Rear Side



Water Inlets Water Outlets

Order information

ADAM fittings	picture	SAP-Material number for order
with thread connector outer thread: M20 inner thread: G 1/4 height: 2 cm		80563
with hose connector (20 mm outer tube diameter)		80420

3C30M

GaAs Solar Cells

ALTADEVICES

TECHNOLOGY BRIEF
Single Solar Cell

Alta Devices produces the highest performance single junction solar cells available on the market.

- The gallium arsenide based cells are thin, flexible, and lightweight, enabling a broad range of mobile power applications
- World-record cell and module efficiencies
- Low temperature coefficients and high sensitivity to low light generate unsurpassed real world performance

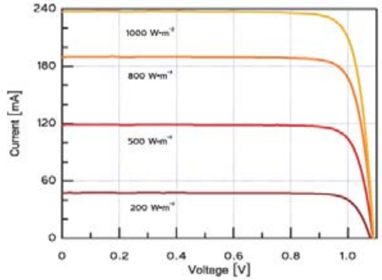
Mechanical Data and Design

Format	[mm]	50 x 19.6 ± 0.5
Thickness	[µm]	110 ± 10
Weight	[mg]	180
Front	[-]	1.0 mm bus bar, AR coating
Back	[+]	Polymer carrier film, vias for electrical contact

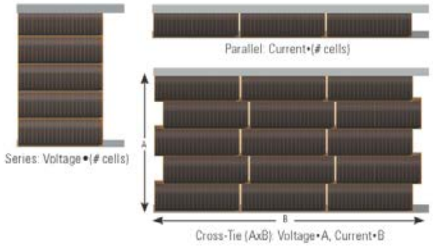
Temperature Coefficients

Voltage	[%/ °C]	-0.187
Current	[%/ °C]	+0.084
Power	[%/ °C]	-0.095

Electrical Performance



Architecture Options



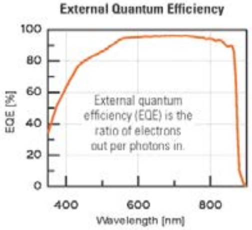
Electrical Specifications

Performance at STC of a 24.2% efficient cell

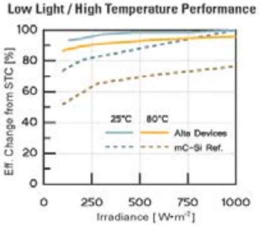
Eff.	[%]	24.2 (shingle area)
Eff.	[%]	26.0 (active area)
P_{mp}	[mW]	220
V_{mp}	[V]	0.96
I_{mp}	[mA]	230
FF	[%]	84.2
V_{oc}	[V]	1.09
I_{sc}	[mA]	239

Standard Testing Conditions [STC]: 1000W•m⁻², AM1.5, 25°C

External Quantum Efficiency



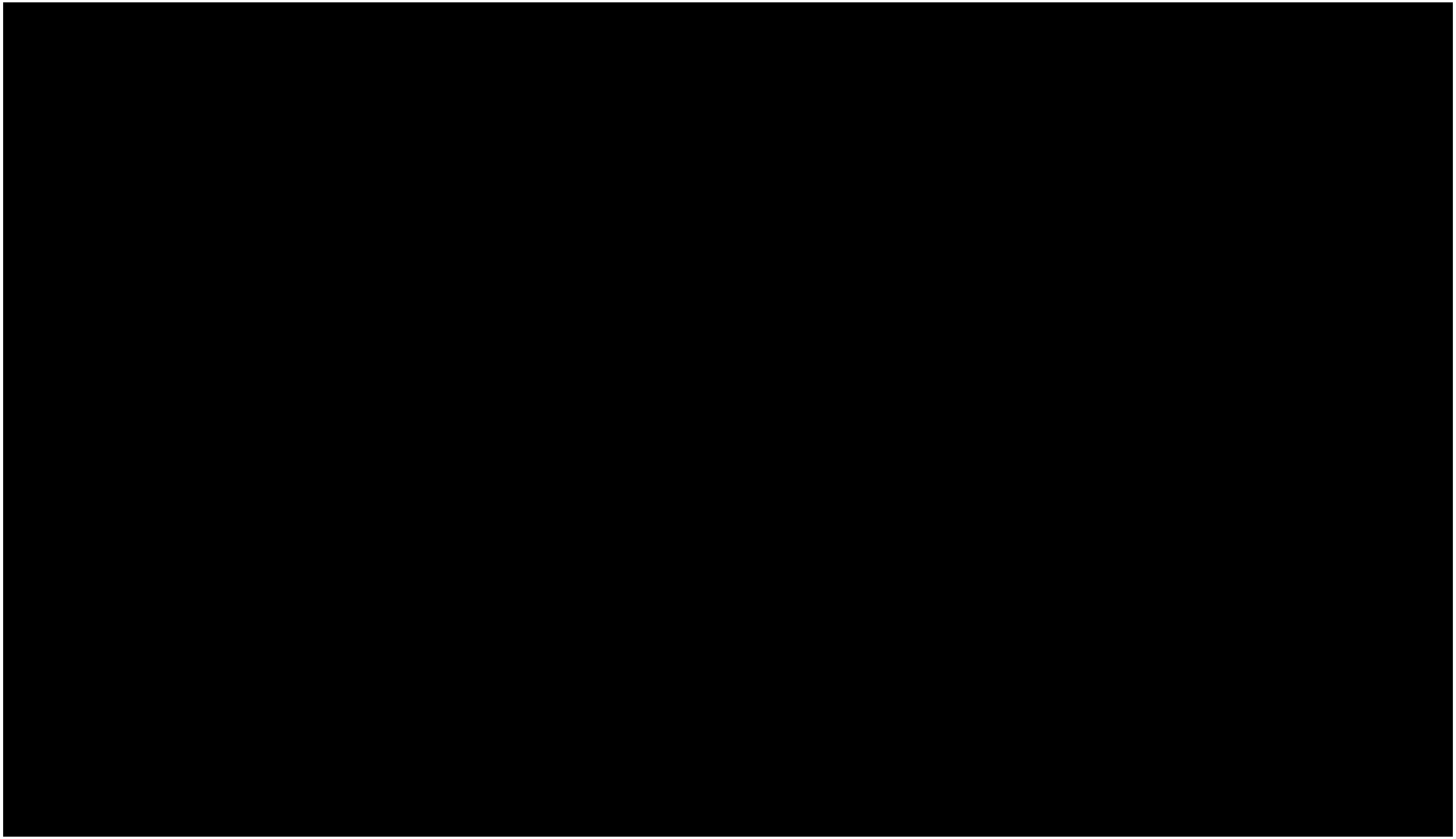
Low Light / High Temperature Performance



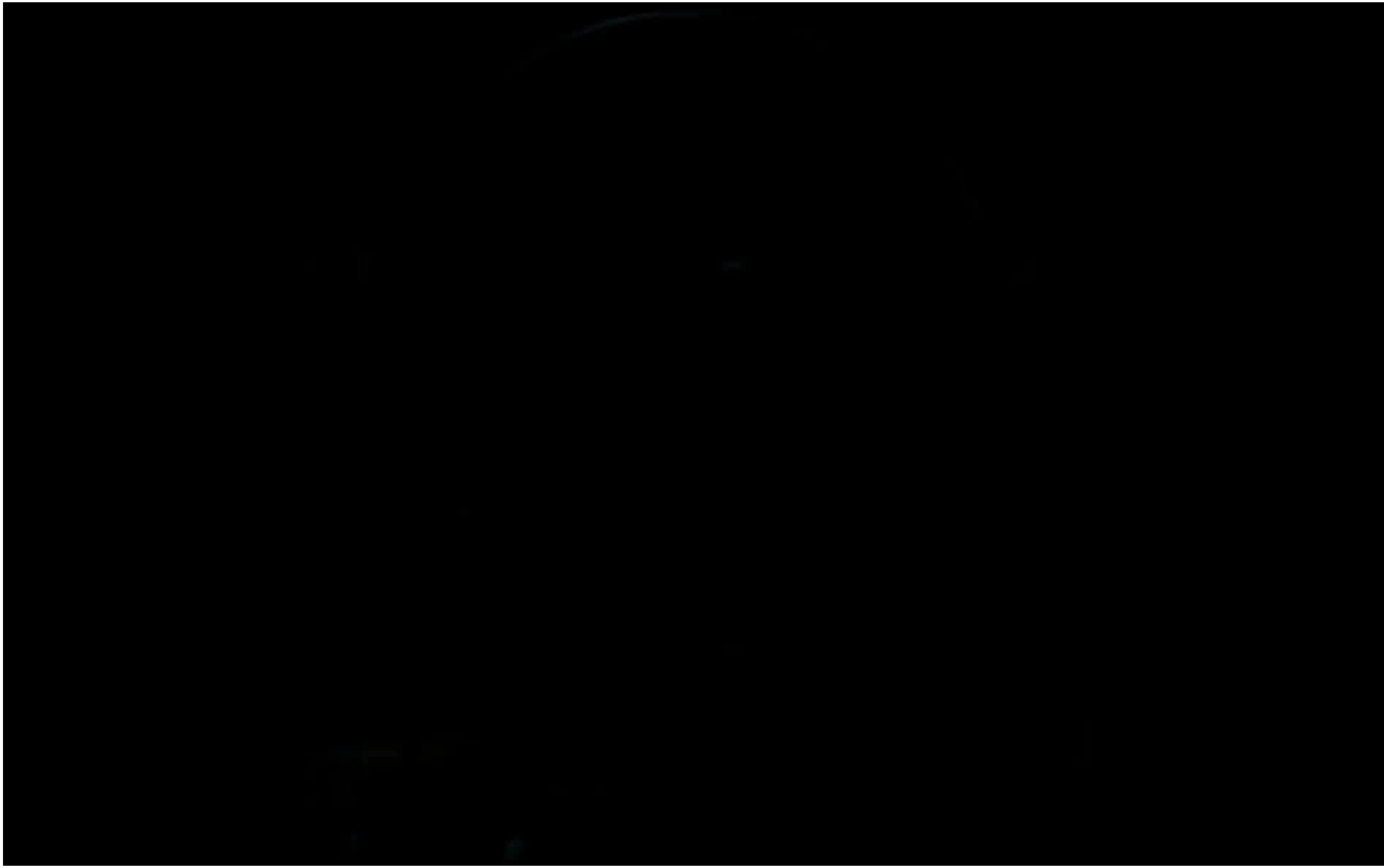
Alta Devices | 545 Oakmead Parkway, Sunnyvale, CA 94085 | www.altadevices.com

Rev:2013v1.3_ENG-04-03

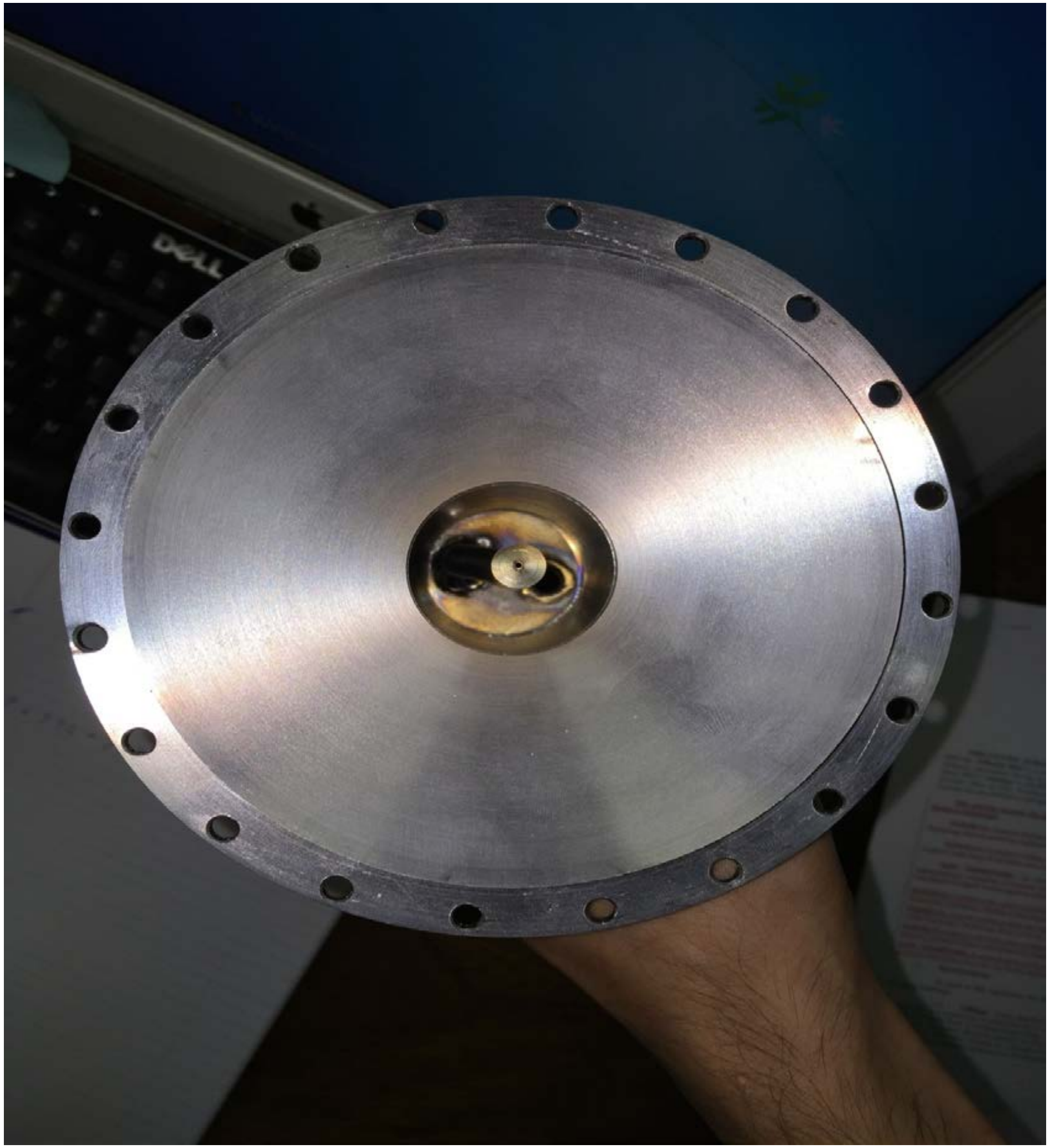
Uncontrolled Ignition



Controlled Ignition Using Electrode EM Pump



Commercial Prototype SunCell

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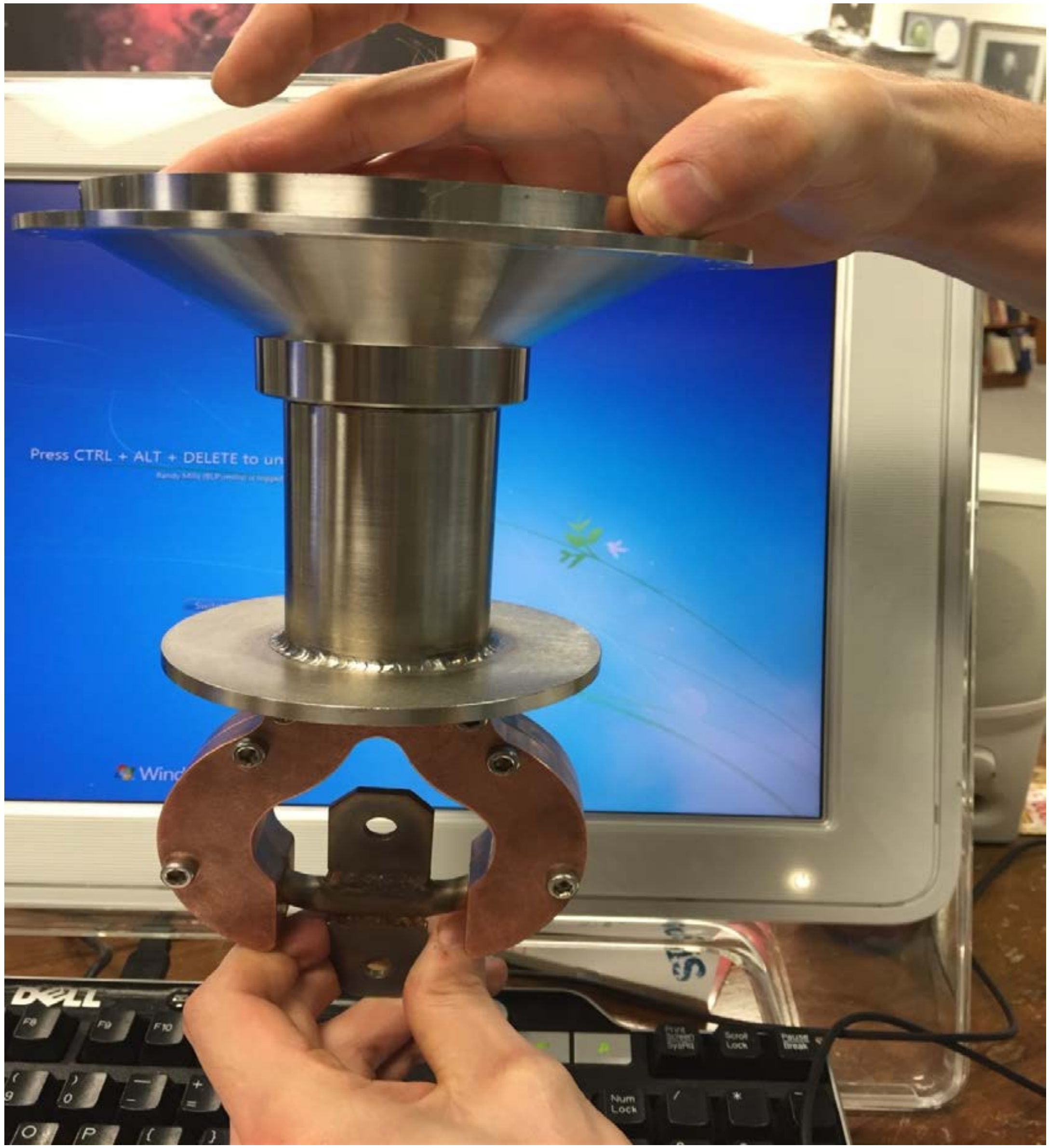
Num Lock
Backspace
Delete
End
Page Down
Home
PgUp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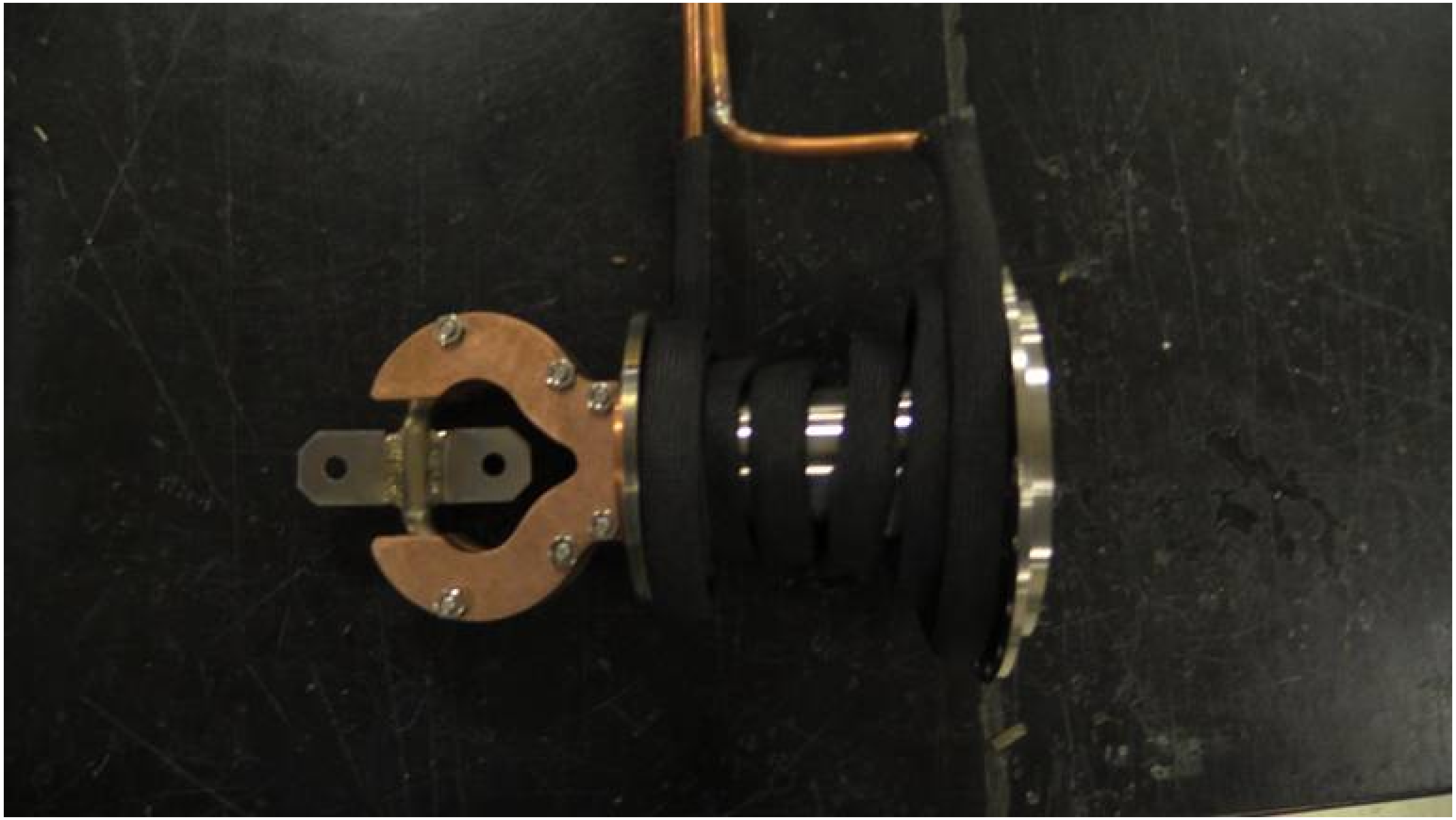
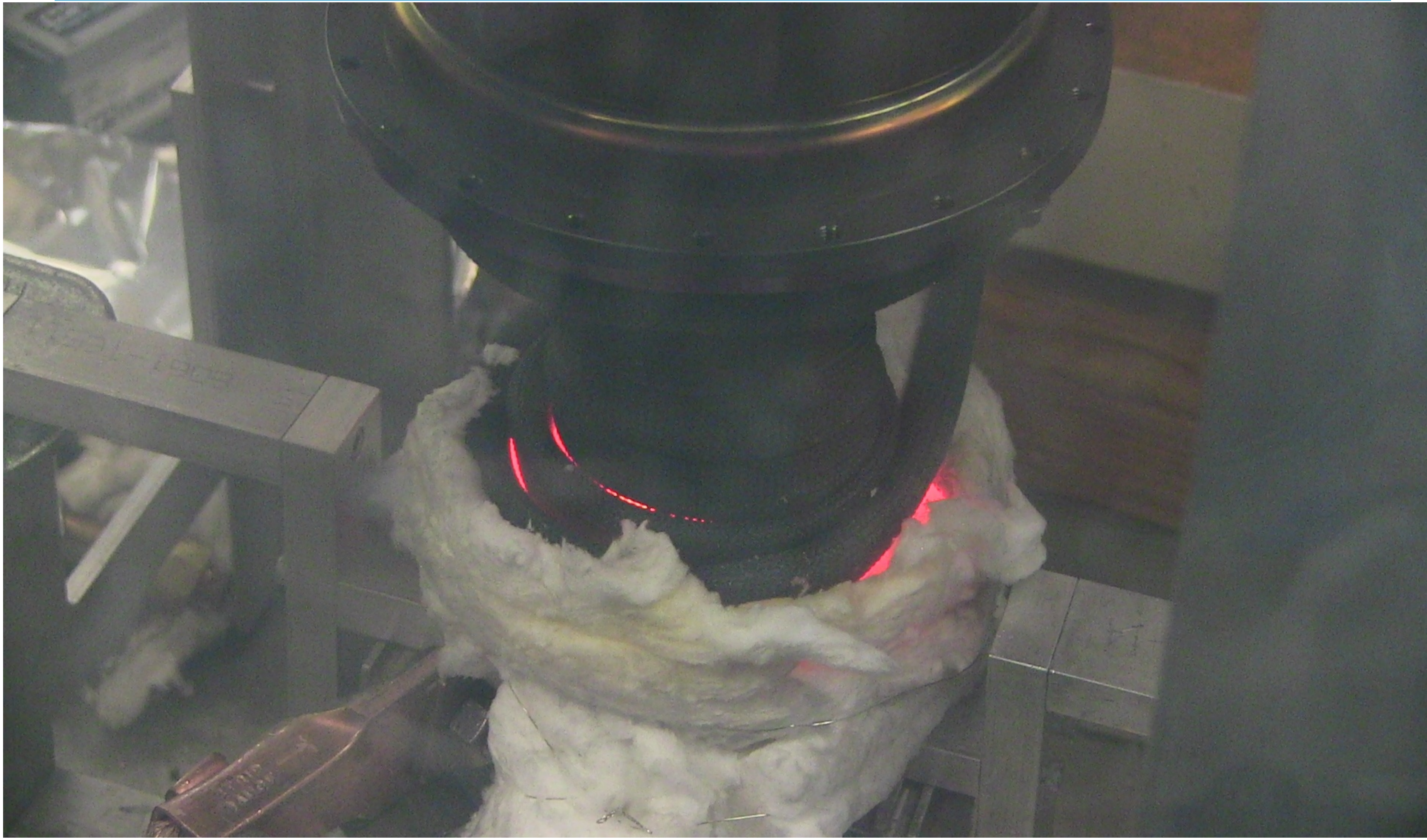
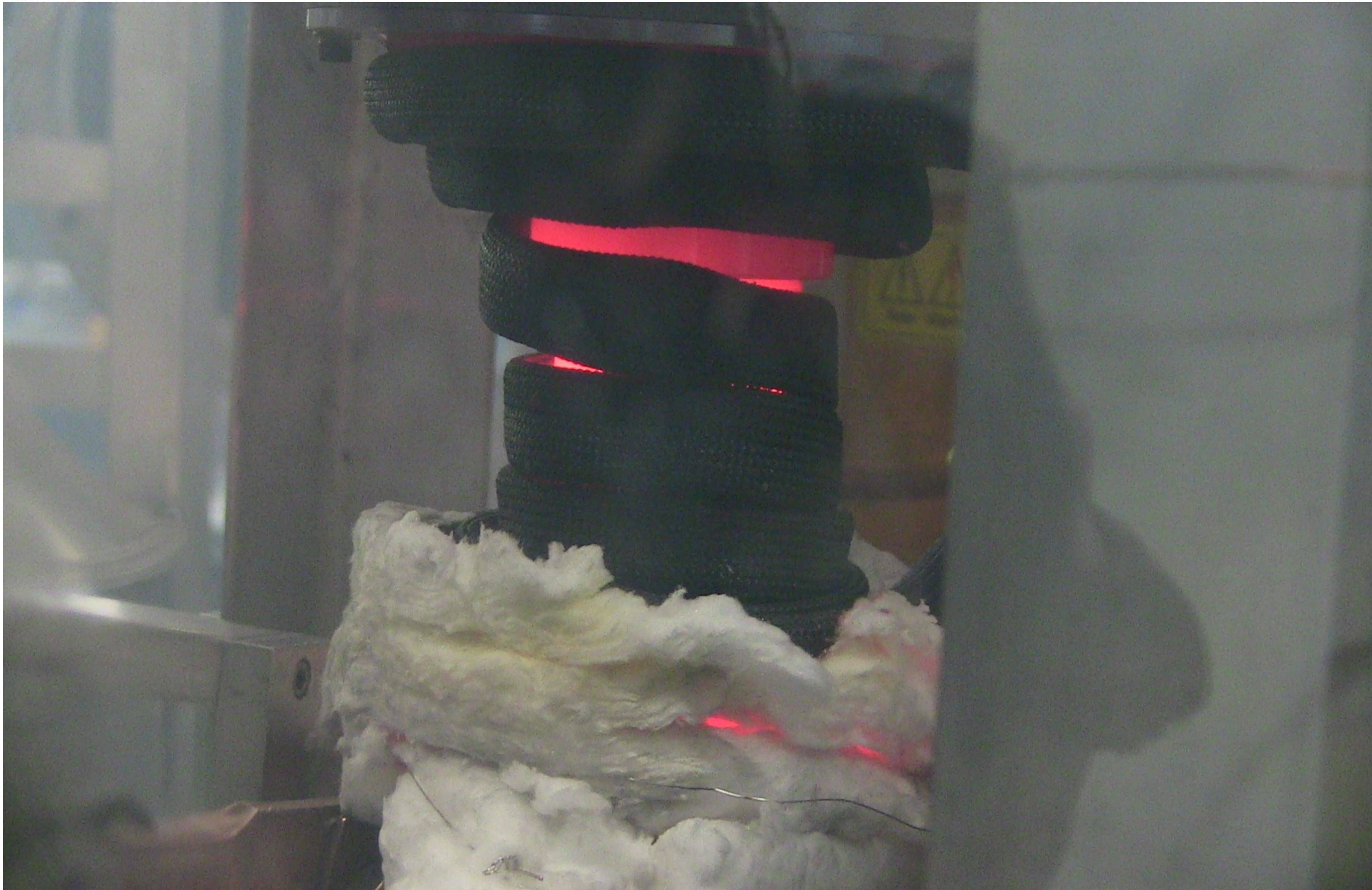
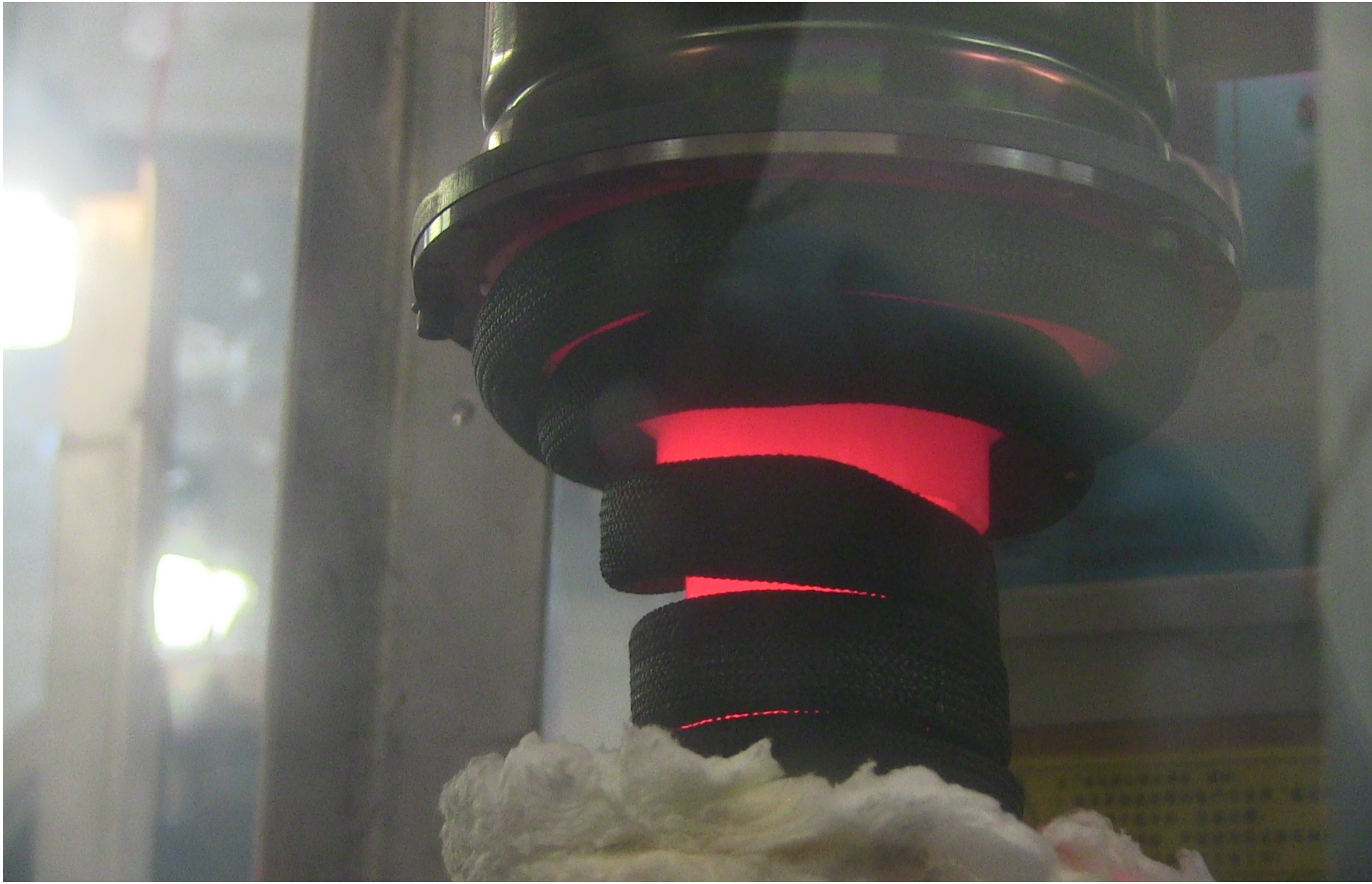
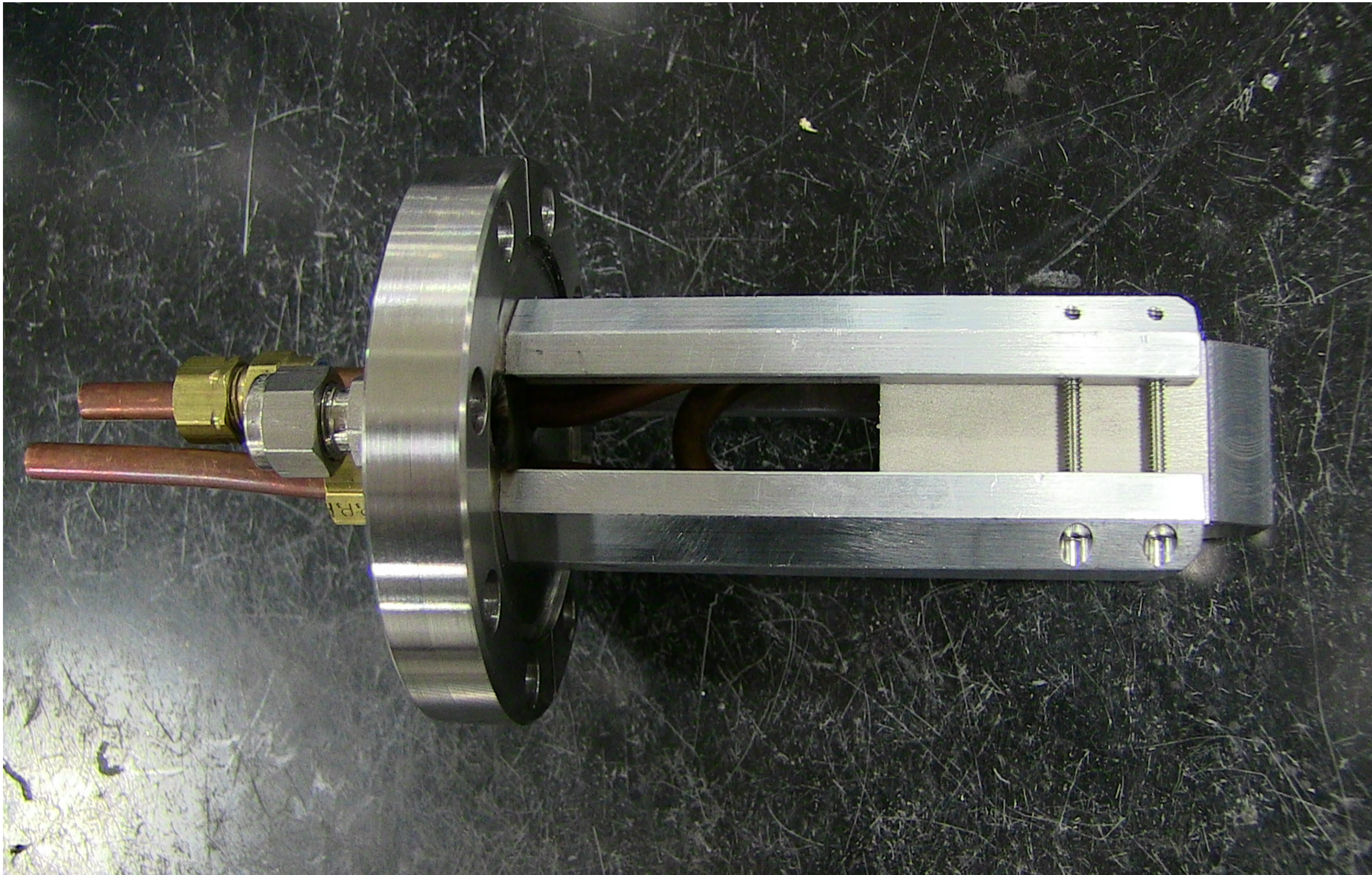
DELL
Num Lock

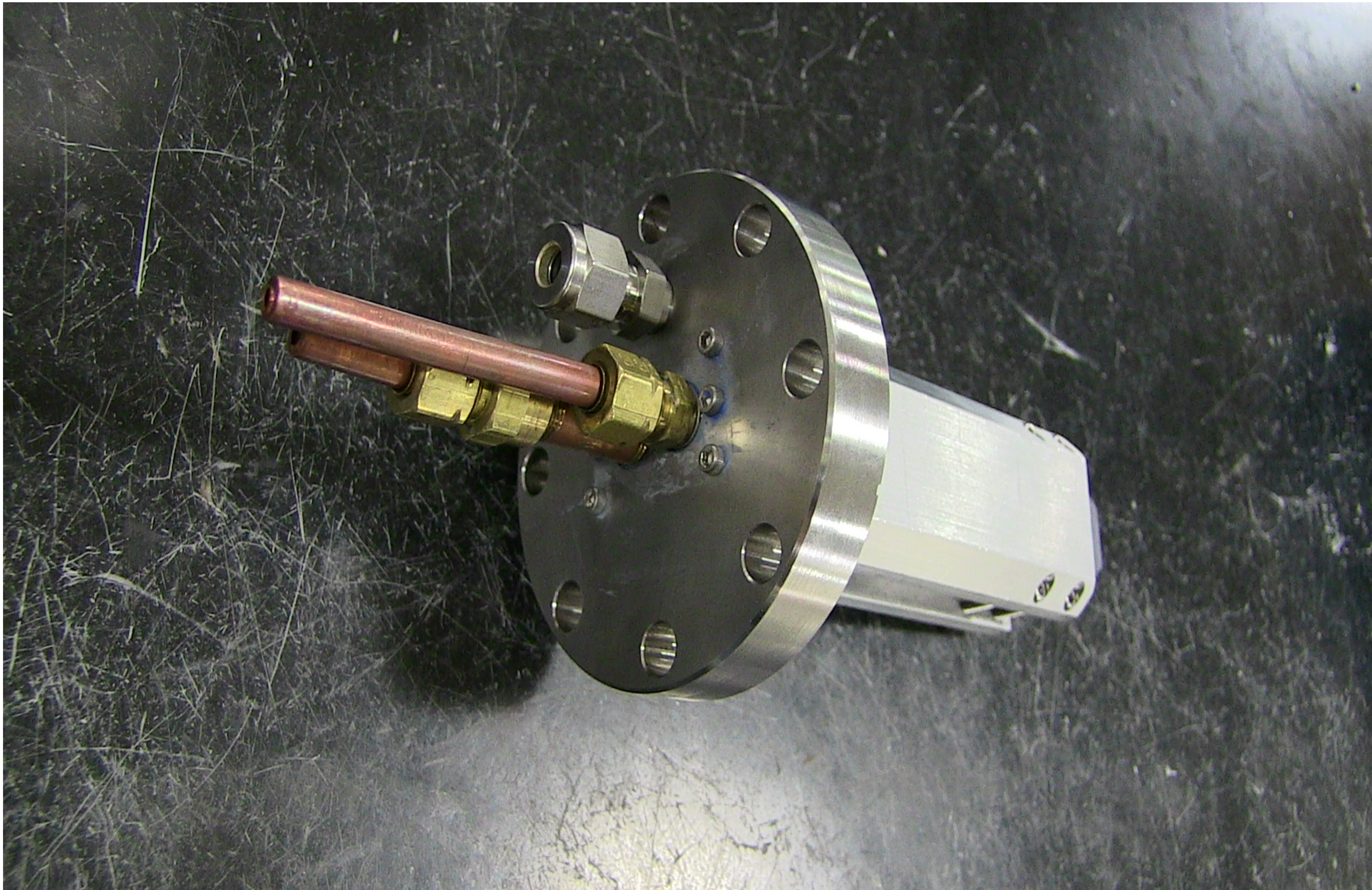


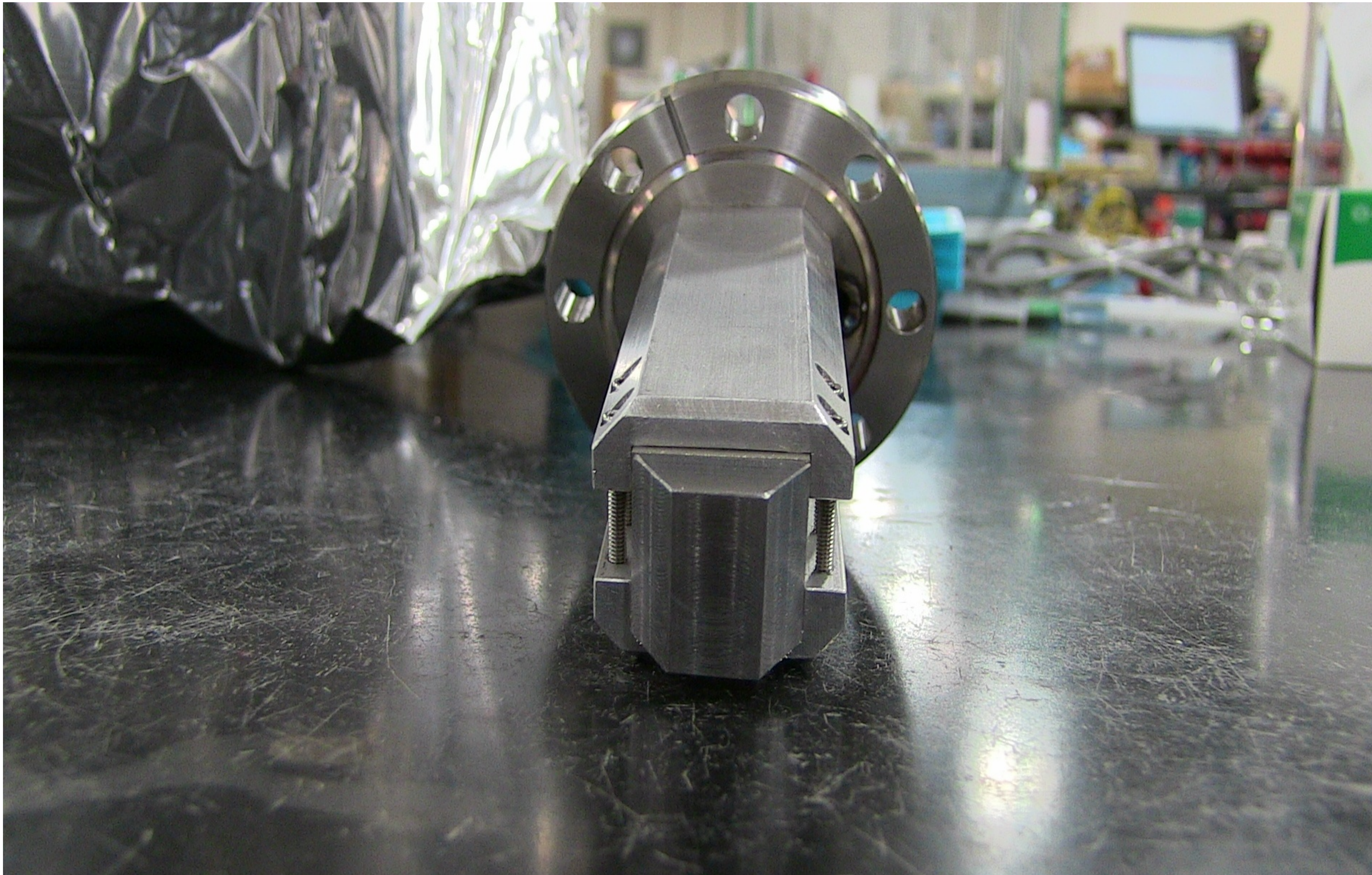


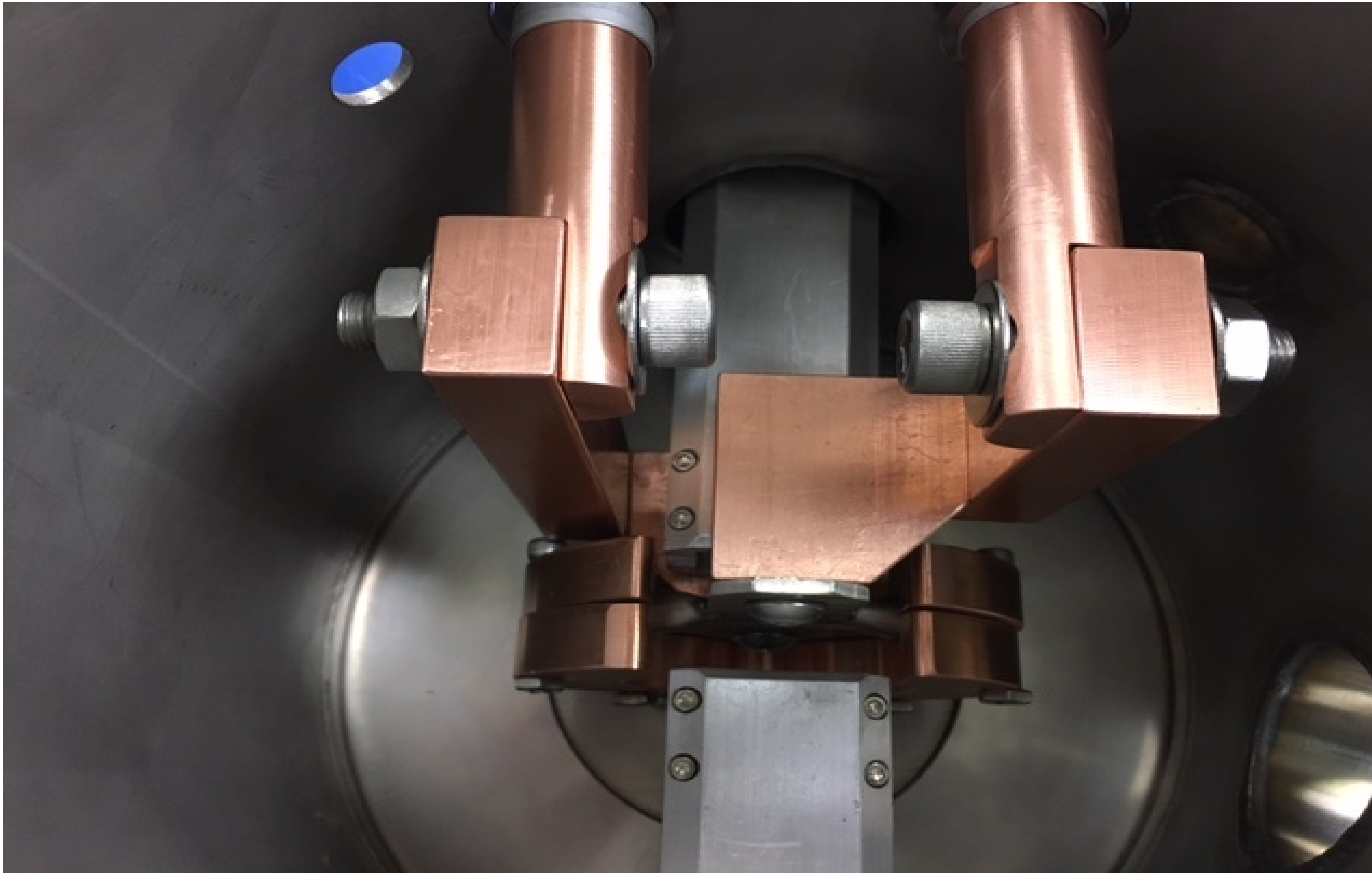


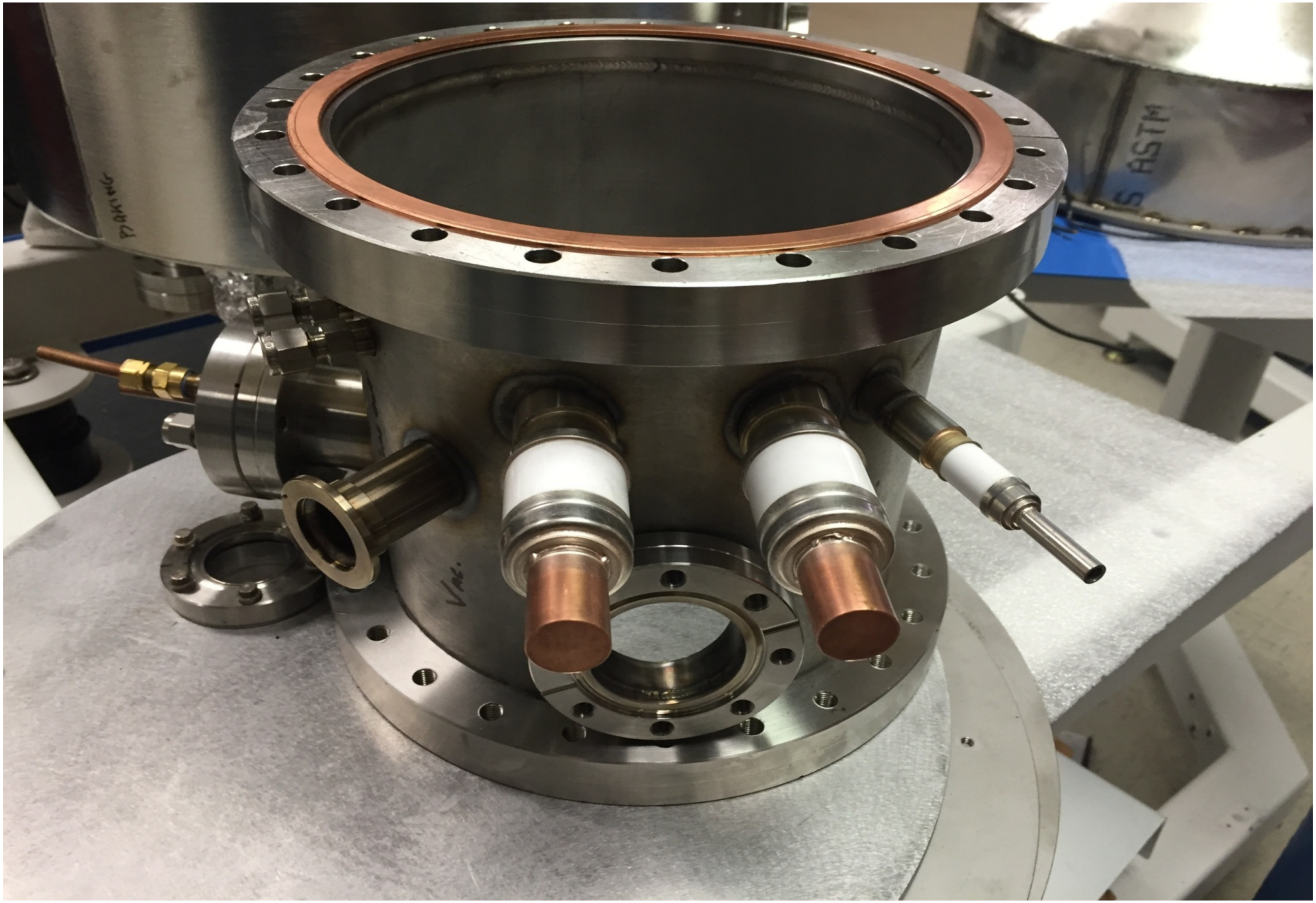


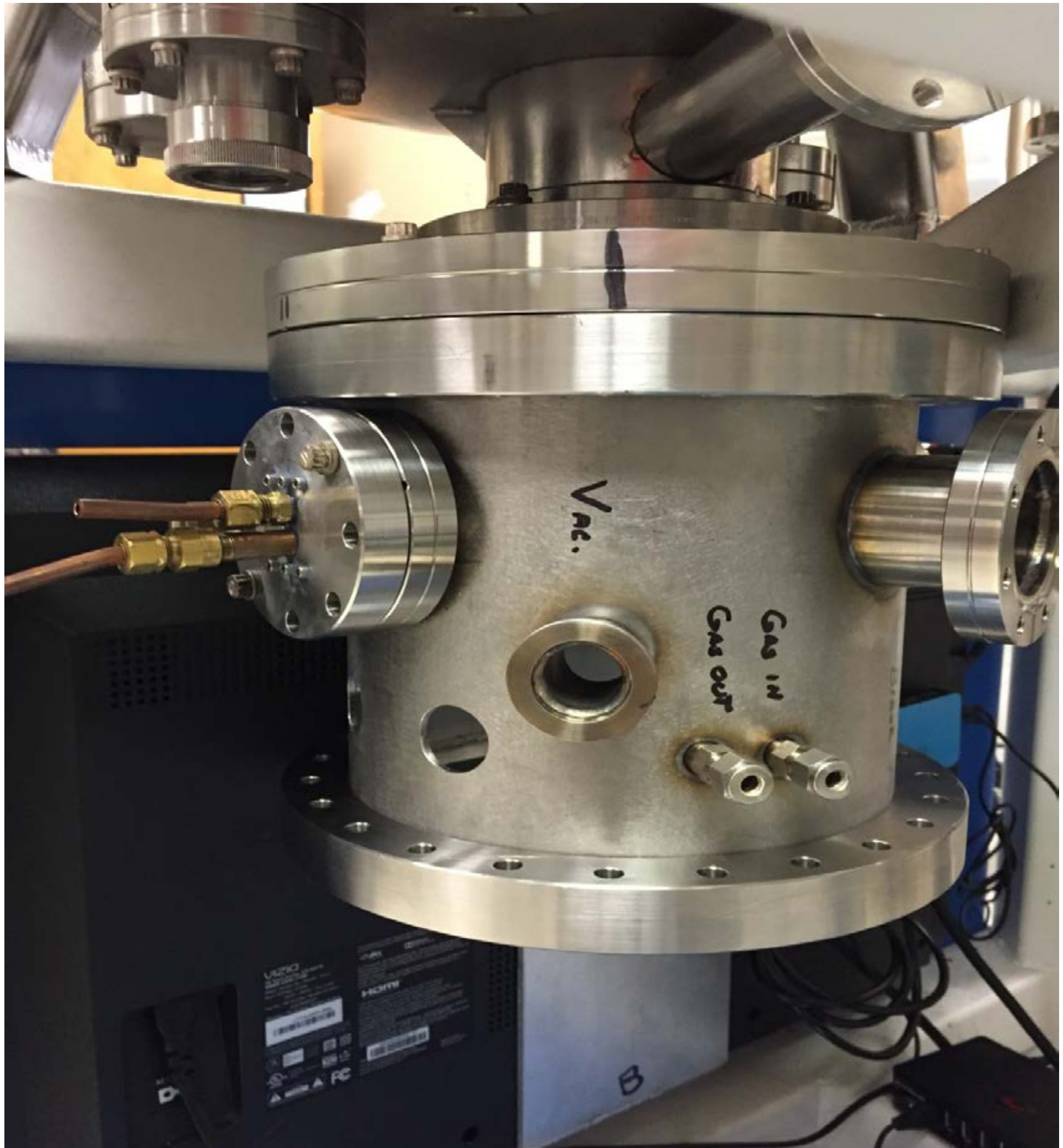


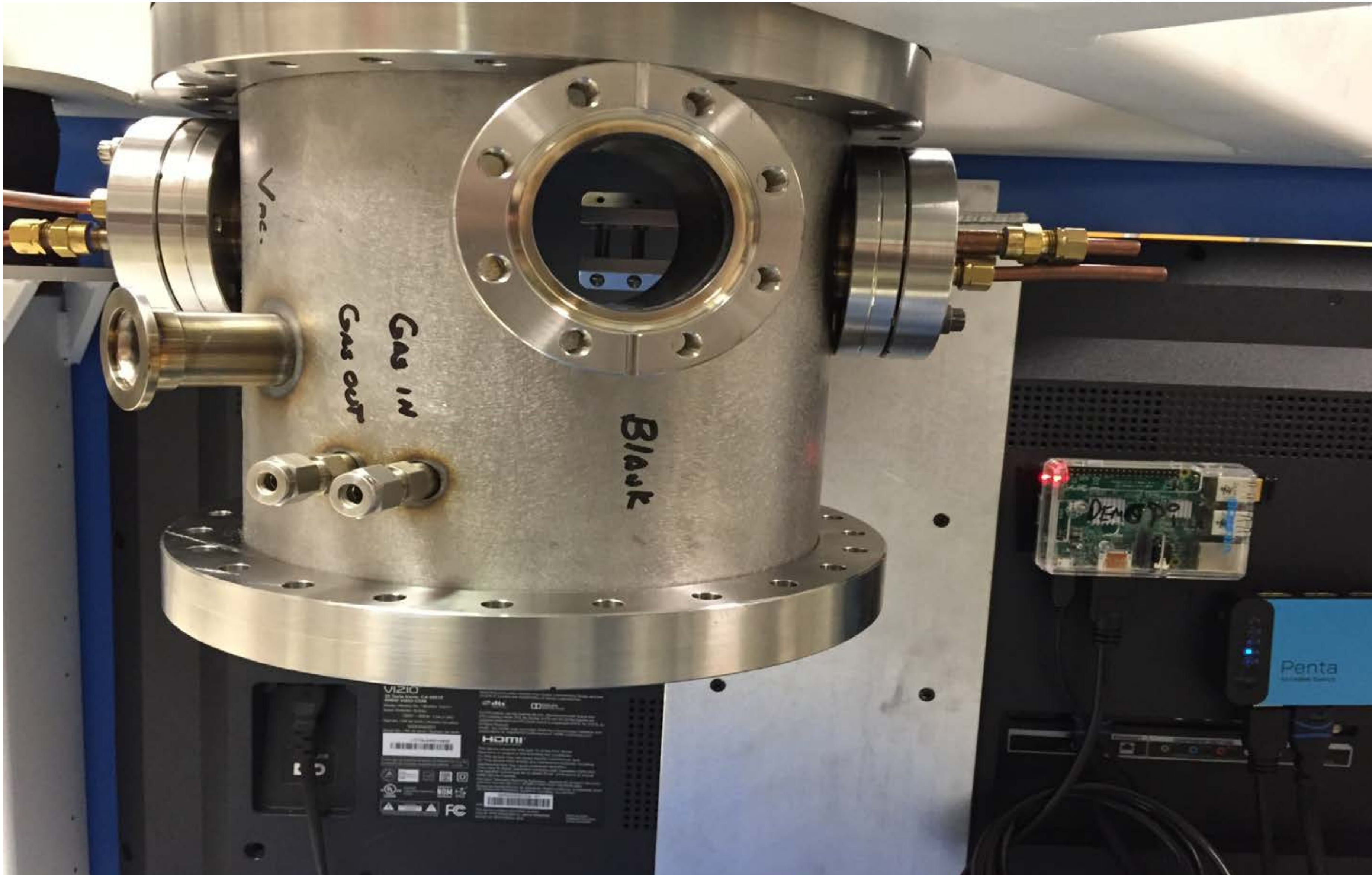







ASTM
Vac.


Vac.
Gas in
Gas out
B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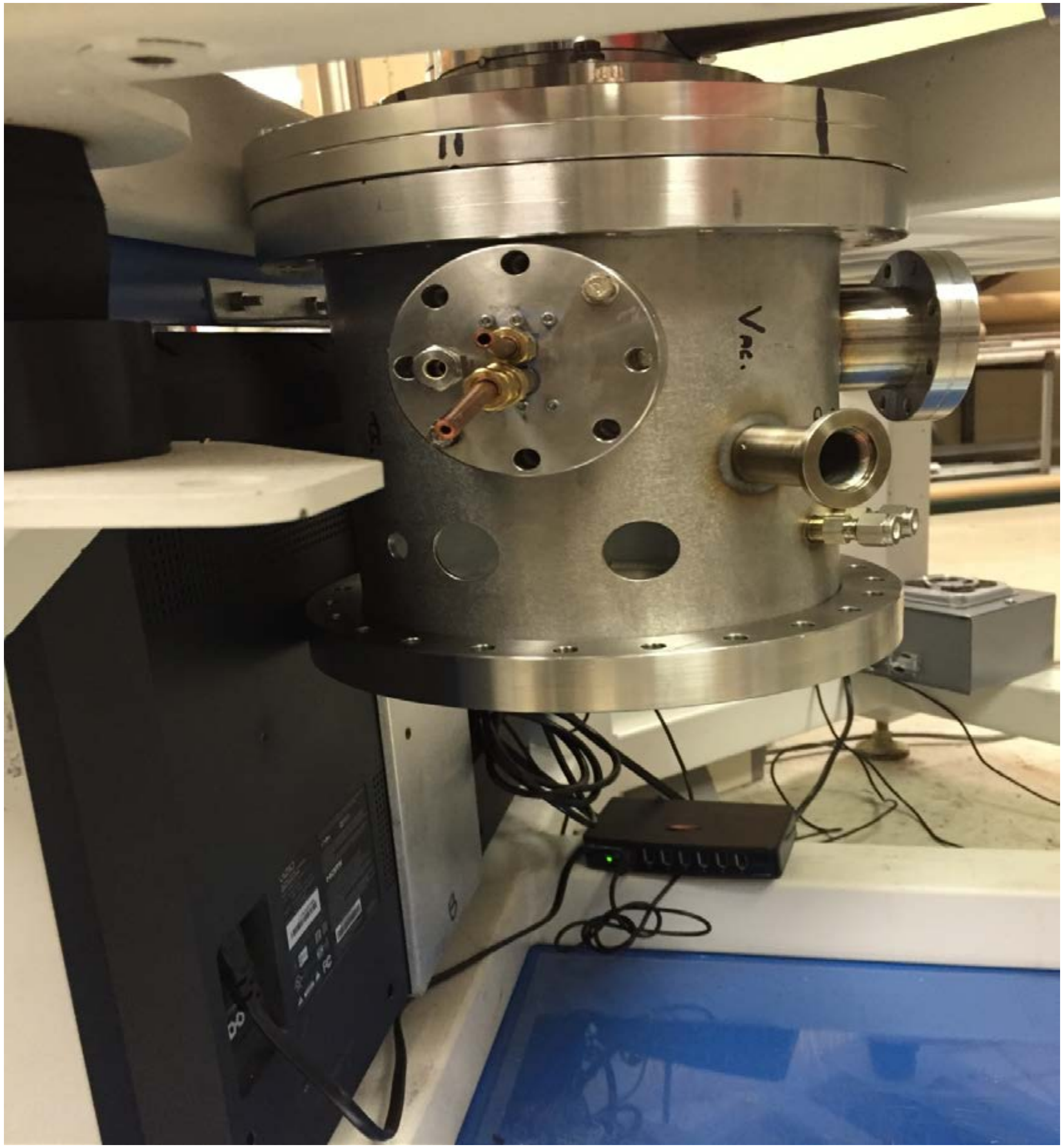
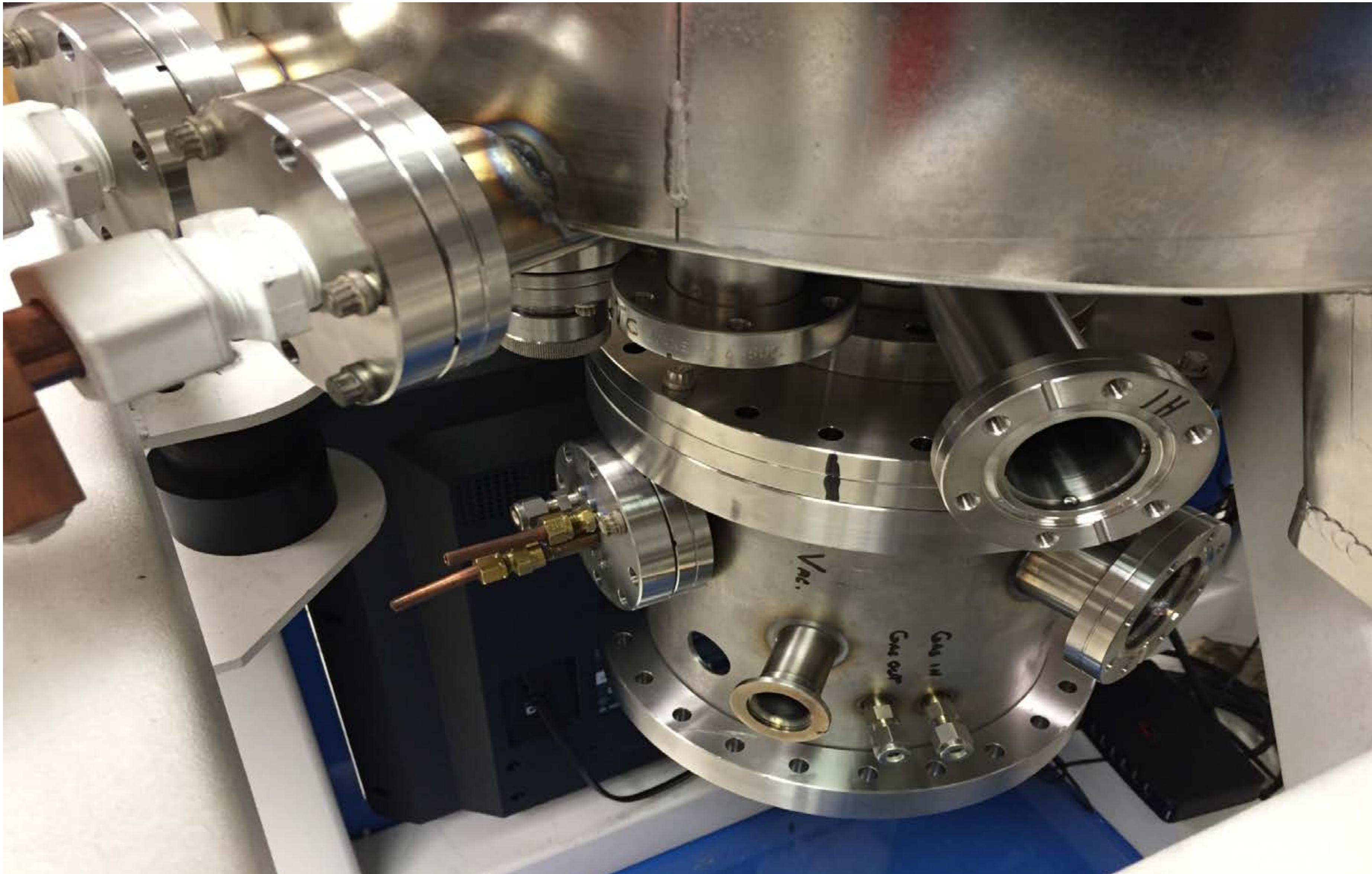
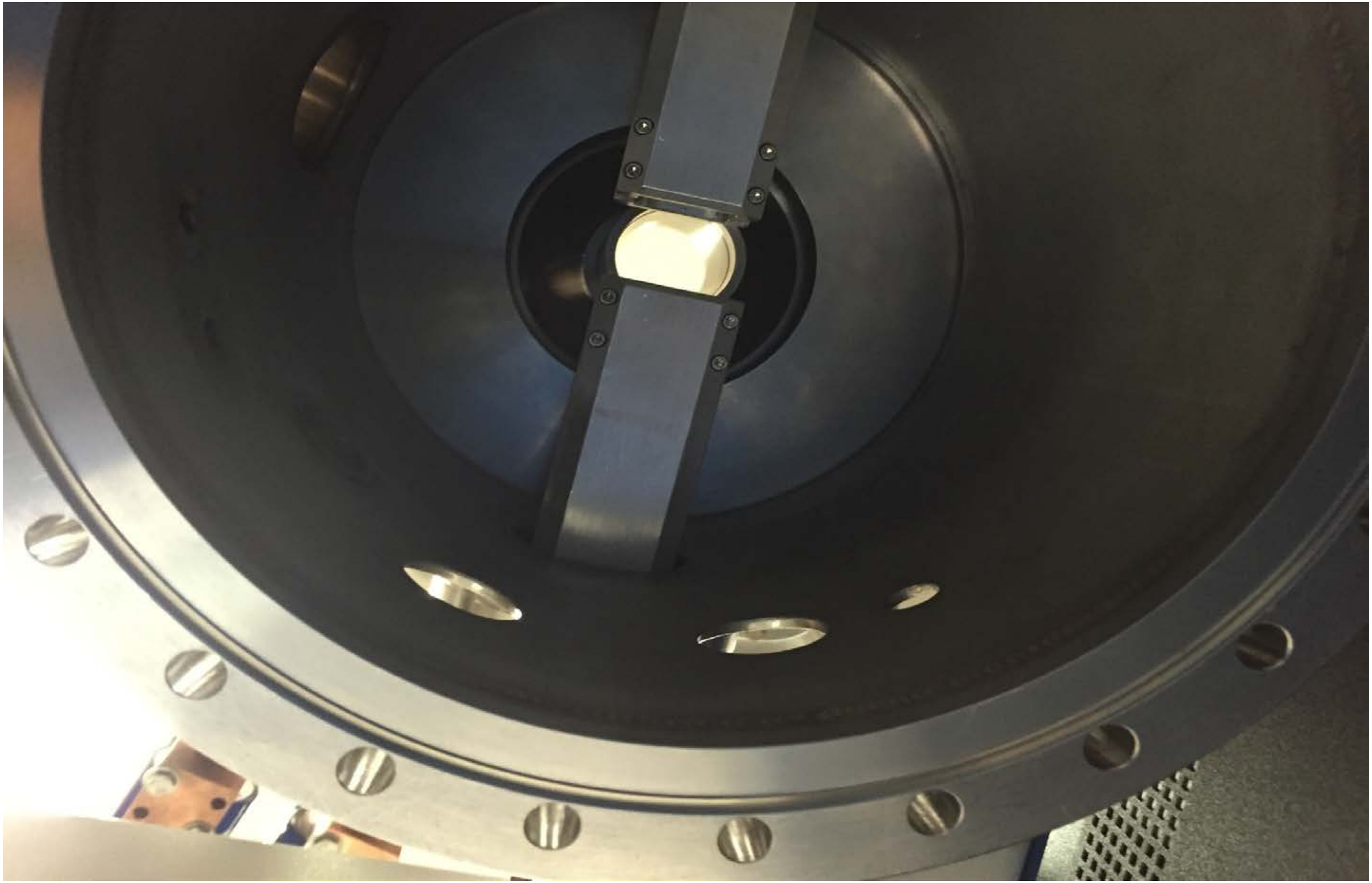
GAS IN
GAS OUT
Black
VIZIO
HDMI
Penta




Vac.
Gas in
Gas out

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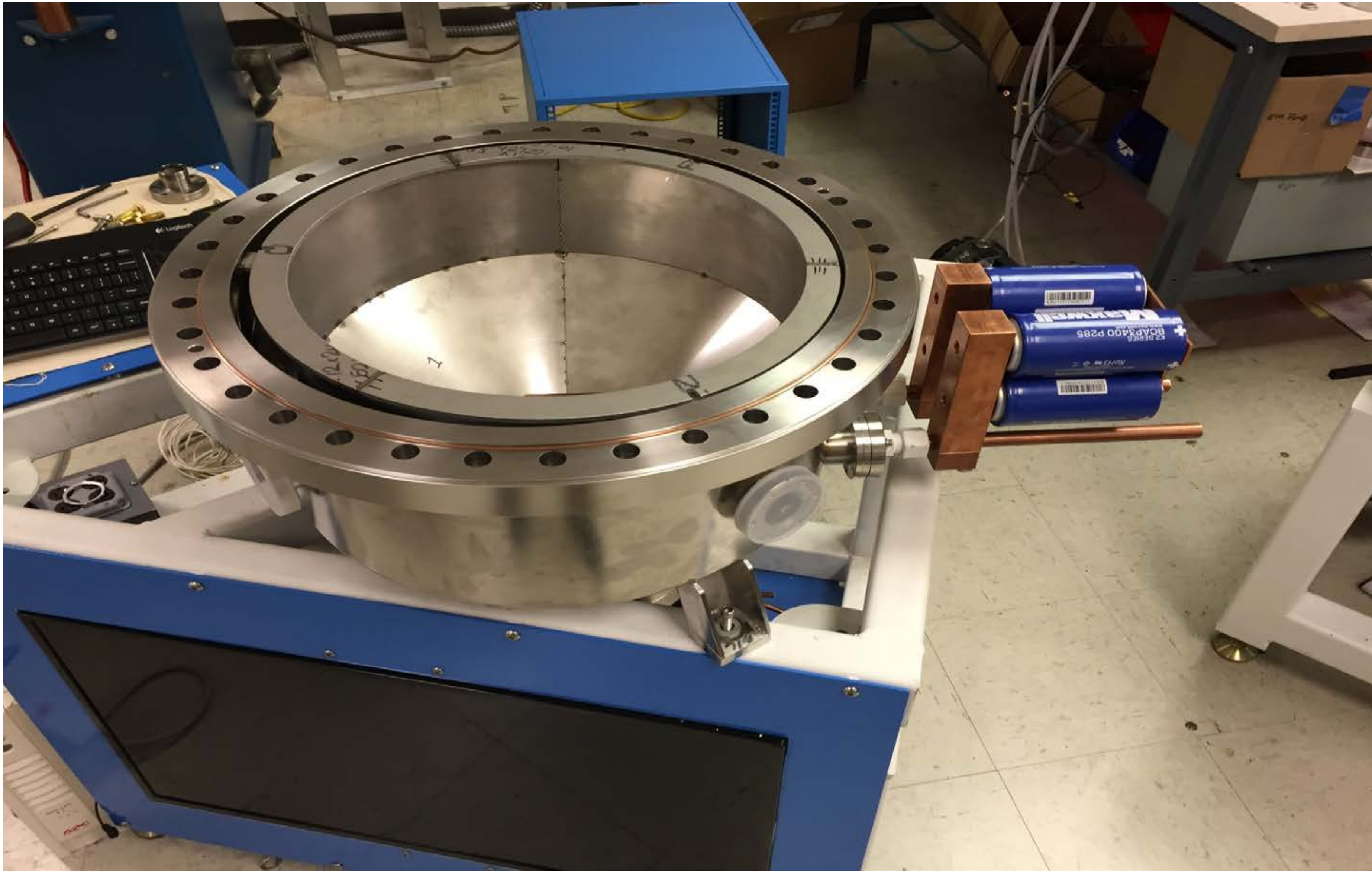
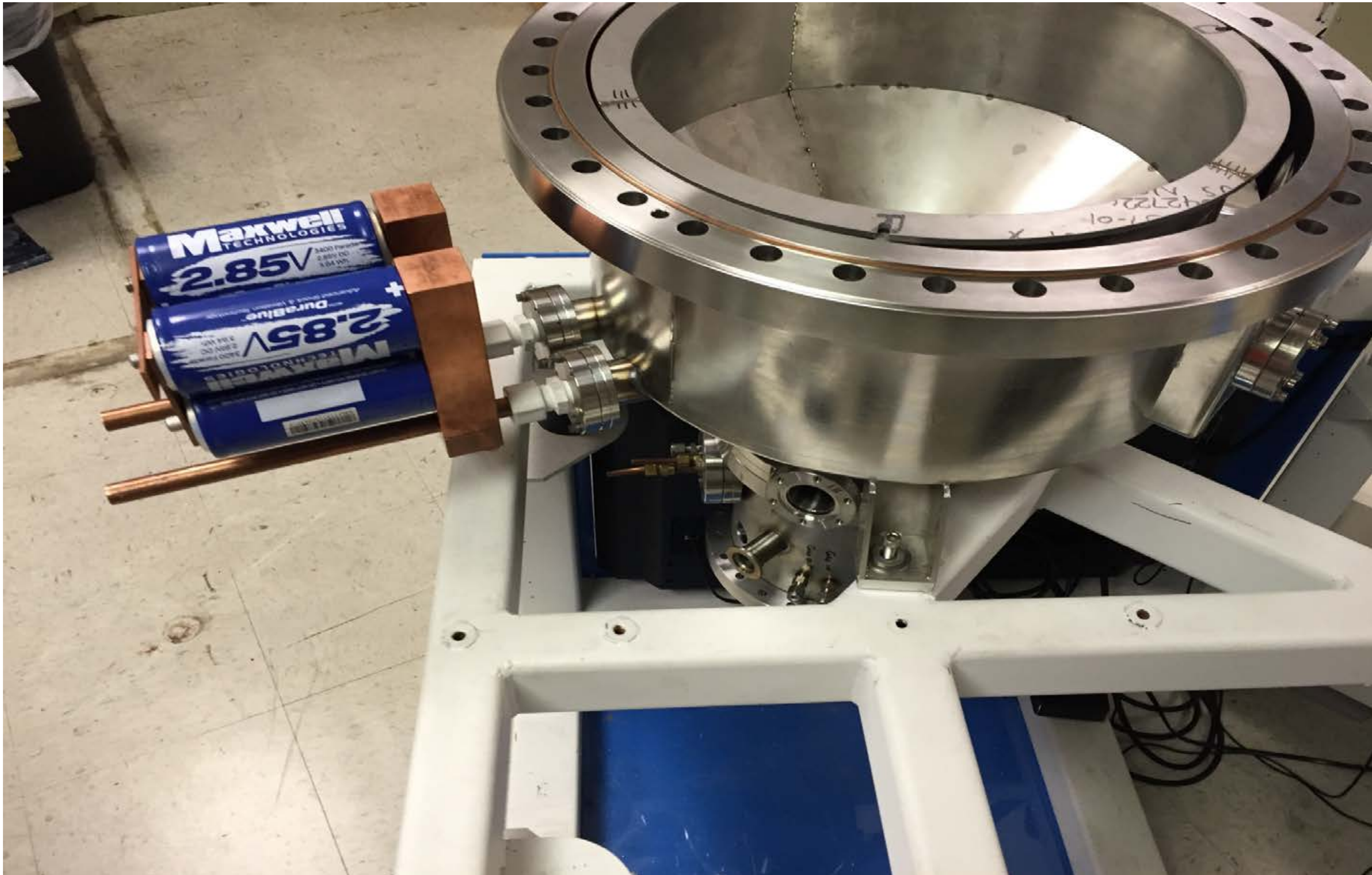
2.85V
2.85V
CHARLES EVANS & ASSOCIATES


VIZIO


K2 SERIES
BCAP3400 P285


Maxwell
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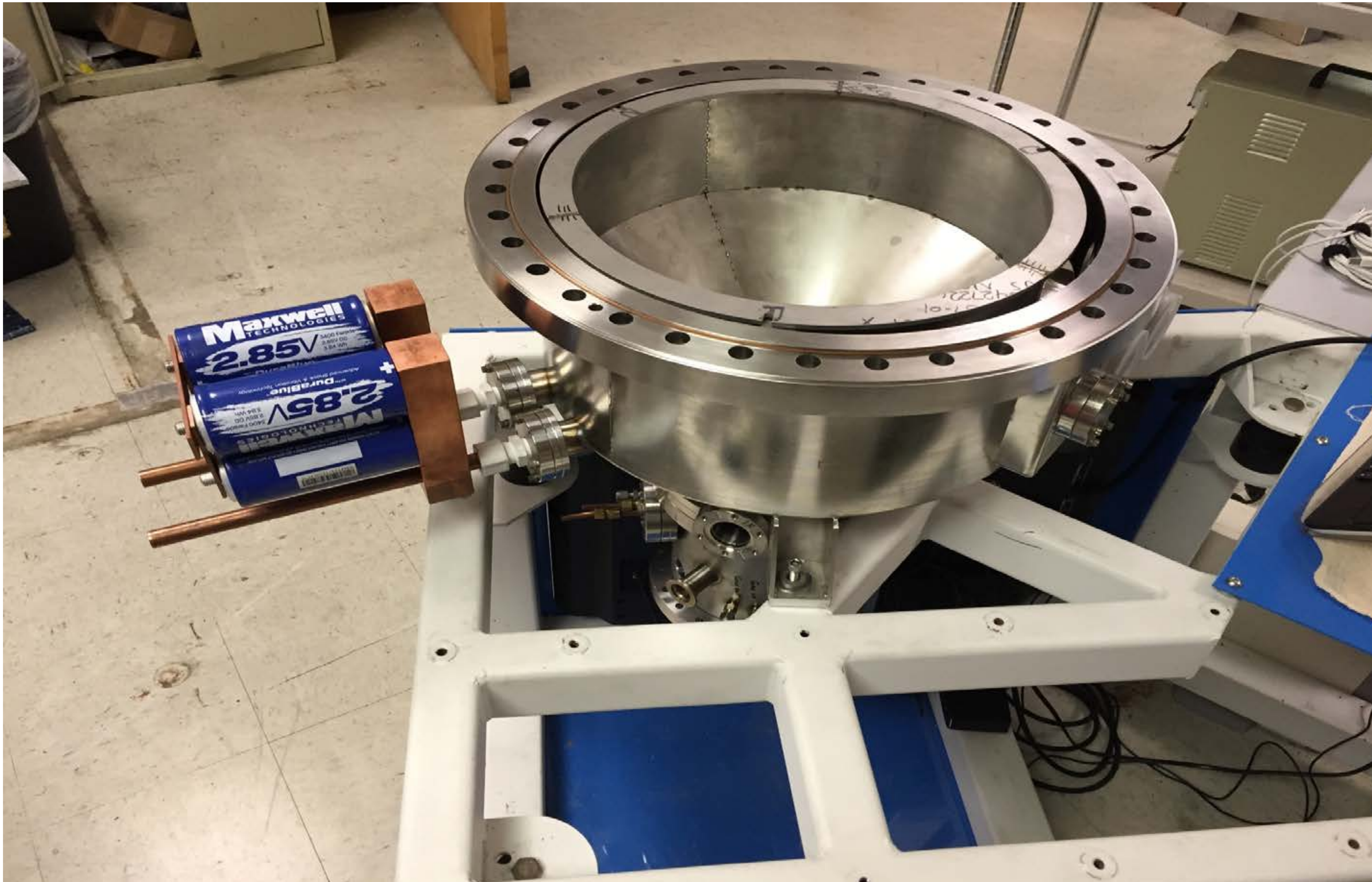
2.85V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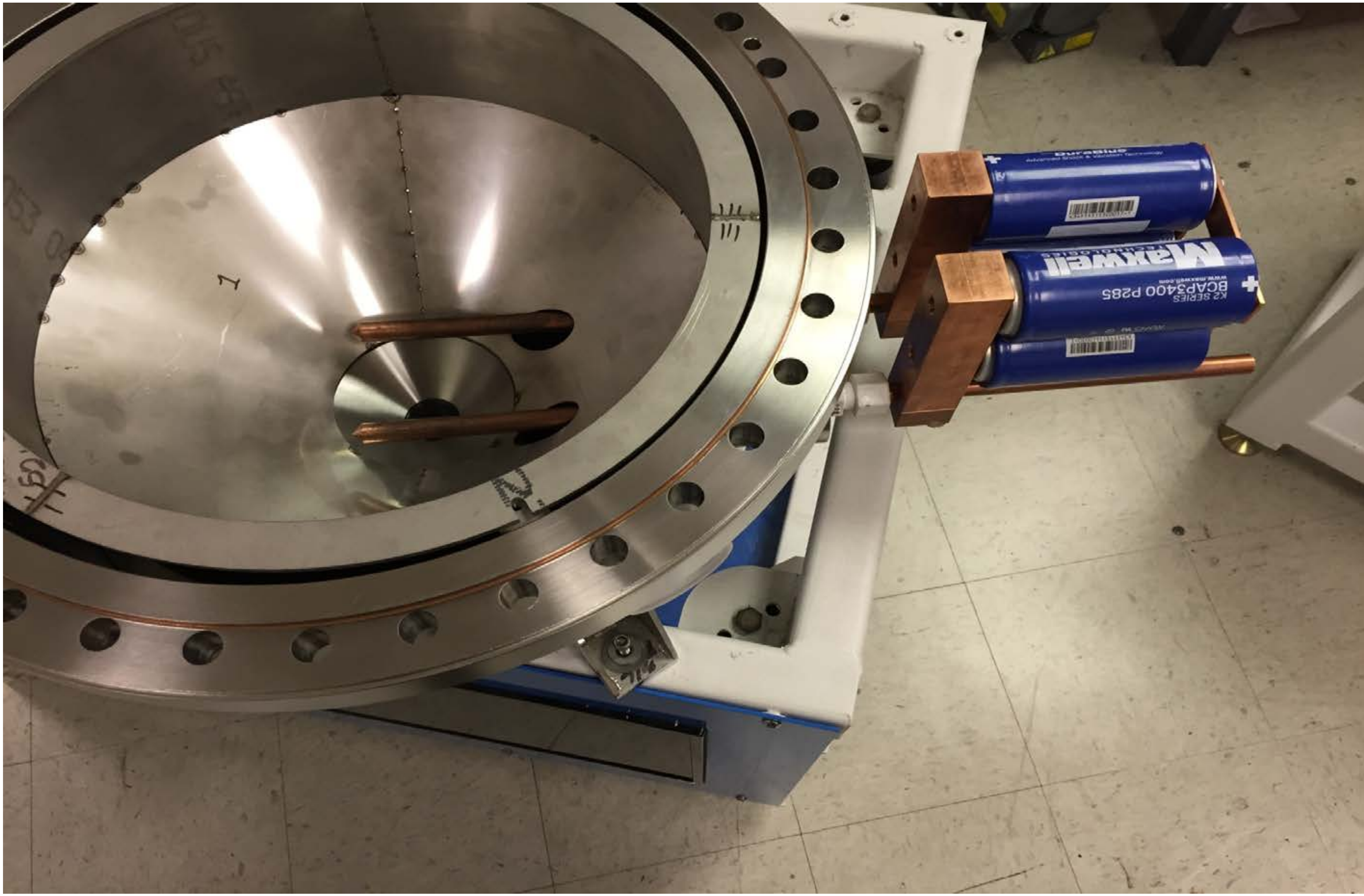
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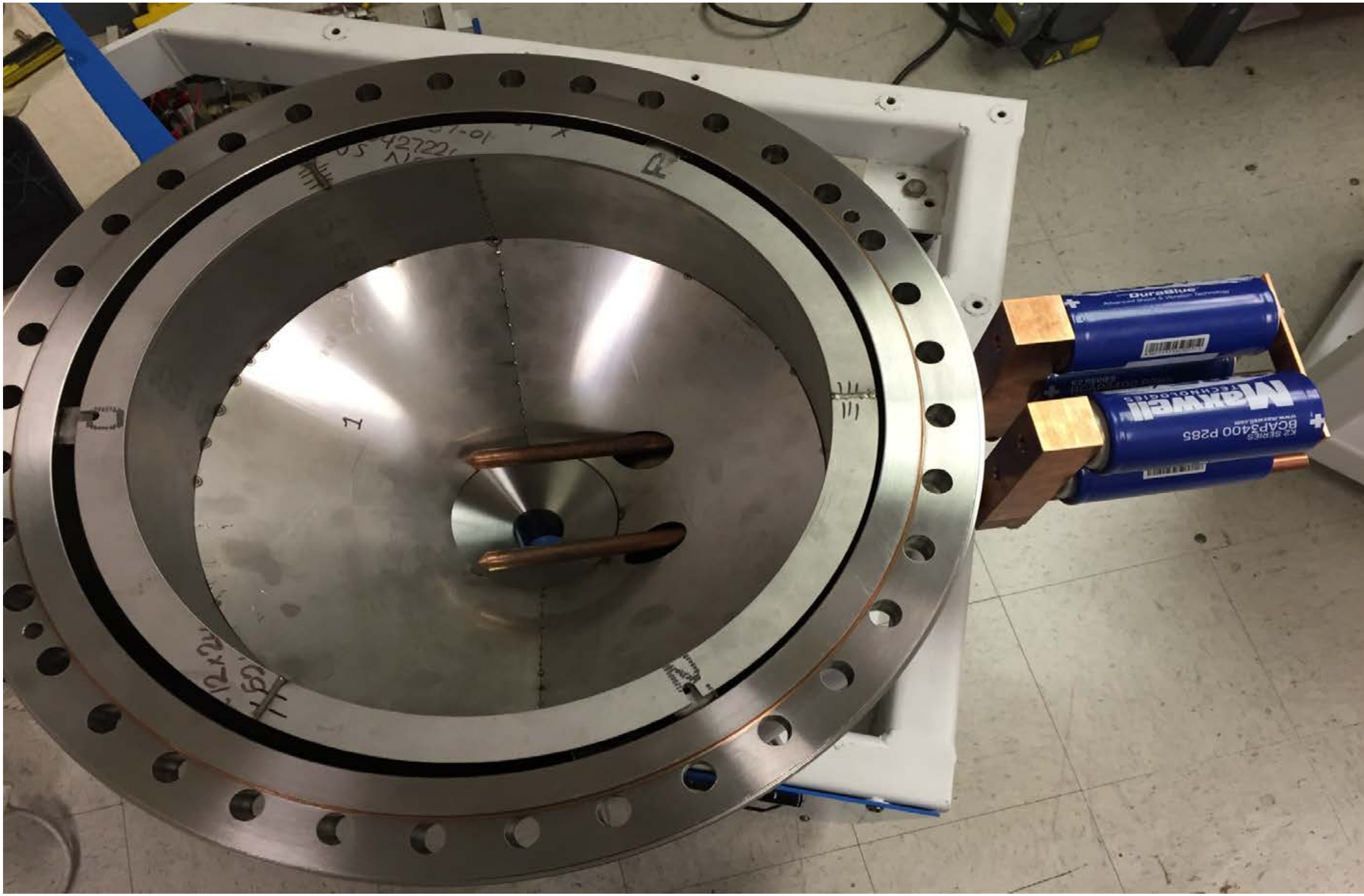
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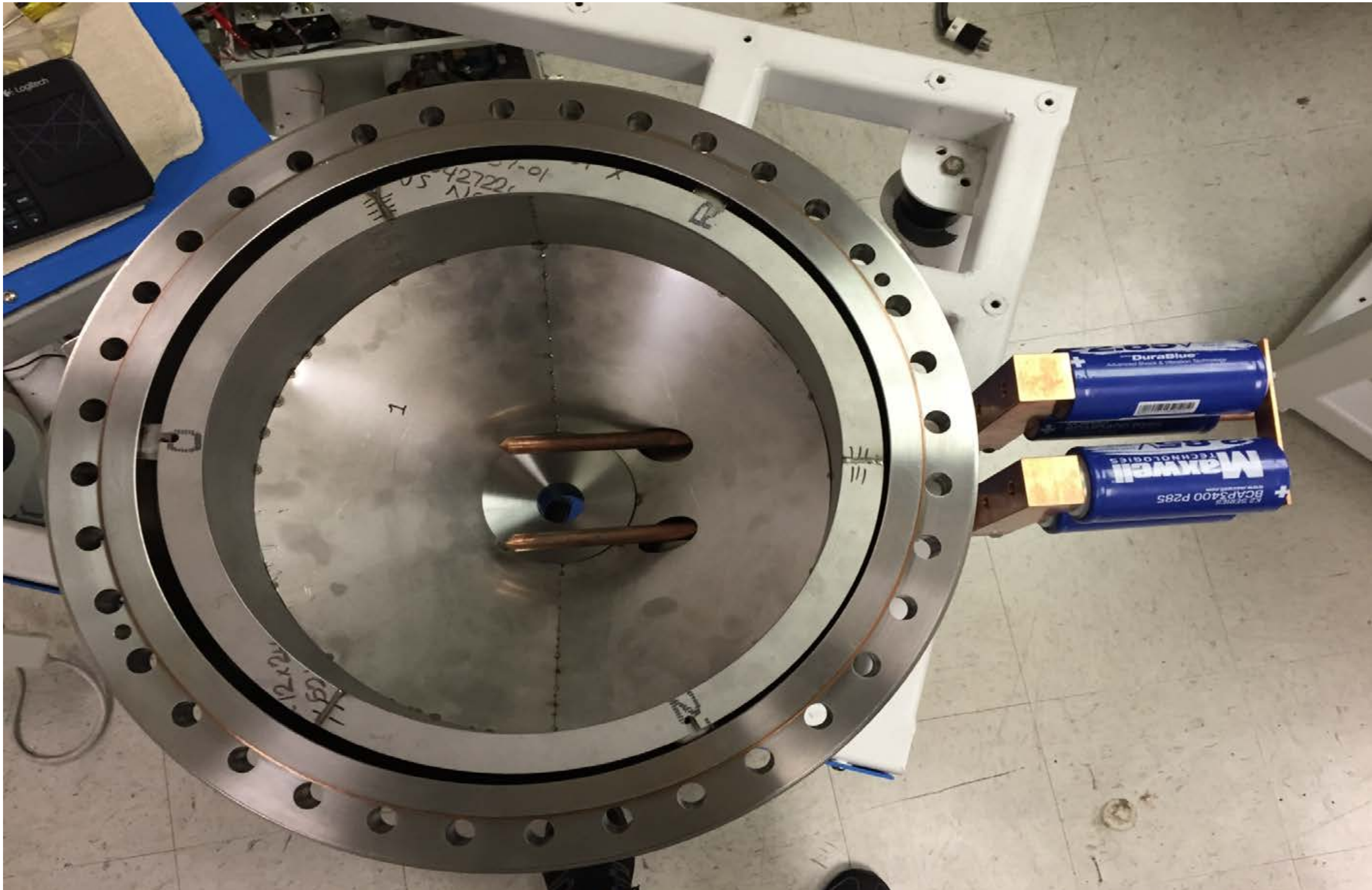
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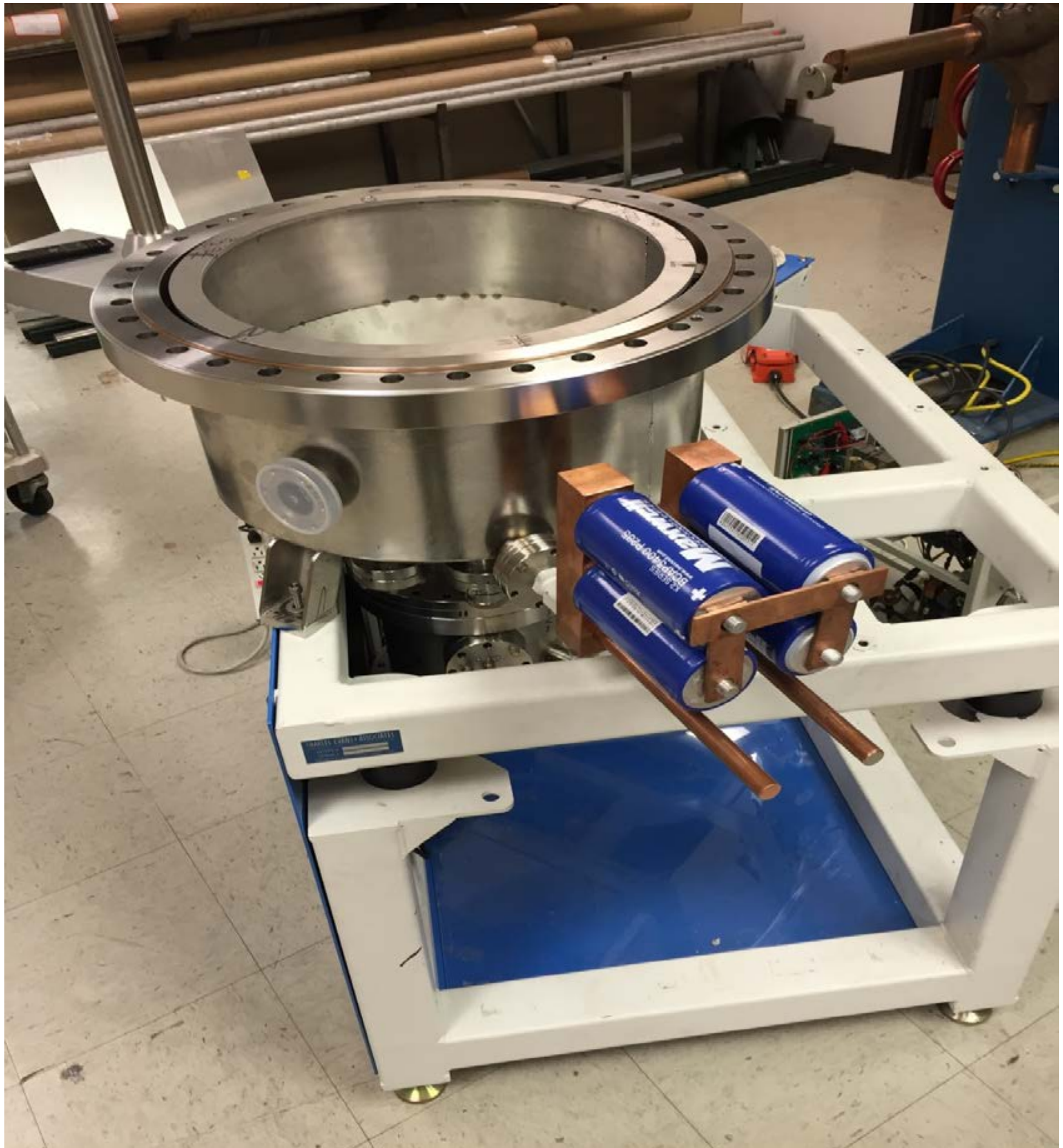

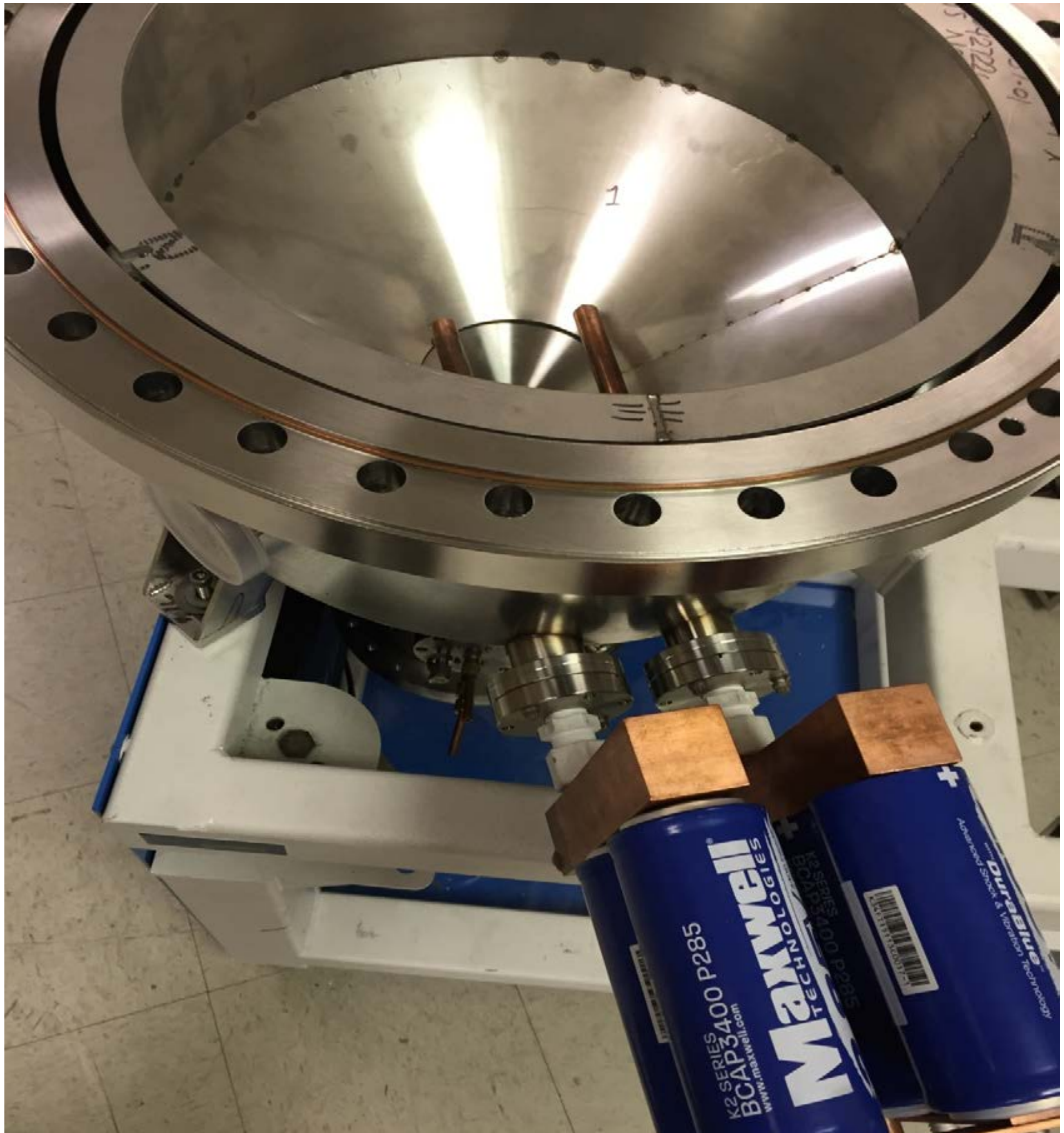
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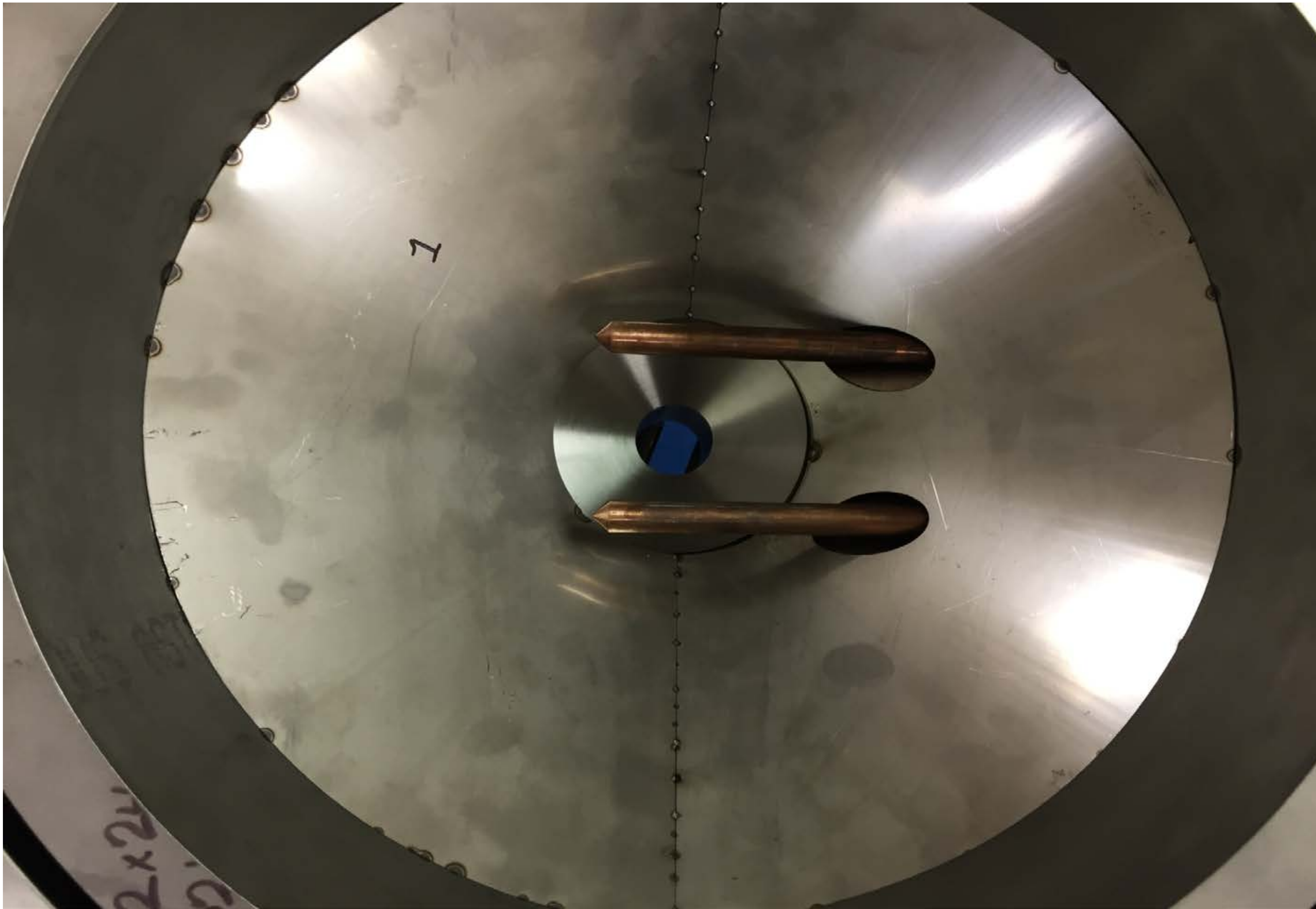

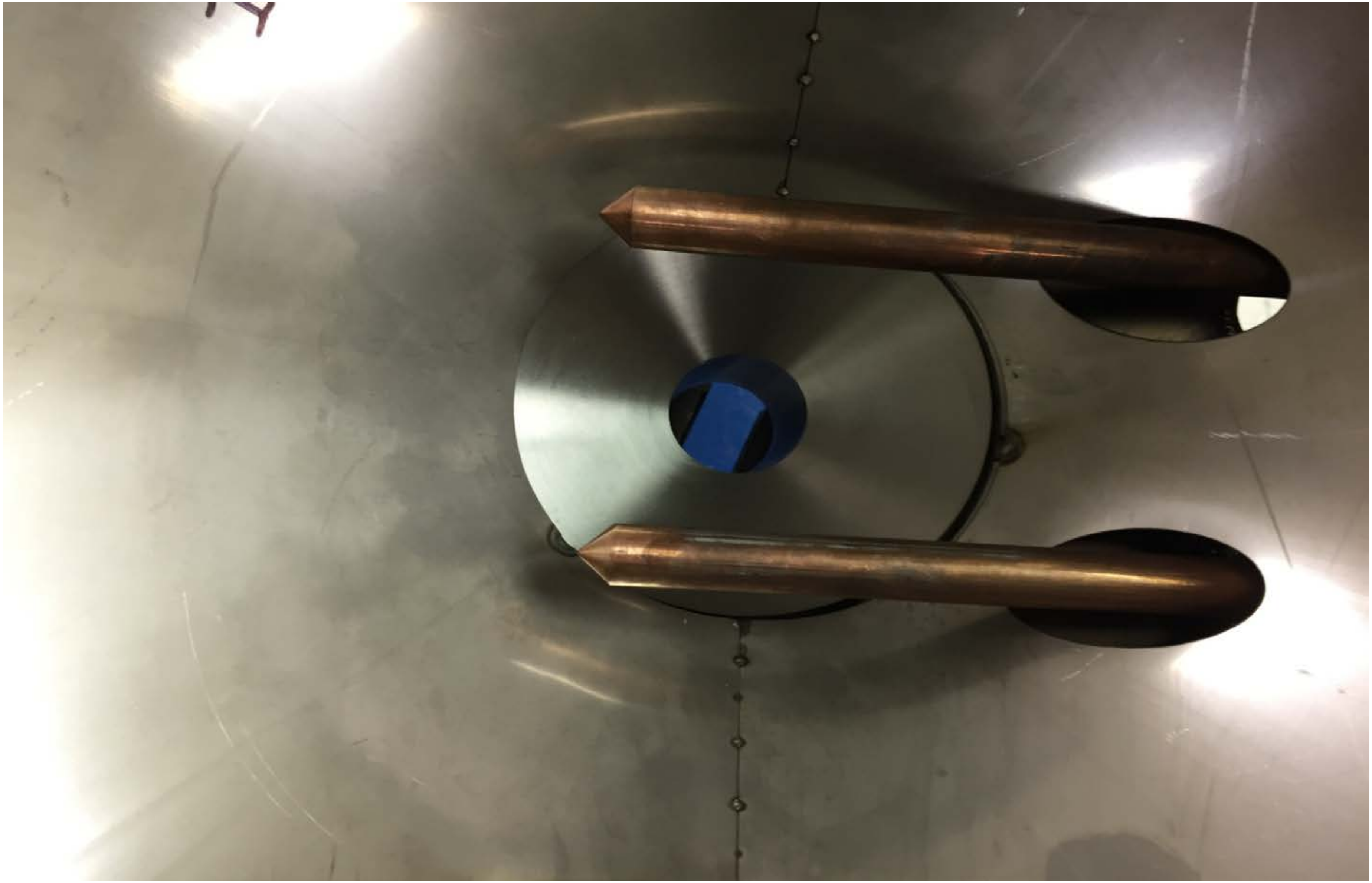

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