# The Revolutionary Plasma Power Technology of Josef Papp

Barry Springer
NPA Web Seminar
November 24, 2012

*Updated April 7, 2013*

I will present some history,

some mystery,

and a challenge.

This is a story about
a Black Swan.

The Black Swan *"…lies outside*
*the realm of regular expectations,*
*because nothing in the past*
*can convincingly point to it's possibility."*

- Nassim Taleb [1]

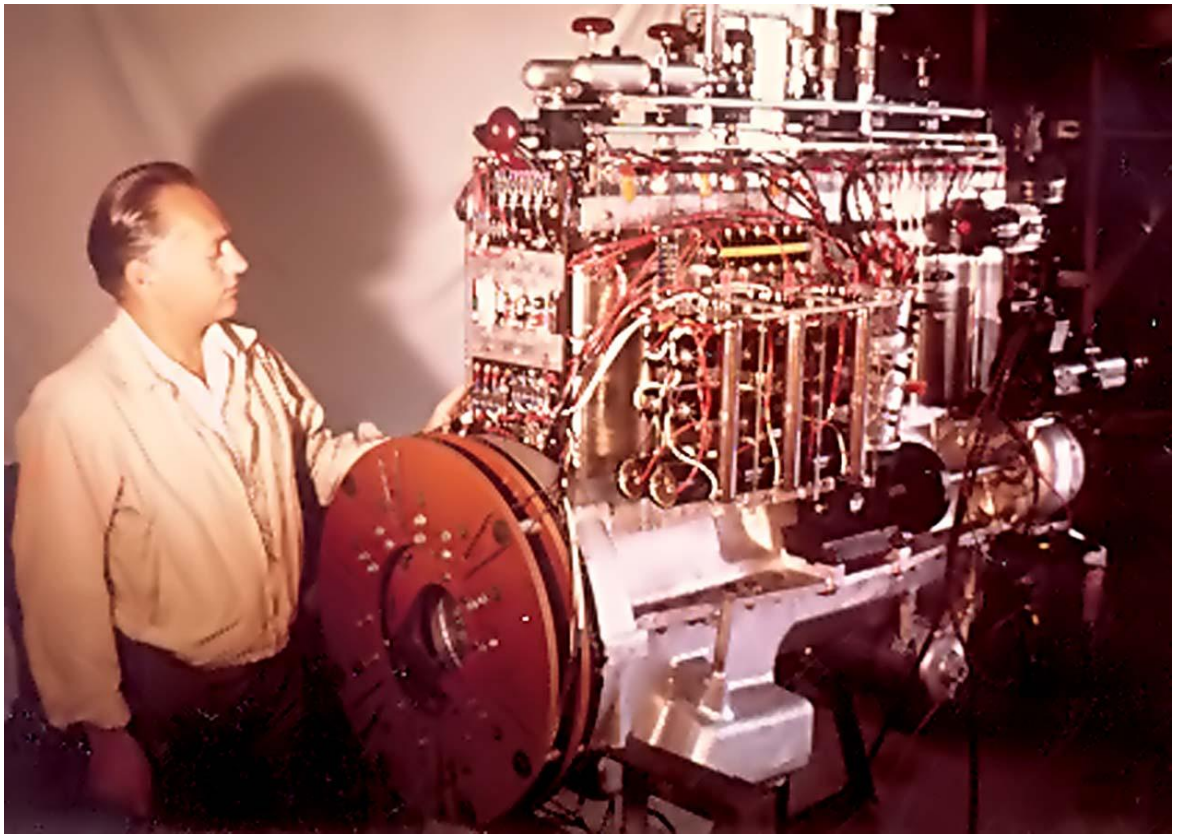
# Overview

- An invention patented 40 years ago is about to go into production.
- It performs the seemingly impossible:
  - Does not burn fuel in the traditional sense
  - Does not appear to produce emissions
  - Warms up when run, but does not get hot
  - Produces more energy than is input to drive it
- This invention will have global impact.

# Josef Papp's Invention

- Josef Papp [2] [3] [4]
  - Born in Hungary in 1933.
  - Emigrated through Canada to U.S. in 1957.
- Developed a plasma transition engine in 1960s.
- Patented his "Method for Converting Atomic Energy into Utilizable Kinetic Energy" in 1972. [5]
- His engine operated on stable noble gases. [5]
  - Contained some Thorium, Rubidium & Phosphorous, but insufficient for known nuclear power reactions.

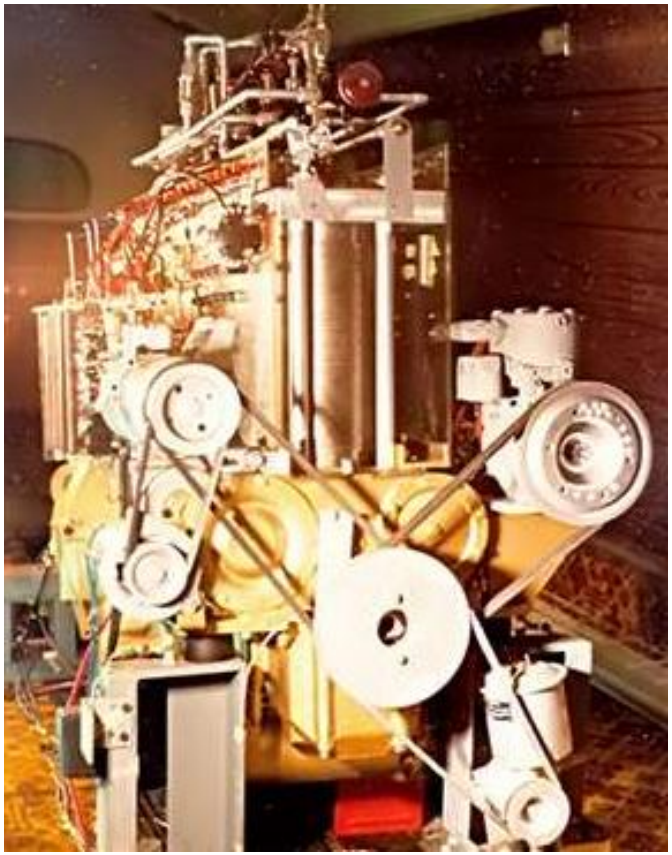
# Josef Papp and his Amazing Noble Gas Plasma Engine (~1968) [6]



*100 hp - no fuel combustion, no emissions!*

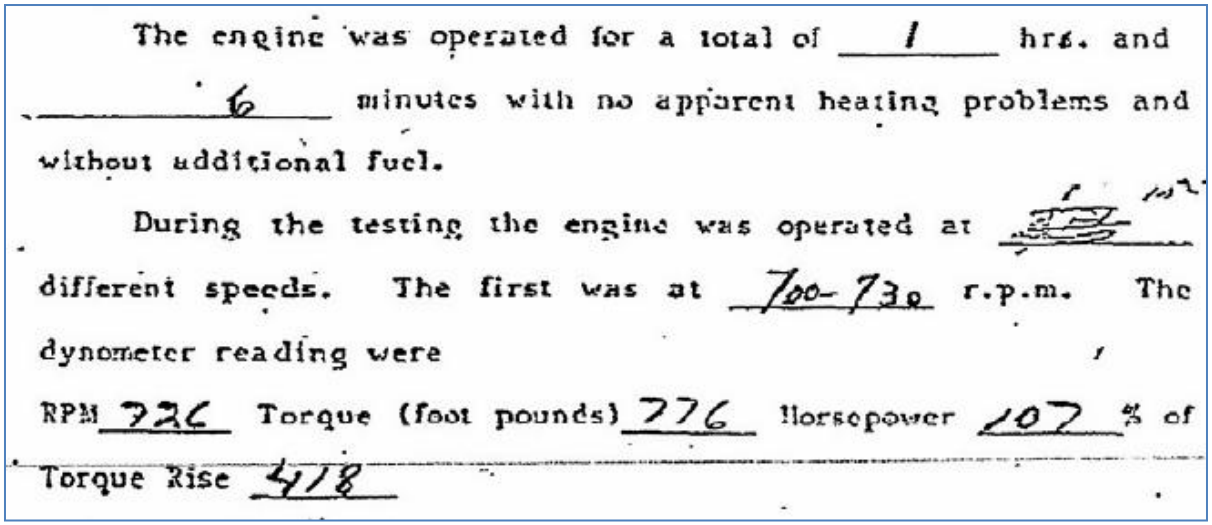
# Papp Engine Demonstrations [6]

- Papp had three demonstration engines built by Rohner Machine Works.
  - 4 cylinder Volvo engine
  - 6 cylinder Leyland engine
  - 2 cylinder custom engine
- All engines ran and produced power.
- None consumed fuel in the traditional sense.



# Plasma Transition Engine Performance

- One engine was dynamometer tested for over an hour and certified by a university team:



The engine was operated for a total of 1 hrs. and 6 minutes with no apparent heating problems and without additional fuel.

During the testing the engine was operated at [illegible] different speeds. The first was at 700-730 r.p.m. The dynometer reading were

RPM 726 Torque (foot pounds) 776 Horsepower 107 % of Torque Rise 418

[7] [8]

  - Produced 107 hp mechanical power (80 kW)
  - Very high torque rise (accepts heavy load w/o stalling)
  - Required about 1 kW of input power
  - Demonstrated about 80:1 over-unity performance!

# Why no Commercially Fielded Papp Engine after 40 years? [4] [9]

- Papp was paranoid about theft of his design.
  - Kept secret significant knowledge of engine physics.
- Cal Tech Prof. Richard Feynmann witnessed a Papp plasma engine demonstration in 1968.
  - Feynmann Interfered in the demonstration, causing engine to explode, with one death and many injuries.
  - Feynmann charged that the demo was a hoax, which persists today, and killed investor support. [9]
- Papp's patent disclosures were incomplete.
  - Engines built to his patent specs would not perform.
- Papp died in 1989 without revealing key secrets.

# *First - a bit of physics and engineering*

| Ancient Greek "Elements" | Modern Physics "States of Matter" |
|---|---|
| ***Fire*** | ***Plasma*** |
| ***Air*** | ***Gas*** |
| ***Water*** | ***Liquid*** |
| ***Earth*** | ***Solid*** |

**Increasing Thermal Energy Densities**

# Energy Density Modes of Plasma

**High to Extremely High Energy Densities**


**Low to Moderate Energy Densities**

Arc Mode

- Solar Photosphere
- Arc Welding
- Lightning

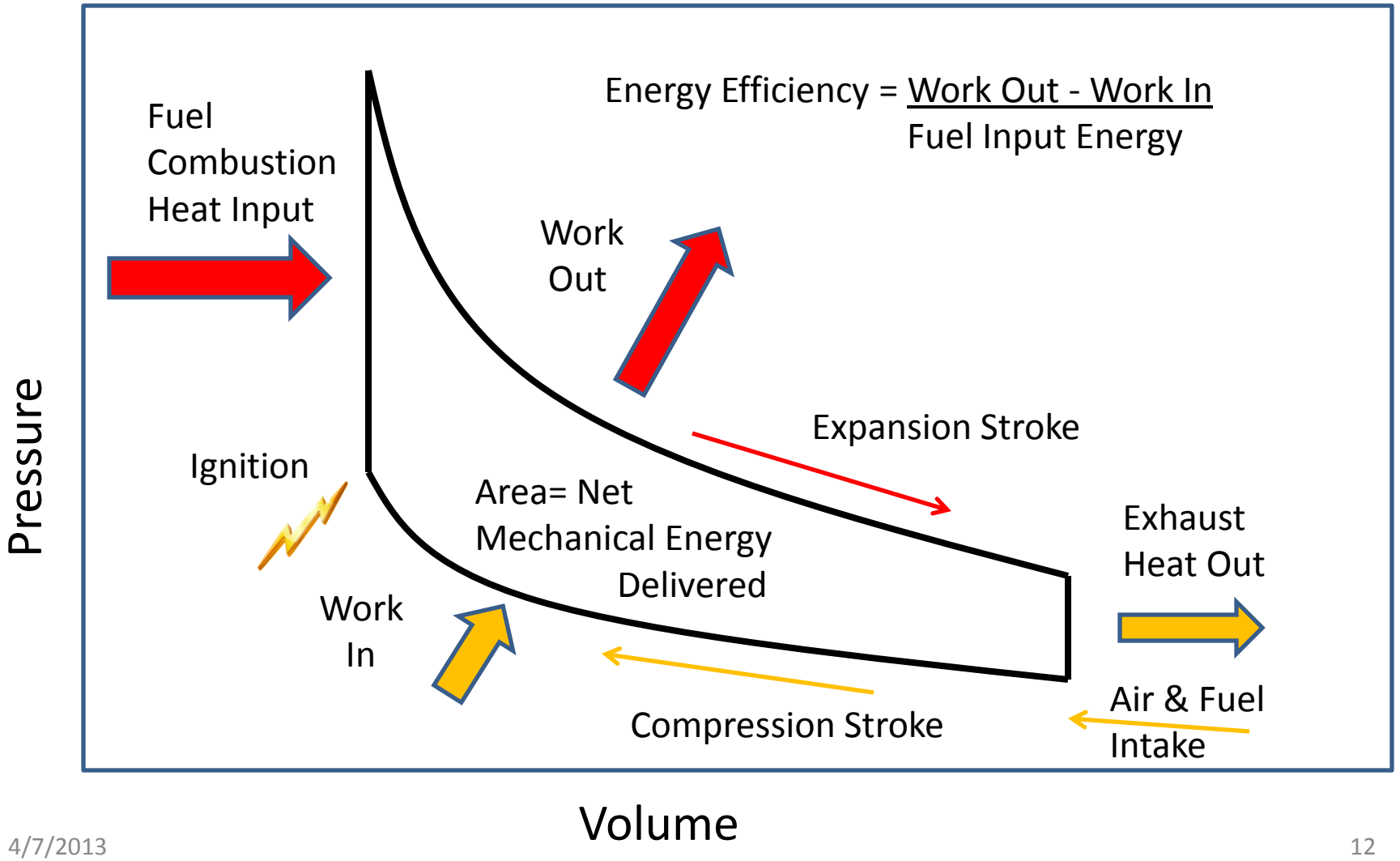
Normal Glow

- Aurora
- Neon Lights
- Fluorescent Lights

Dark Mode

- Solar Wind

# Basic Otto Combustion Engine Cycle [10]



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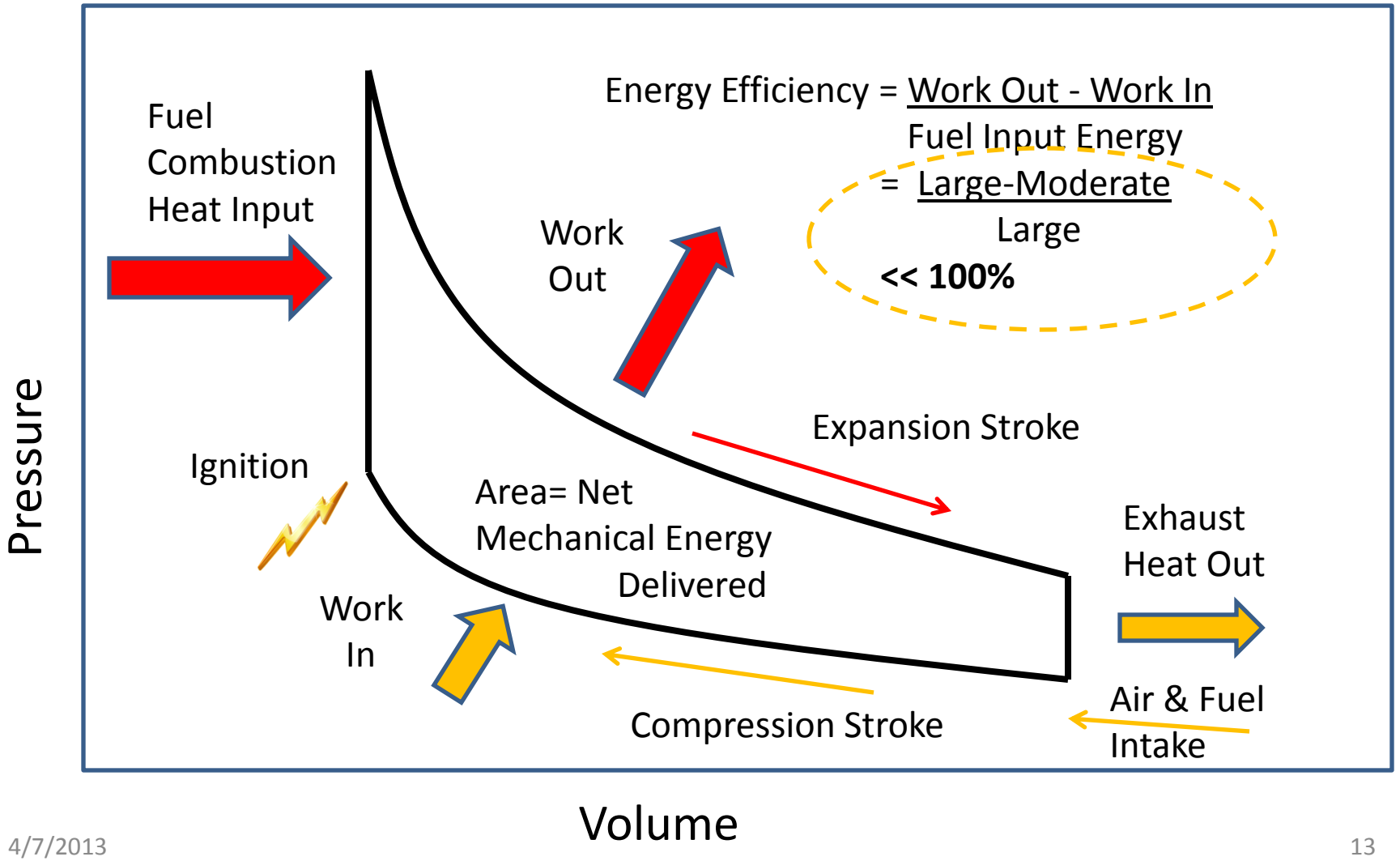
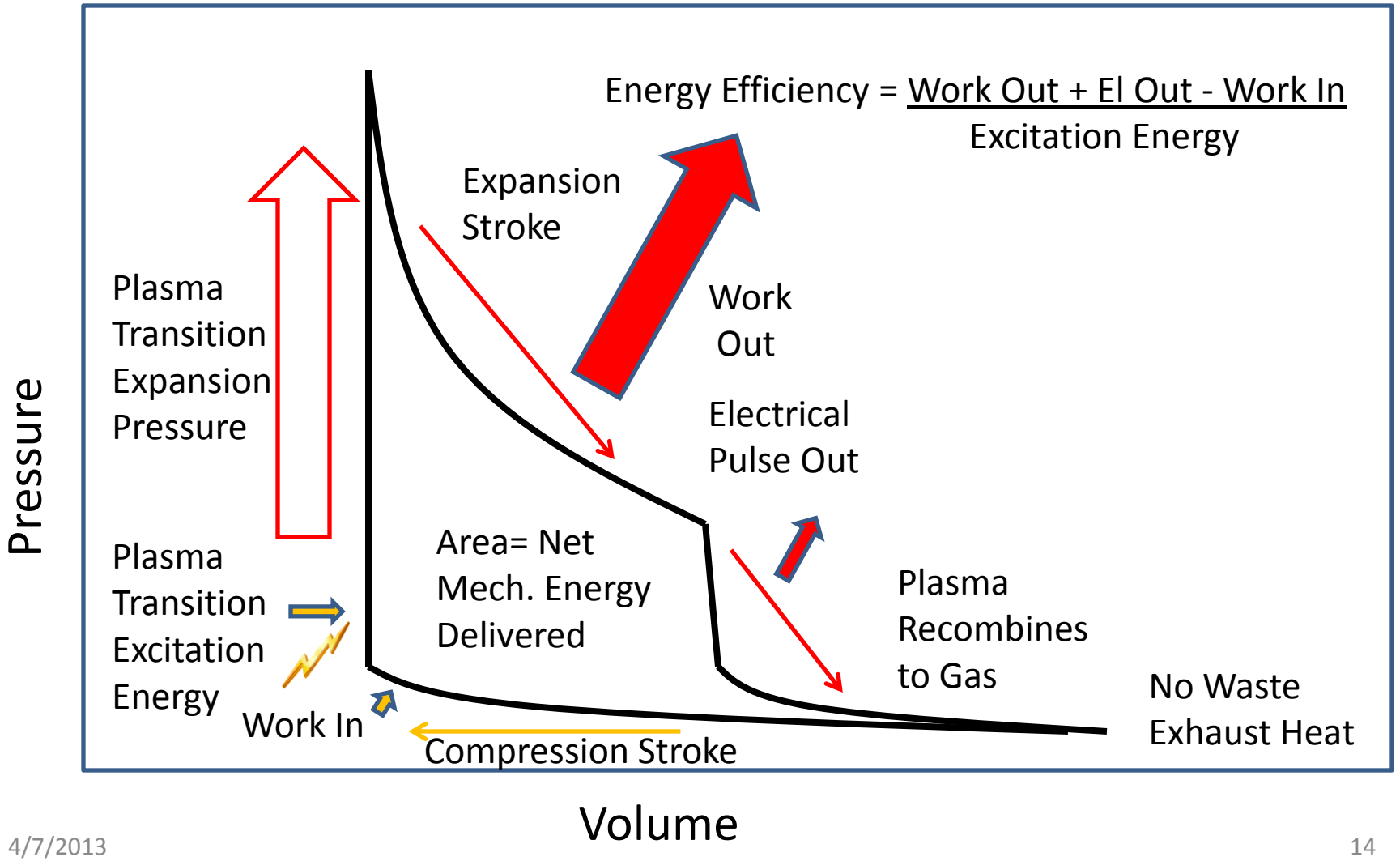


# Notional Plasma Transition Engine Cycle



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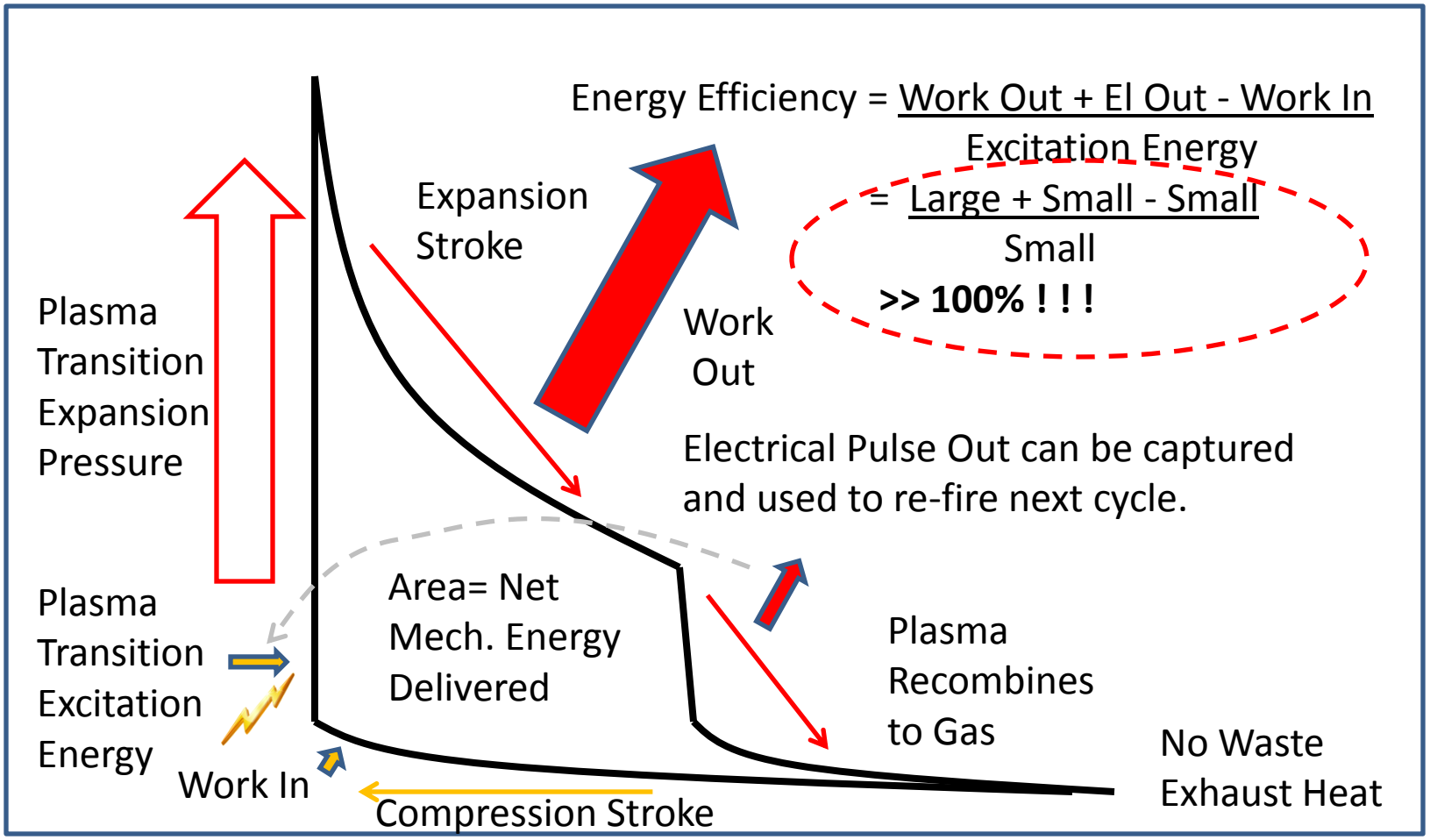

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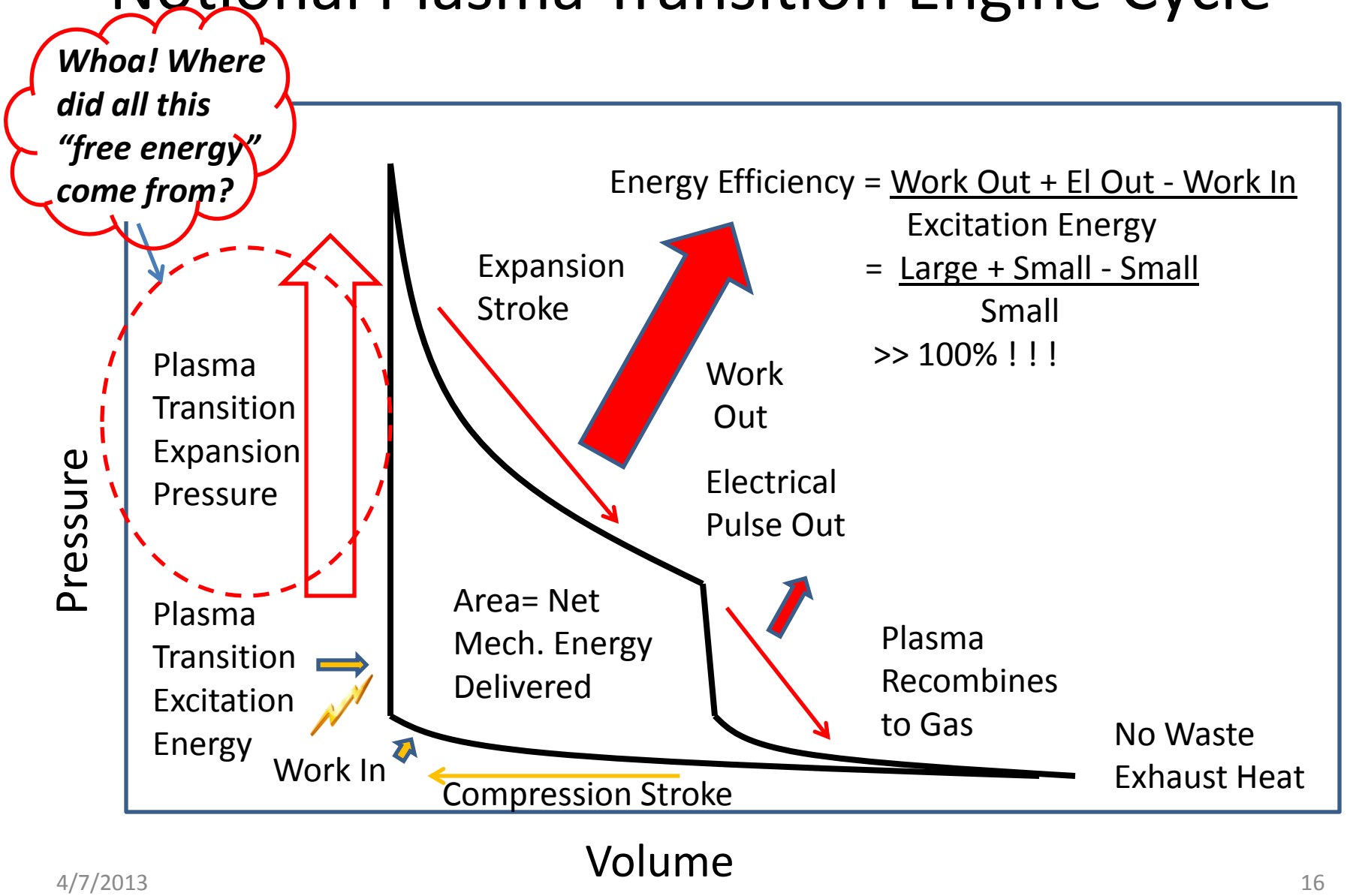
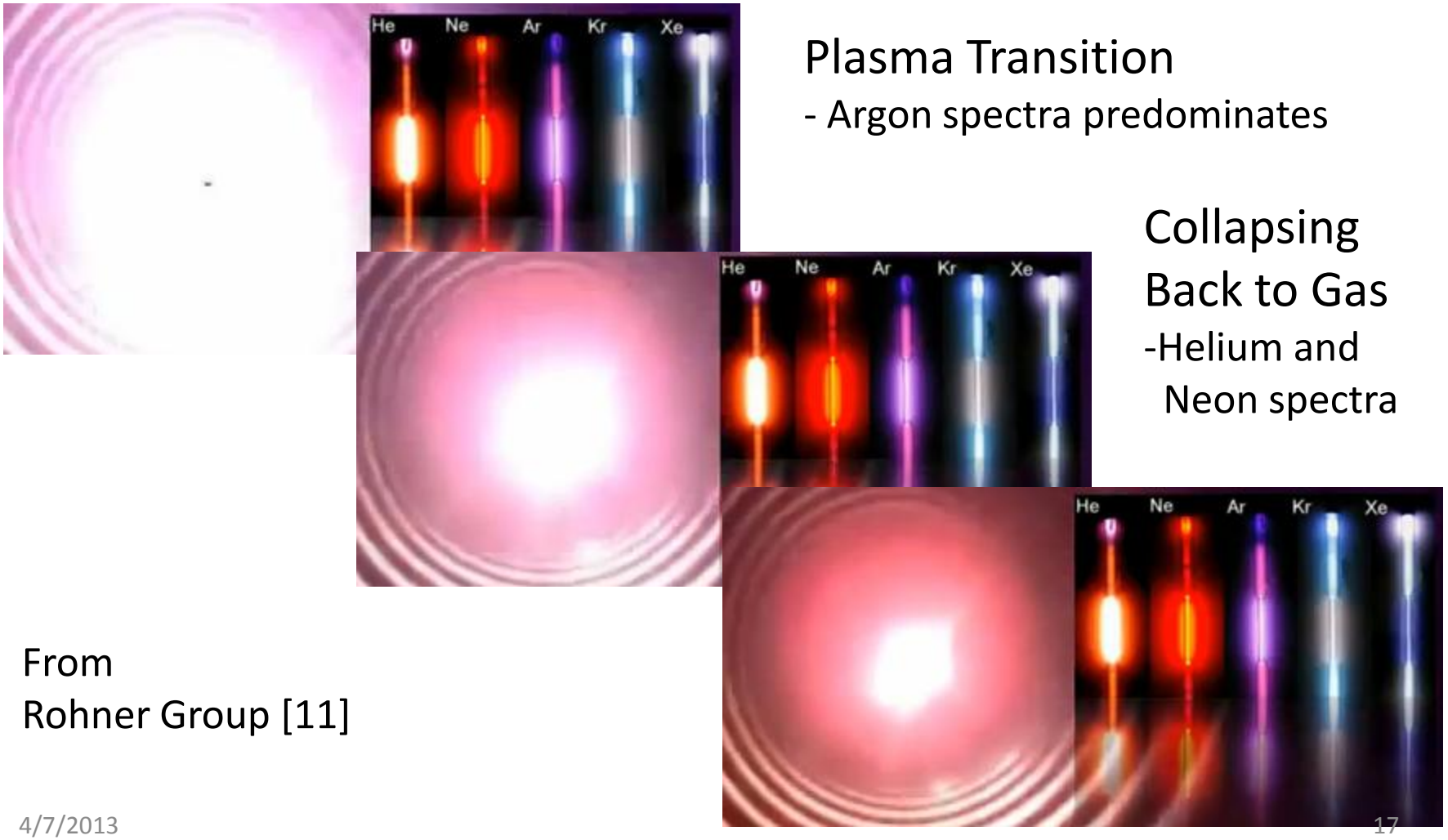


# Plasma Transition Progression

He Ne Ar Kr Xe




Plasma Transition
- Argon spectra predominates

Collapsing
Back to Gas
-Helium and
Neon spectra

From
Rohner Group [11]

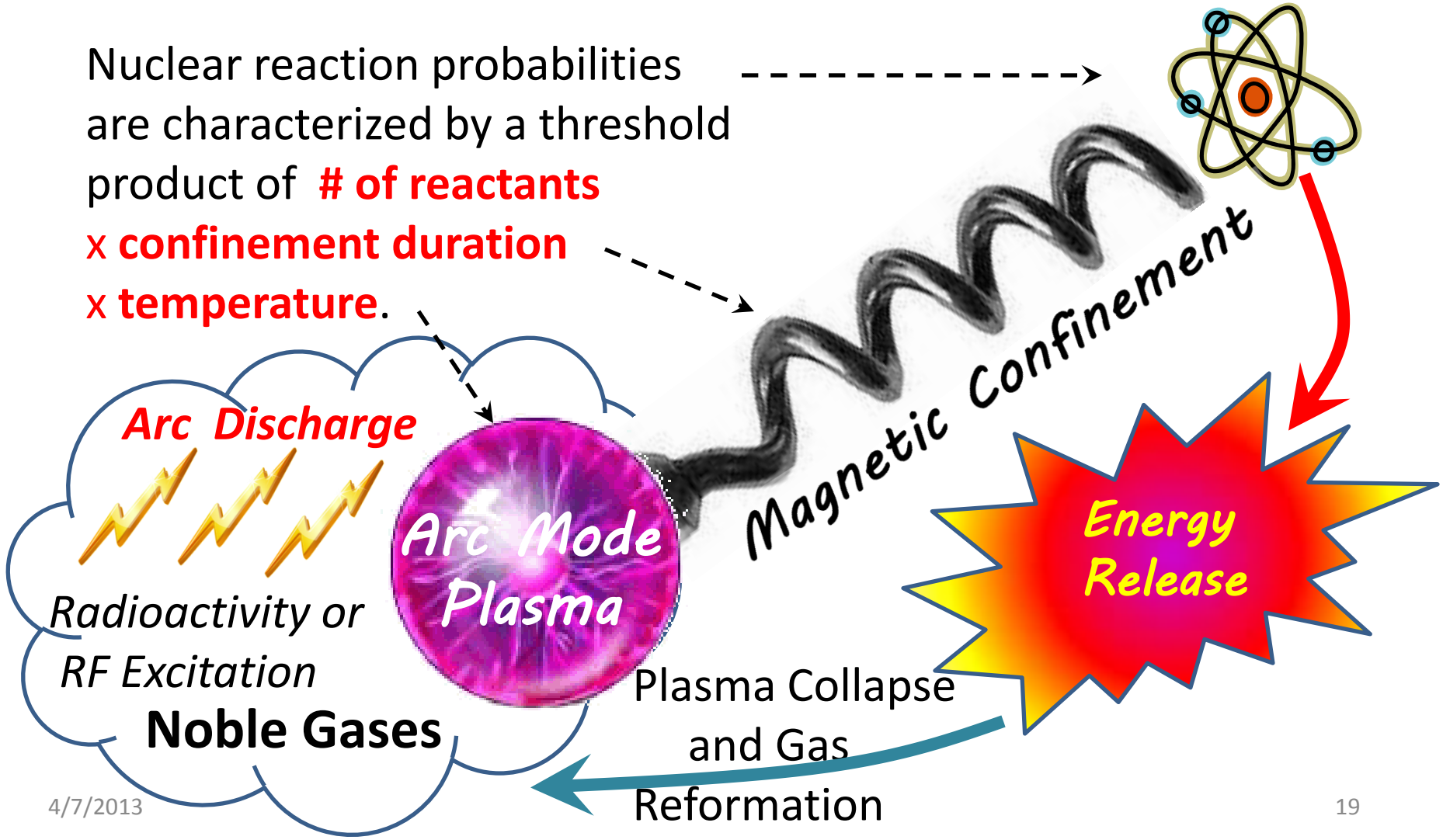
# McKubre's Assessment [12]

- Electro-chemist Dr. Mike McKubre reviewed Papp history and plasmic demonstrations.
  - Former Director of Energy Research Center of Stanford Research Institute (SRI) International

  *"…when I first heard of the Papp engine, I was intrigued because* [under current theories of chemistry and physics] *it is clearly impossible. It is clearly impossible, but apparently works."*

  *"…we set up the test, showed them what to do, made the measurements, and yes there was at least ten times more energy being produced than electrical input energy."*

*Dr. McKubre - "But it is clearly a nuclear process, and … energy density in nuclear effects is about ten million times larger than the energy density of chemical processes."* [12]



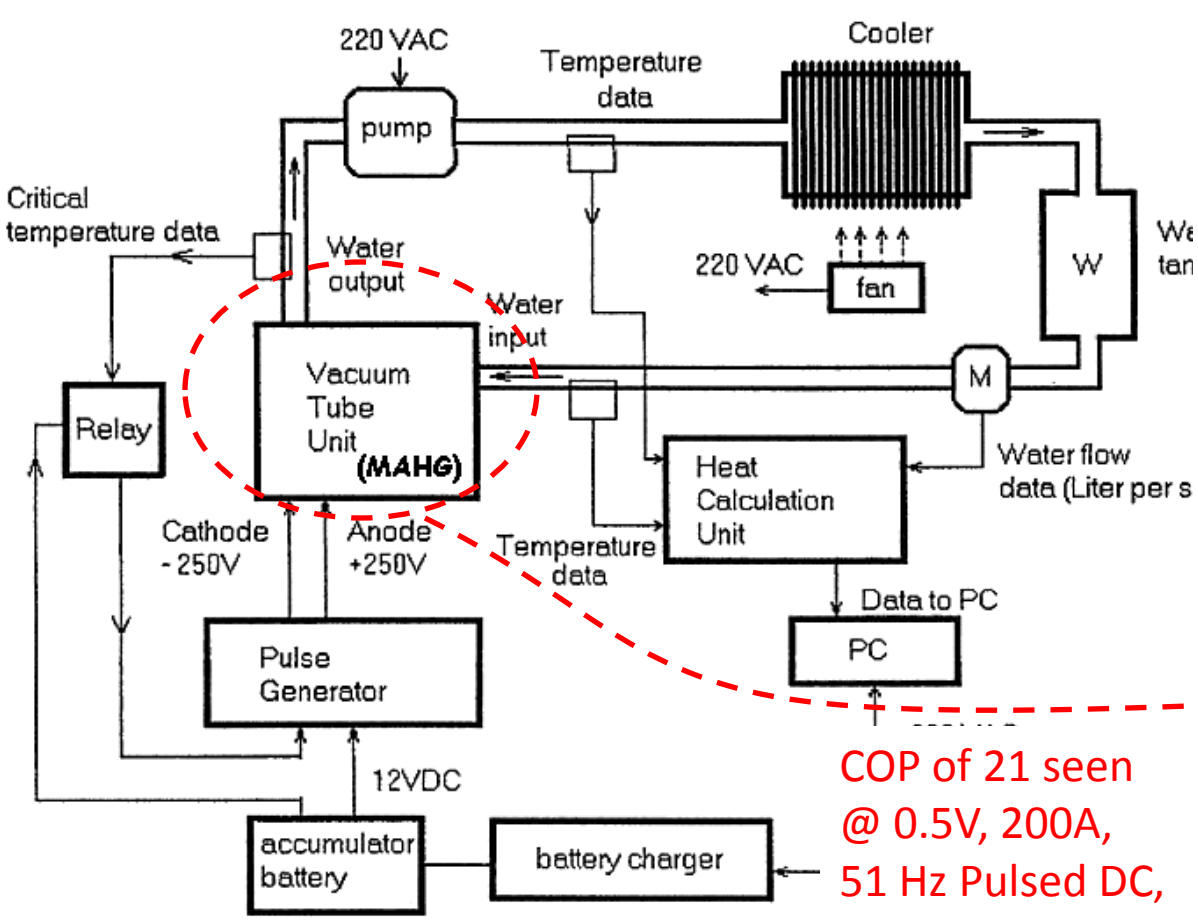
# Energy-Releasing Reactions [13]

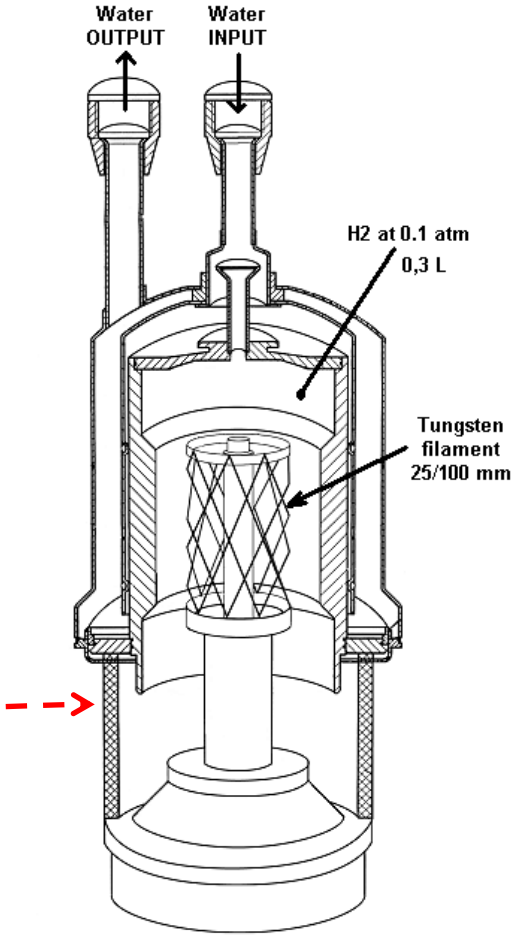
| Reaction Class > | Chemical | Fission | Fusion |
|---|---|---|---|
| **Sample Reaction** | $C + O_2 \rightarrow CO_2$ | n + U-235 -> Ba-143 + Kr-91 + 2 n | H-2 + H-3 -> He-4 + n |
| **Typical Inputs (to Power Plant)** | Bituminous Coal | $UO_2$ (3% U-235 + 97% U-238) | Deuterium & Lithium |
| **Typical Reaction Temperature (K)** | 700 | 1000 | 100,000,000 |
| **Typical Reaction Temperature (°F)** | 801 | 1340 | 180,000,000 |
| **Energy Released per kg of Fuel (J/kg)** | $3.3 \times 10^7$ | $2.1 \times 10^{12}$ | $3.4 \times 10^{14}$ |
| **Relative Energy Density** | 1 | 63,636 | 10,303,030 |

# Langmuir's Atomic Hydrogen [14] [21]

- Dr. Irving Langmuir discovered that with only 431 J/g.m., molecular Hydrogen can be dissociated into atomic Hydrogen ($H_2$ -> 2 H).
- But, recombination into molecular Hydrogen (2 H -> $H_2$) releases 376-435 kJ/g.m. energy!
  - Recombination appeared to involve a catalyst
- Based on Langmuir's work, G.E. developed the Hydrogen arc torch -- capable of 3700 K heat.
  - Torch was designed for welding Tungsten; which may have served as surface catalyst for molecularization, and provided an efficient heat transfer mechanism.

# Moller/Frolov Atomic Hydrogen Generator (MAHG) Test Cell [20] [21]



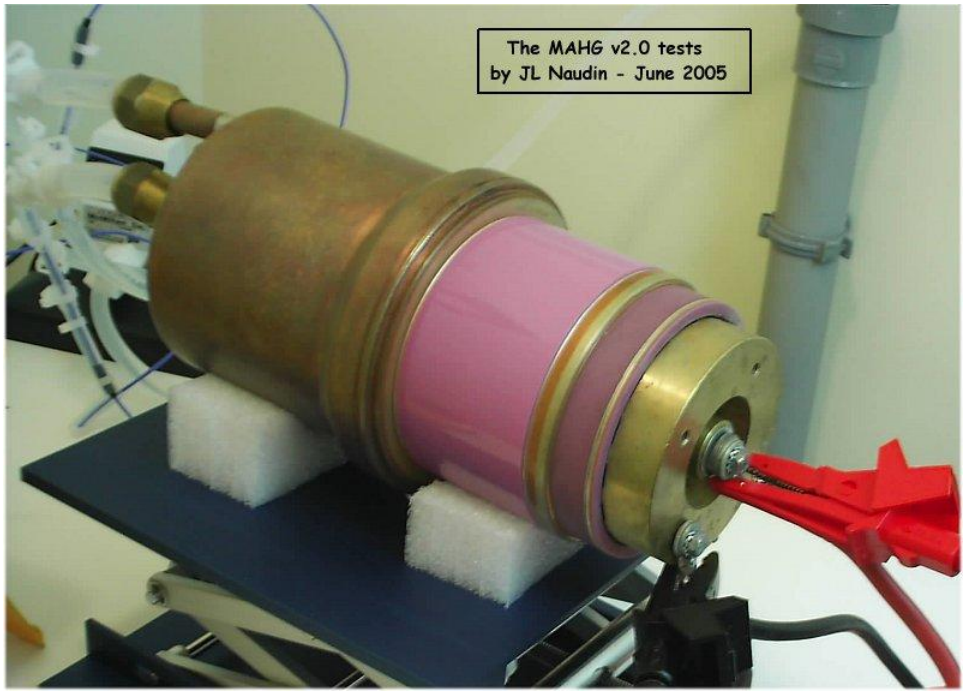




The MAHG (Moller Atomic Hydrogen Generator)

COP of 21 seen
@ 0.5V, 200A,
51 Hz Pulsed DC,
4.8% Duty Cycle.

# Moller/Frolov Atomic Hydrogen Generator (MAHG) Test Cell [15] [21]

- Using the Langmuir atomic Hydrogen process, this MAHG test cell has demonstrated over unity thermal COP of 21.
- Could Langmuir's atomic Hydrogen provide the key to understanding Papp's noble gas transition energy release?



# Papp's Explanation

*"… an ignition discharge occurs in which the helium splits into hydrogen [*] in a volume not larger than 2 or 3 x 10 -6 cubic millimetres at a temperature of approximately 100,000,000 degrees F. "*

*"… there is a minute fusion reaction in the helium consisting of the energy conversion of a single helium atom [*] , which releases sufficient energy to drive the piston in that chamber.. "*

-- from Papp's 1972 Patent [5]

* *"splits" and "fusion"* -- Is Papp describing Langmuir's molecular dissociation and atomic fusion process?

# ***Bob Rohner's***
# Pulsed Plasma Demonstration [12]

- A single cylinder plasmic "popper" was demonstrated at 2012 Tesla Tech Conference.
- Piston was driven by electrically induced, magnetically confined plasma expansion of gases:
  - 36% Helium, 26% Neon, 17% Argon, 13% Krypton, 8% Xenon (*Papp's preferred mixture per his patent*)
- Chamber was sealed, no intake, no exhaust.

# *John Rohner's*
# Pulsed Plasma Demonstrator

- This single cylinder plasmic "popper" (absent a confinement coil) was shown, but not demonstrated, at 2012 Tesla Tech Conference.
- Inteligentry sells construction and operation plans.
- An advanced experimenter could build one.

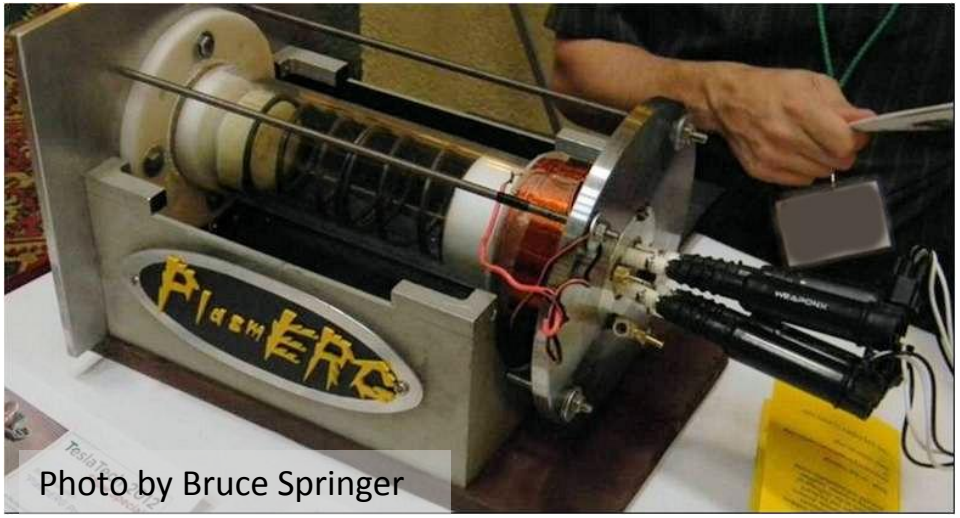


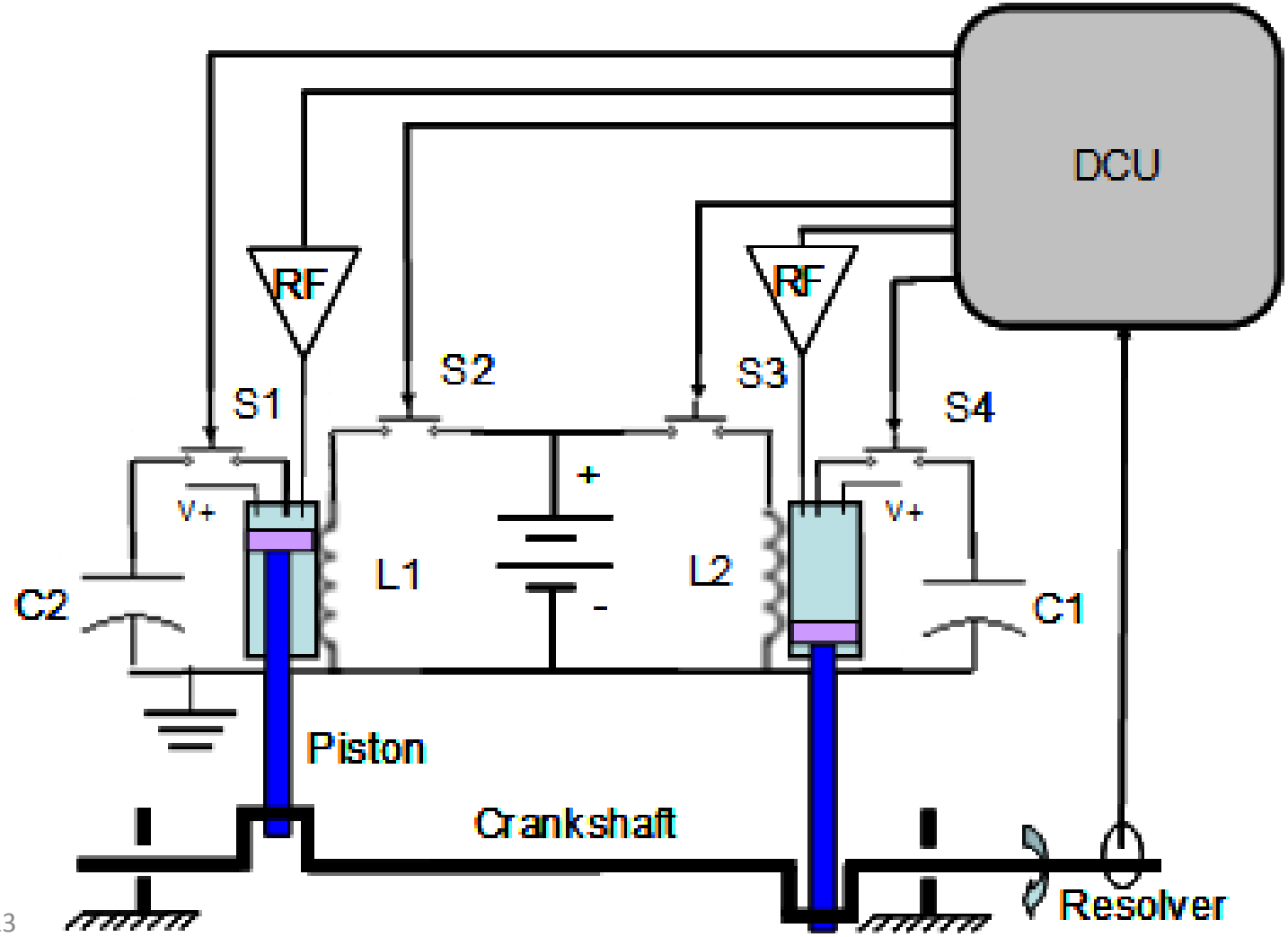
Photo by Bruce Springer

# ***John Rohner's*** Improved Plasmic Transition Process Motor [16]

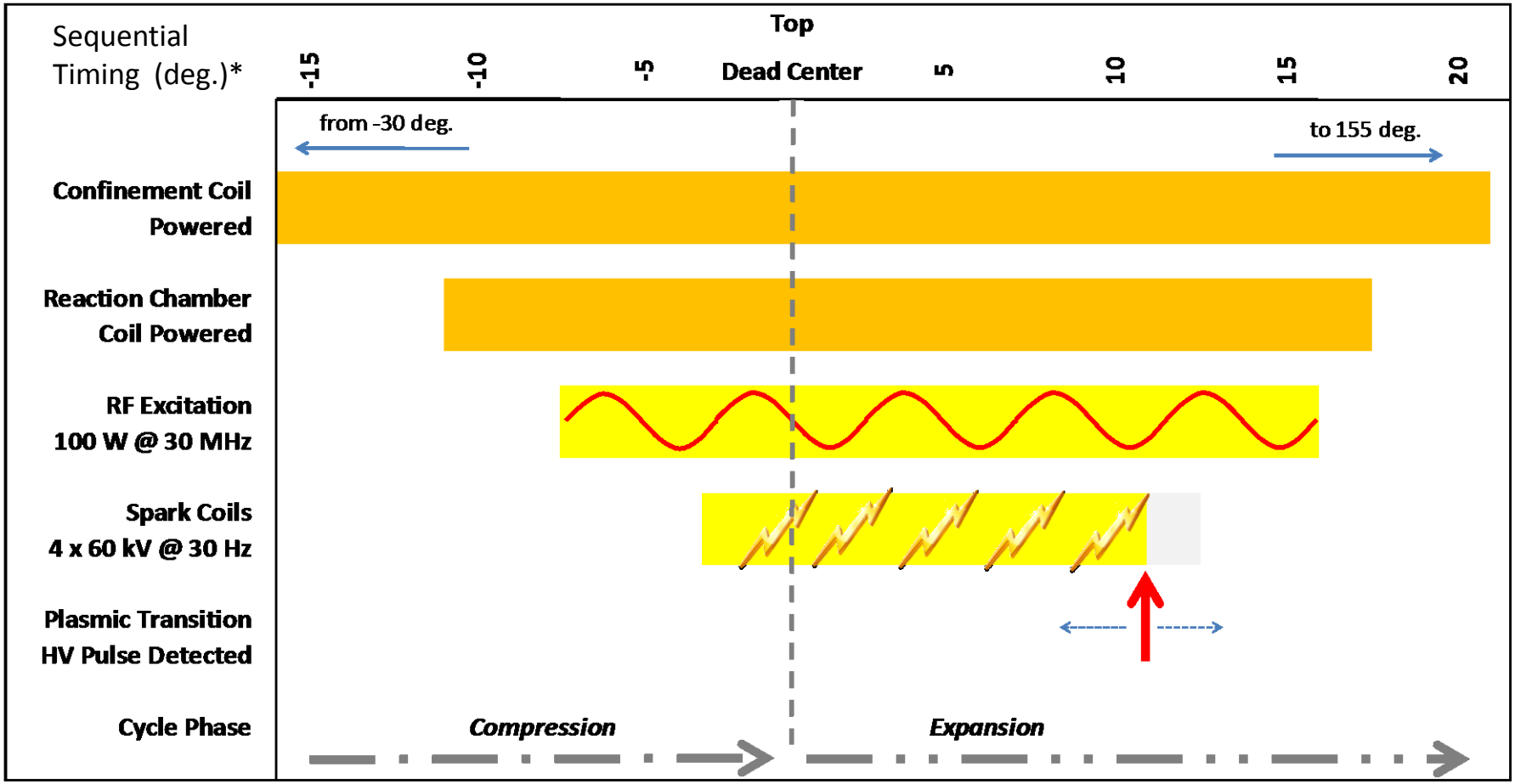
- Pre-charge of 100 cc of noble gases/cylinder.
  - Helium, Neon, Argon, Xenon and Krypton
- 5:1 volume expansion = 500 cc displacement/cyl.
- Digital control unit regulates motor processes
  - RF energy input excites and pre-charges gas mix *(new*)*.
  - Magnetic field confines charged gases to cylinder axis.
  - Helium moves to inside; heavier gases insulate walls.
  - Electric arc discharge transitions gases into plasma state.
  - Plasma expansion forces piston to move against load.
- Controller detects need to refresh motor gas mix *(new*)*
  - Can perform gas mix refresh while motor is running. *(new*)*

**new* identifies improvements over original Papp motor design.

# System Diagram of the Plasmic Transition Process Motor [16]

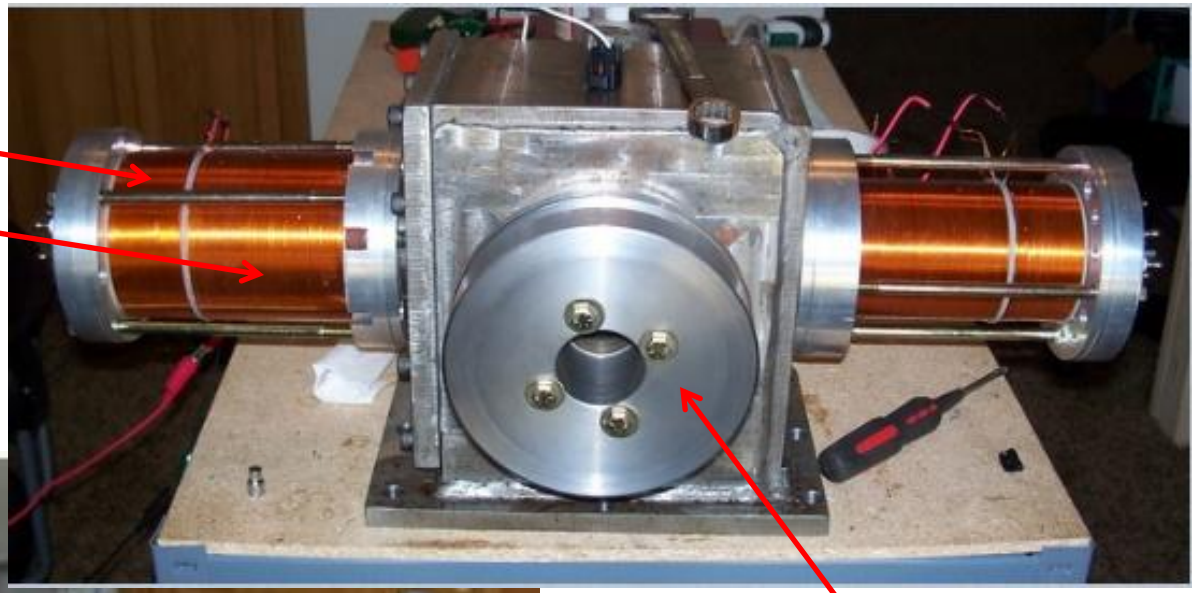


# Plasmic Transition Power Cycle




* Timing sequence as described by Sterling Allen. [17]

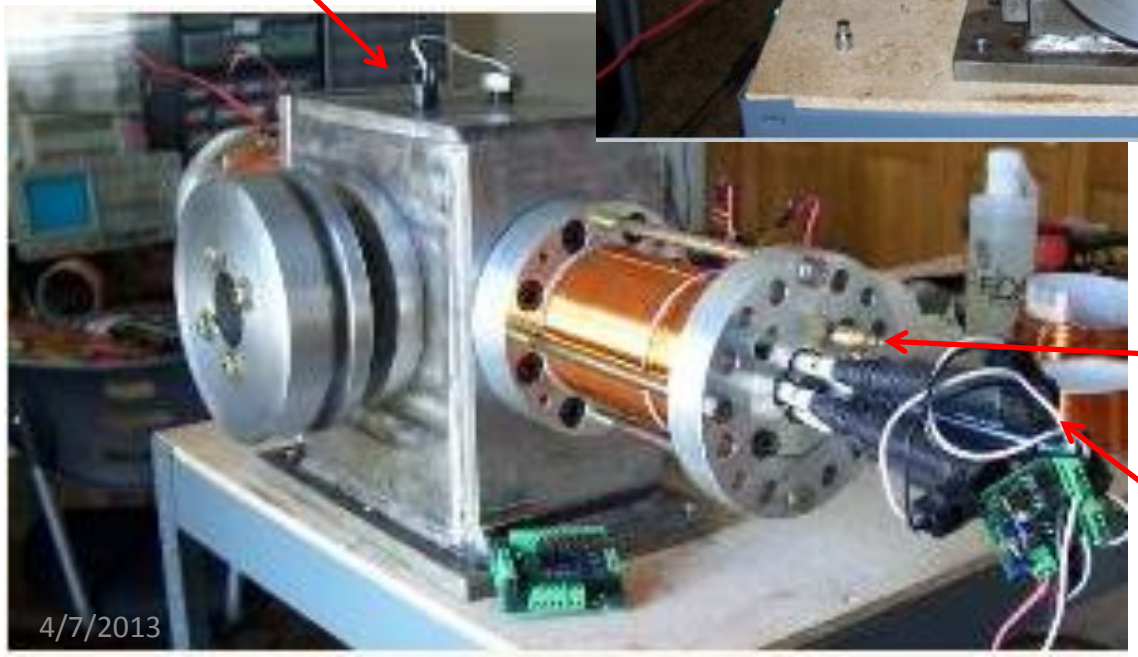
# Laboratory Test Model of the Plasmic Transition Process Motor [16]



Reaction Chamber Coil

Confinement Coil

Timing Sensor



Motor Flywheel

Gas Charge Port

Spark Coils on Arc Electrodes

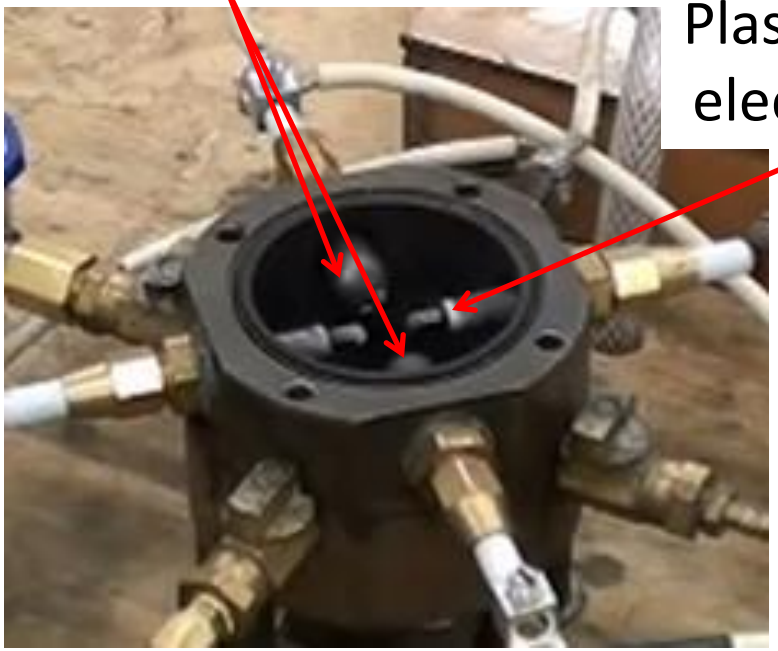
# Papp to Rohner Design Evolution of Plasma Transition Chamber

Rubidium, Thorium and Red Phosphorous in excitation "Thimbles"

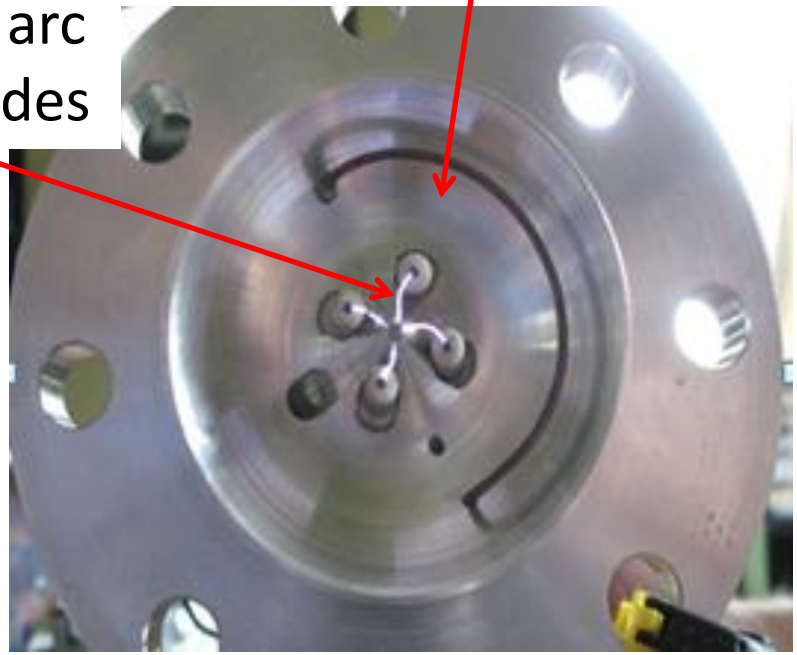
Improvements

Radioactive materials are replaced by RF excitation injected by loop antenna.

Plasma arc electrodes



Papp's original chamber design, built by Bob Rohner [12]



Improved chamber design, built by John Rohner [16]

# Positive Signs of Progress

- John Rohner's company "Inteligentry" is licensing a "Plasmic Transition Process Motor" for international production.
  - Patent pending on improvements to Papp design. [18]
  - Motor was designed in 3-D CADD-CAM.
  - Inteligentry will produce motor control electronics.
- Inteligentry announced plans to demonstrate a PTM at POWER-GEN in Orlando, Dec. 11-13. [19]
  - The Plasma Transition Motor with a generator was displayed, but not functionally demonstrated. [23]

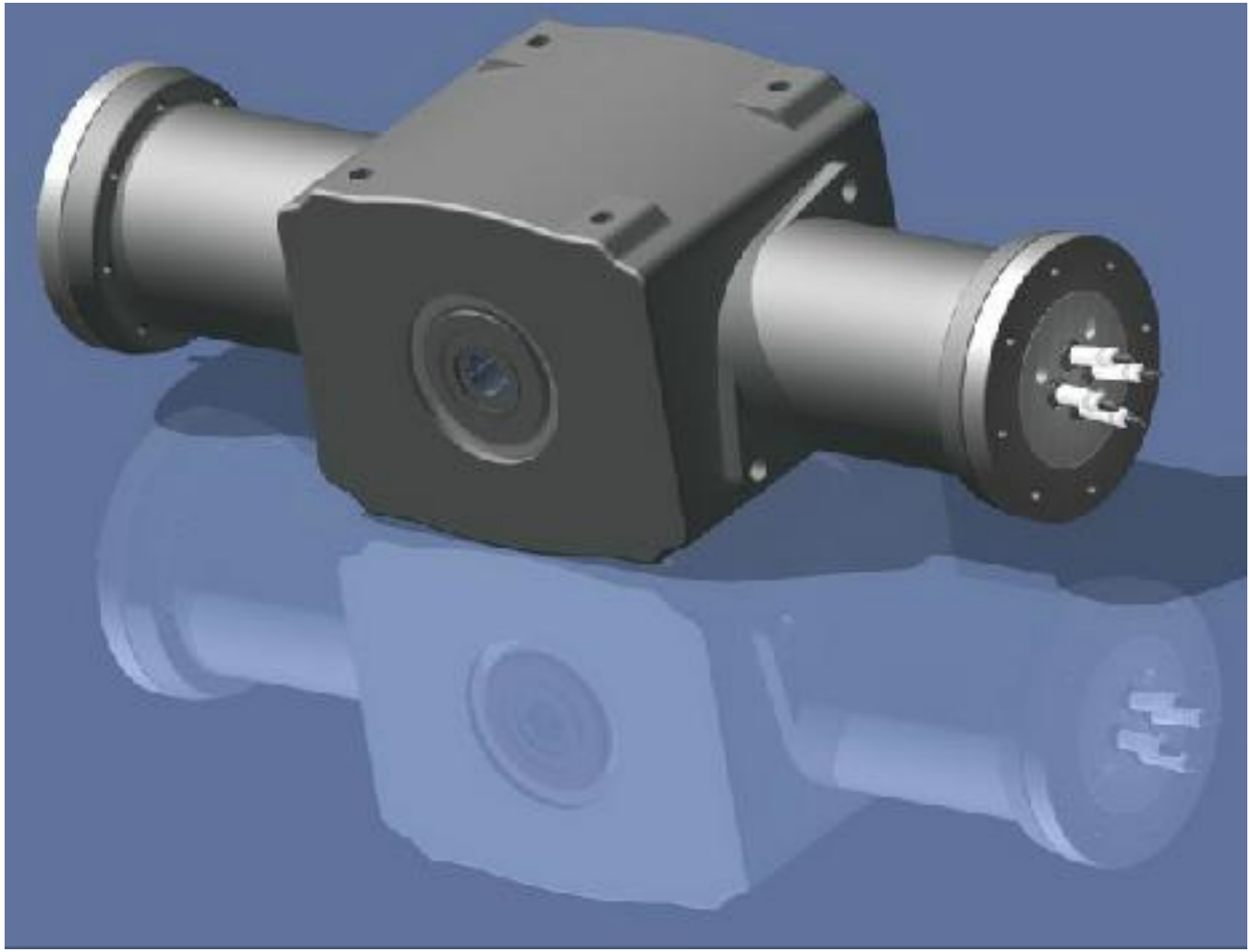
# *Status Update - April 2013*

- Bob Rohner has continued his re-development of a plasma transition motor based on Josef Papp's original design.
- He has demonstrated cycling of a twin cylinder motor using excited plasma expansion.
  - Input and output energies were not measured.
  - No claim of over unity performance has as yet been demonstrated or claimed for this newly built motor. [25]

# *Status Update - April 2013*

- FBI raided Inteligentry offices and facilities and confiscated all motor components, tools, production and test equipment, computers, software and business records.
- Raid was prompted by a complaint filed by SEC against John Rohner alleging that he sold unregistered investments in his company to finance his development work.
- This action effectively halts current development work by John Rohner on his Plasma Transition Motor. [24]

# CADD-CAM Design View of Plasmic Transition Motor [16]



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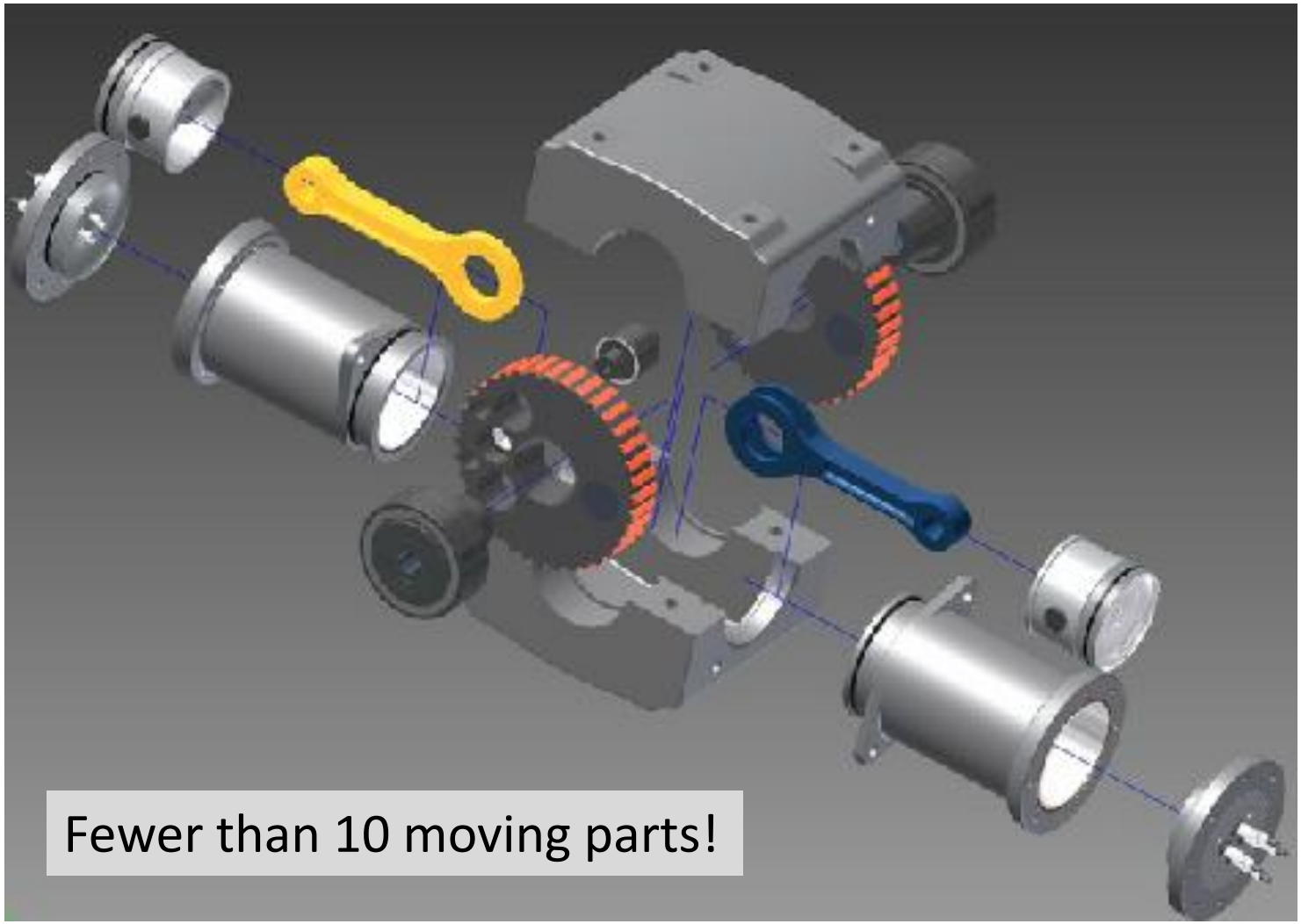


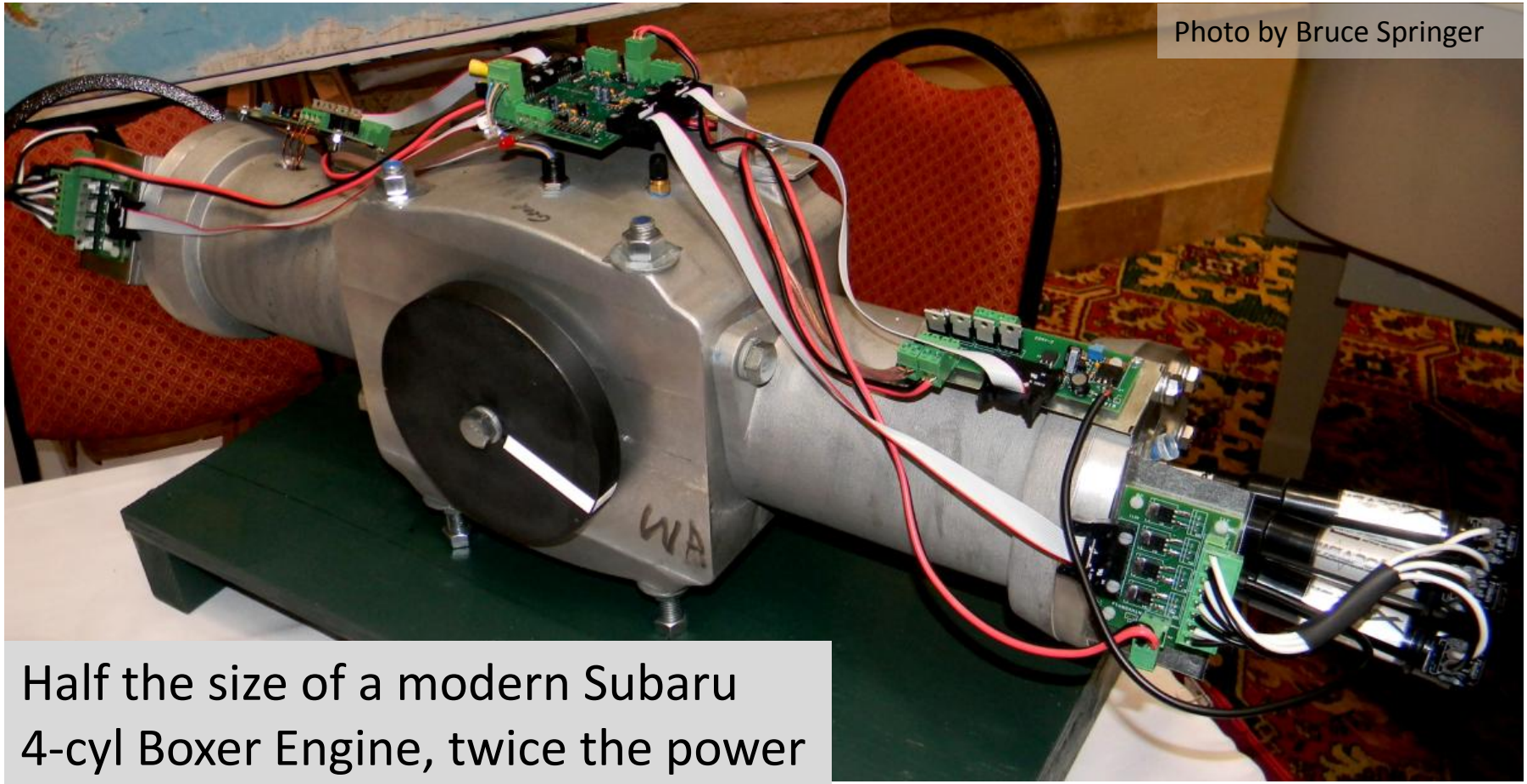
# Potential Mobile Power Uses for the Plasmic Motor

- Low cost, extended range, true zero emissions power sources for cars, trucks, motorcycles, aircraft, boats, and agricultural equipment. (near term)
- Non-aspirating, non-emitting long life power source will enable new endeavors in underground, undersea and space environments. (long term)

# Potential Fixed Power Uses for the Plasma Motor

- Modular portable generators for emergency and back up power needs. (near term)
- Power off-grid needs such as remote location electric power generation, desalination and agricultural pumping. (near term)
- Scaled or banked plasmic motors may provide megawatt class dispatchable renewable electric power generation at delivery points. (long term)

# Instructional Boxer Design Shown at Tesla Tech 2012 [12]




Half the size of a modern Subaru 4-cyl Boxer Engine, twice the power and no exhaust emissions!

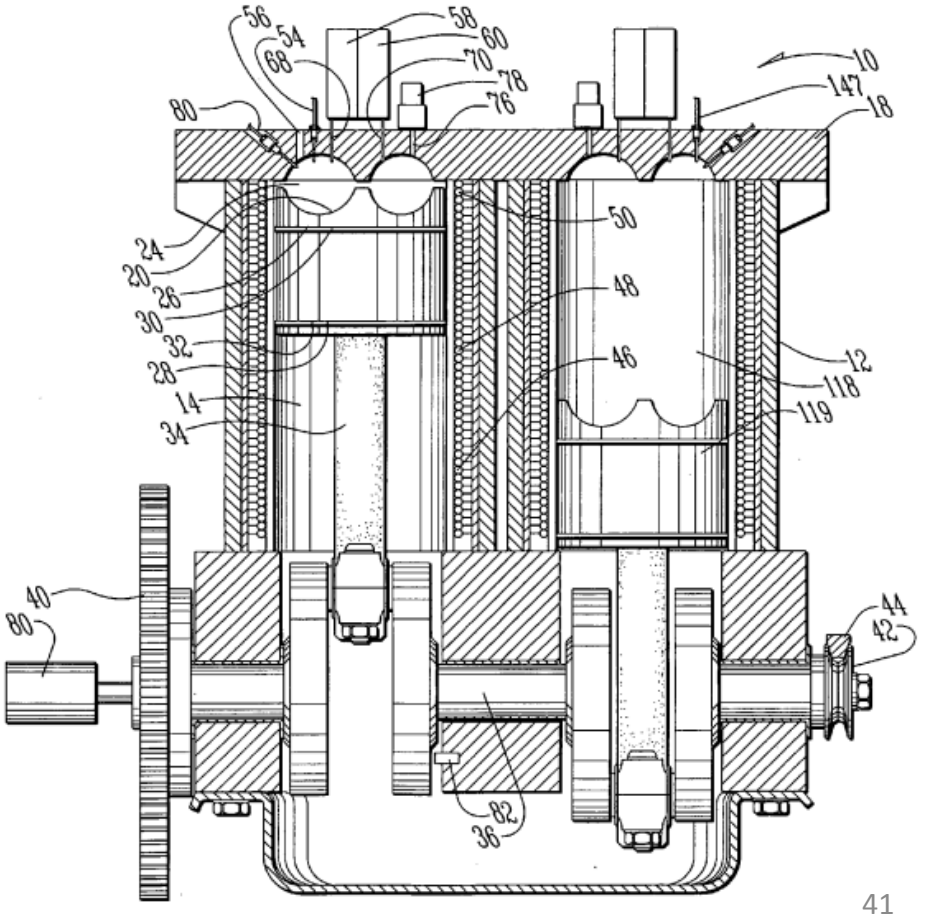
# Potential Retarding Factors

- Long term reliability, maintainability and life cycle costs of plasma transition motors have not yet been demonstrated.
- Inertia of present energy system investments will slow deployment of plasma transition motors.
- Plasmic transition motors will be deployed gradually:
  - First, in high risk early technology adopter markets;
  - Then, in markets driven by high fuel costs; and
  - Finally, in competition with traditional energy sources, encountering highest opposition but with greatest long term impact.

# Original and Current In-Line Designs for Noble Gas Plasma Transition Motors

***1984*** Noble Gas Plasma Engine built by ***Robert Rohner*** for Josef Papp [6]

***2012*** Plasmic Transition Process Motor by ***John Rohner*** (from Patent Application) [18]



# Conclusions

Noble gas plasmic transition energy release is not understood.

However -- plasmic transition energy release appears to be very real.

We may be on the verge of a revolution in power generation technology.

# The Questing Mind

"When James Clerk Maxwell was a lad,
His questing mind fair deaved his Dad;
For "**What's the go of it**?" he'ld speir,
An' hammer on till a' was clear."

from The Genius o' Glenlair [22]
by Prof. Keith Moffatt

# A Challenge for the NPA

- Mainstream chemistry and physics regard the Papp engine as "*clearly impossible*."
  - Observational evidence suggests otherwise.
- A process that operates outside the box -- requires thinking outside the box to explain.
- Does NPA harbor intellectual talent capable of discovering *"what's the go of it"* regarding noble gas transition energy release?

# Areas for Inquiry

- Experimentation and testing
  - Sample cylinder gases during extended plasmic motor operation to map molecular and/or atomic migration.
  - Accurately measure timing of spectral line changes during gas to plasma transition and collapse.
  - Monitor electromagnetic and particle emissions.
- Theory and prediction
  - Explore non-mainstream atomic and subatomic models for potential mechanisms that could explain the noble gas transition energy release process.
  - Predict and bound gas mixes and dynamic operating modes that might prove to be optimum or hazardous.

# A Serious Note on Safety

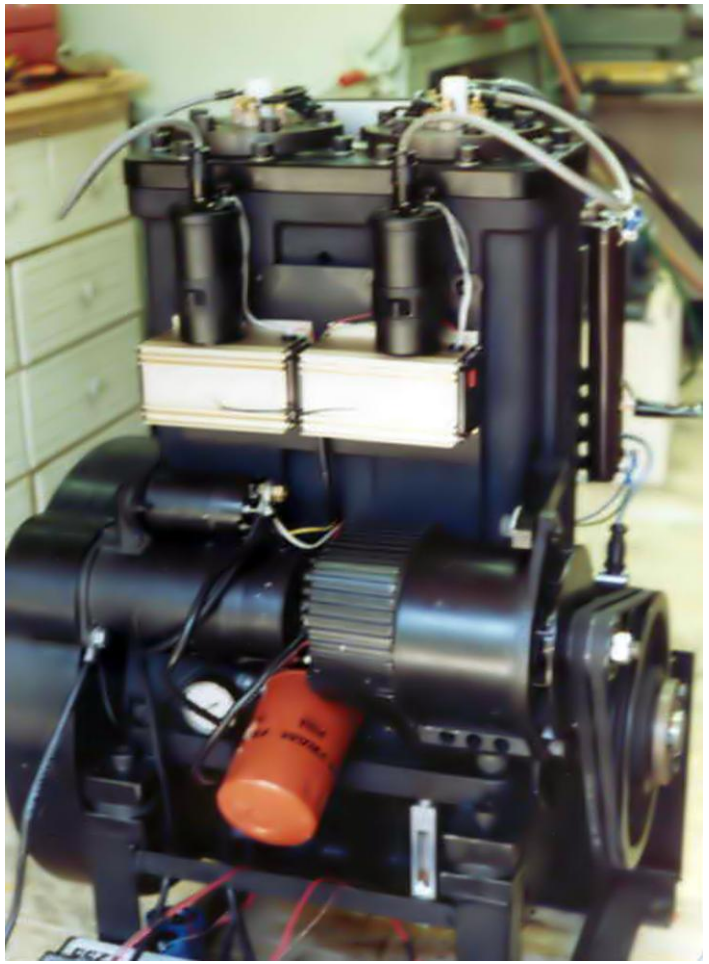
Plasma transition technology resides in ***lightly trod regions of nuclear physics***.

It's mysterious ability to trigger release of ***highly energetic forces*** piques curiosity.

An advanced ***amateur experimenter*** could build and operate a plasma transition device.

For those who fail to respect the potential power involved and for whom curiosity outruns caution -- ***unfortunate outcomes may result***.

This motor clearly *". . . lies outside the realm of regular expectations . . ."*



*Can it generate 1.21 GigaWatts?*
*Not yet, but perhaps in the future . . .*

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