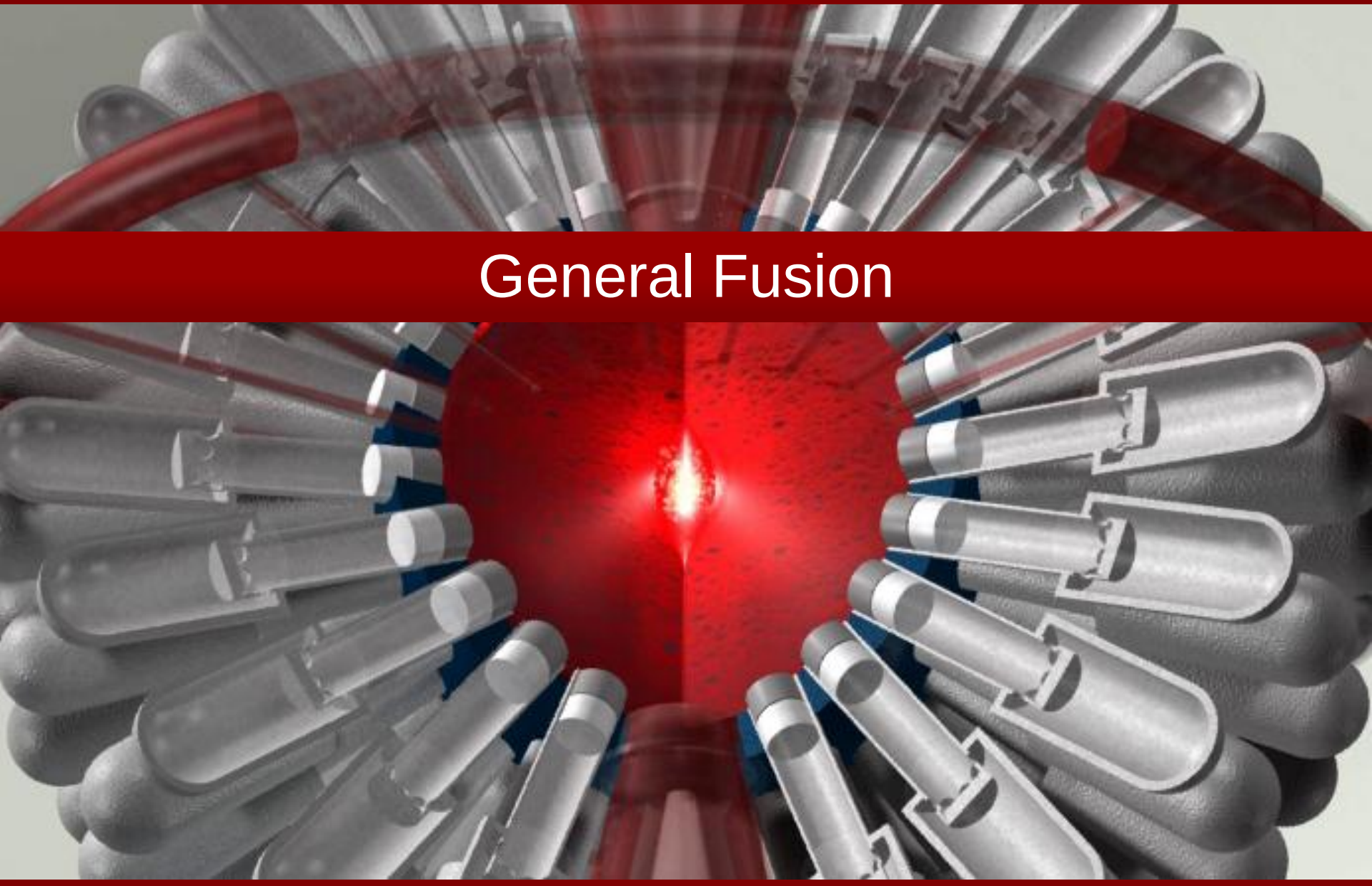
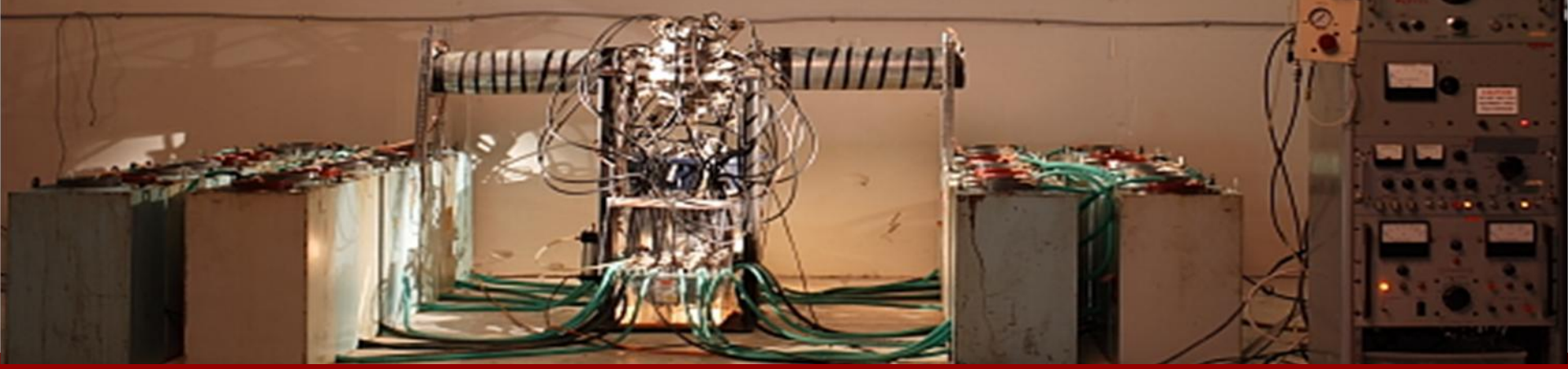


# General Fusion

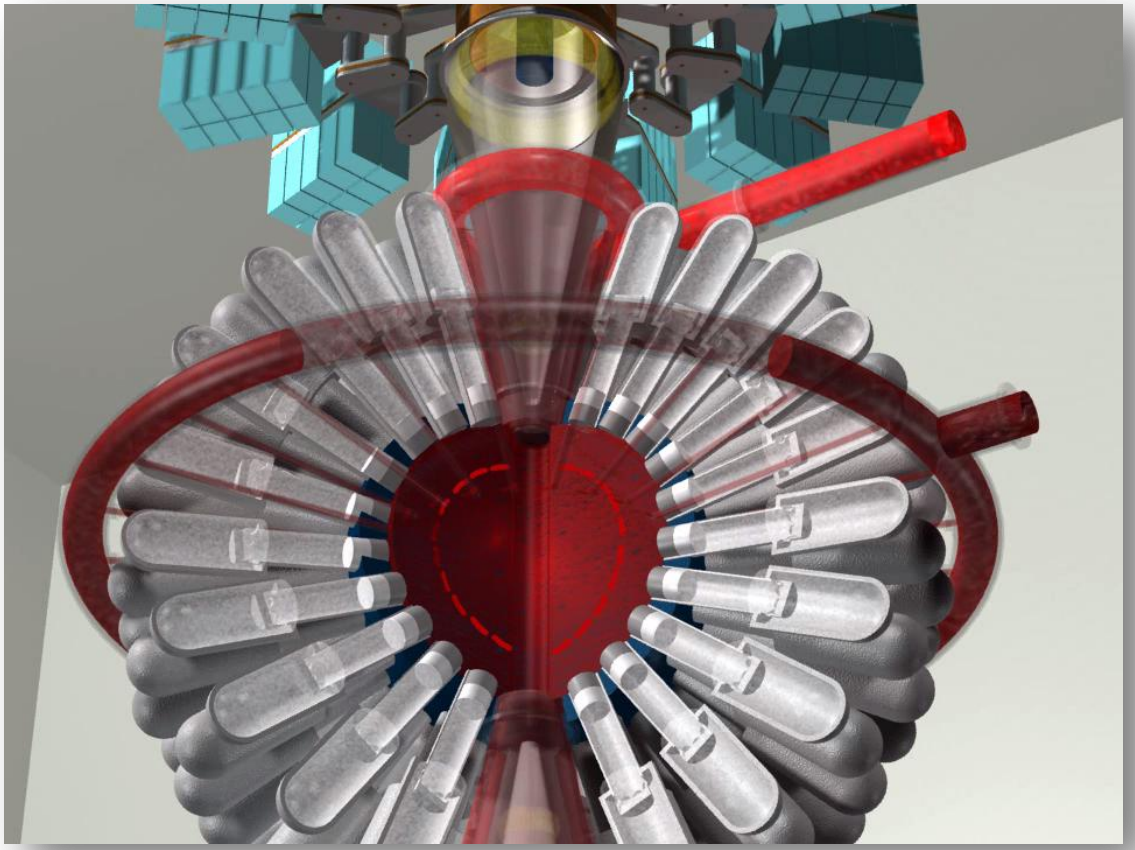


# General Fusion

**Making affordable fusion power a reality.**

- Founded in 2002, based in Vancouver, Canada
- Plan to demonstrate proof of physics DD equivalent “net gain” in 2013
- Plan to demonstrate the first fusion system capable of “net gain” 3 years after proof
- Validated by leading experts in fusion and industrial engineering
- Industrial and institutional partners
- $42.5M in venture capital, $6.3M in government support

# General Fusion's Acoustically Driven MTF



# Development Plan

**2009 PHASE IIa**
Construct key components at full scale
Prove system can be built
Plasma compression tests

**2013 PHASE IIb**
Build net gain prototype

**2016 PHASE IIc**
Test prototype –
Net Power out

4 years

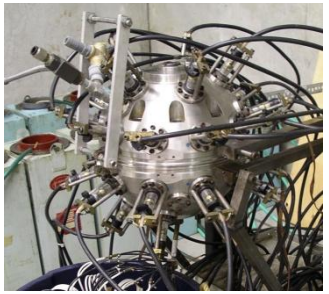
3.5 years
$50M

2 years
$80M

8 months
$20M

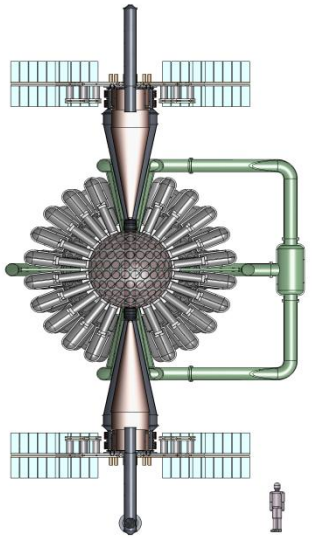
5 years

**PHASE I**
Proof of principle
**Completed**



Progress to Date

**PHASE II**
Demonstration of Net Gain
**2013**



**PHASE III**
Electricity generation and commercialization
**$1 billion+**
**2020**

# Objectives for Phase IIA – Subsystem Development

## Full Scale Component Design and Test

| Plasma Injector | Temperature | Density | Lifetime |
|---|---|---|---|
| | ***100eV*** | ***1E16*** | ***100 µs*** |

| Acoustic Driver | Impact Velocity | Impact Timing | Vortex Collapse |
|---|---|---|---|
| | ***50m/s*** | ***10us*** | ***10X symmetric compression*** |

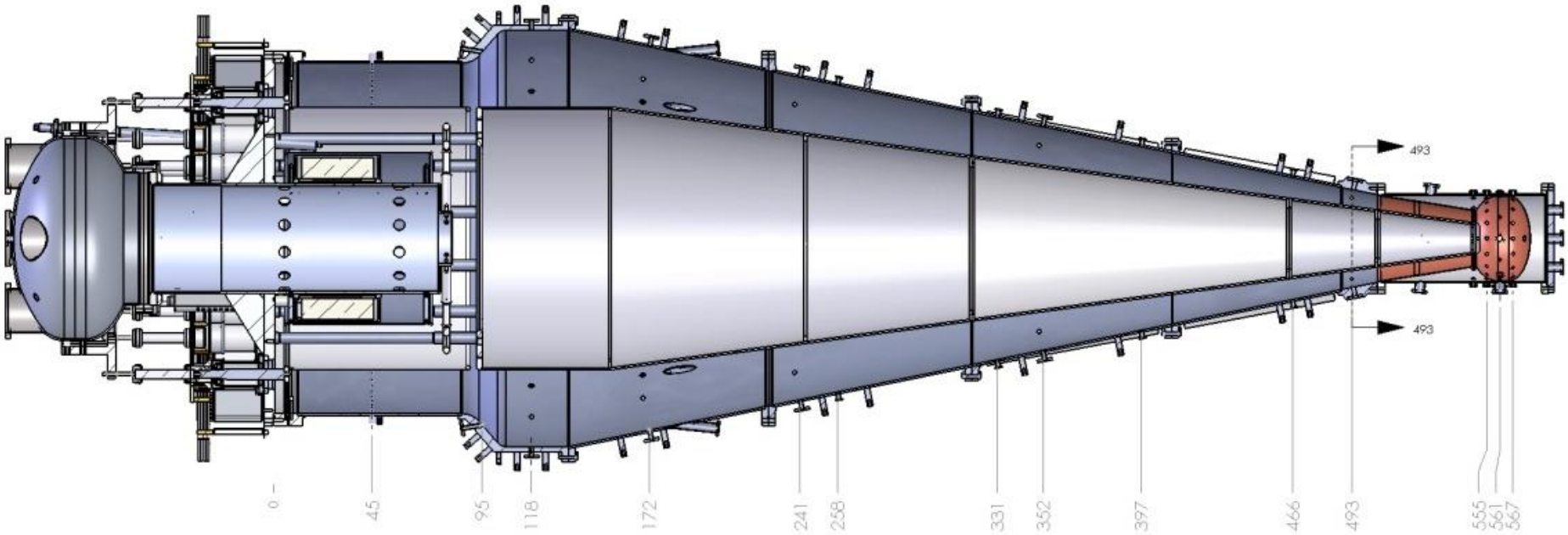
## Plasma Compression Tests

| | |
|---|---|
| Small Tests | ***10 keV*** |
| Large Tests | ***Equivalent Net Gain*** |

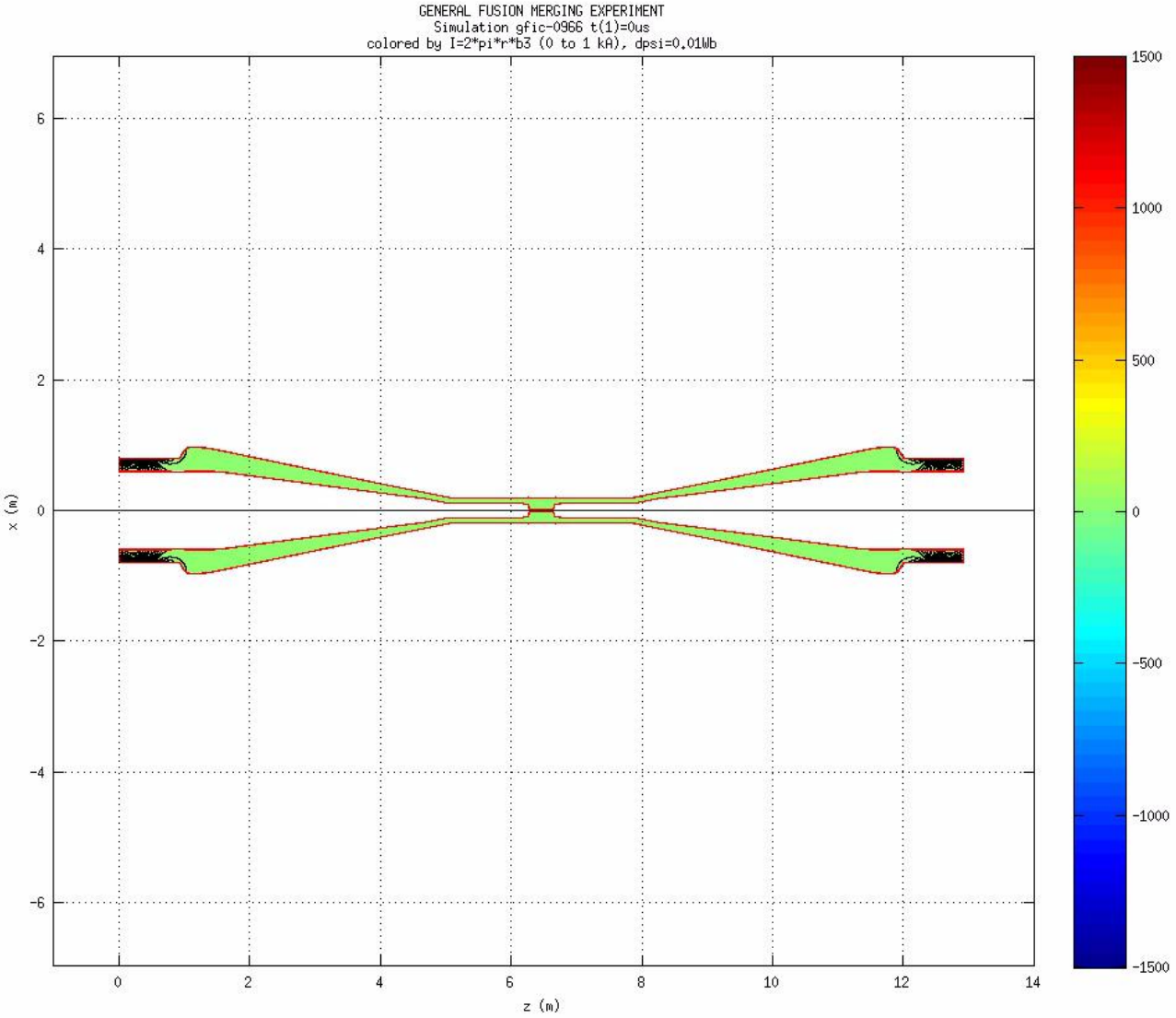
## Build Strategic Relationships

Customer / Partner

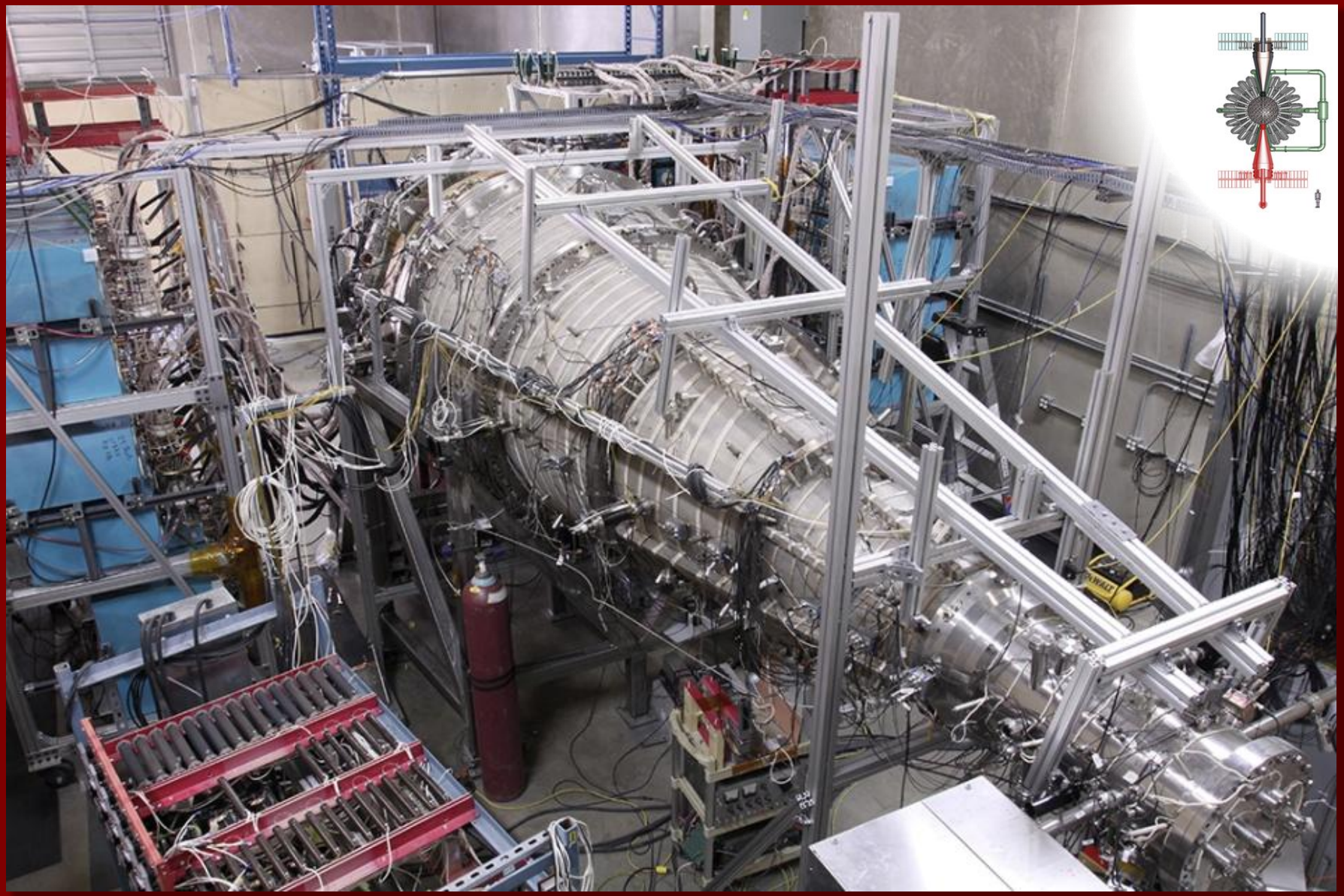
# Plasma Injector Performance



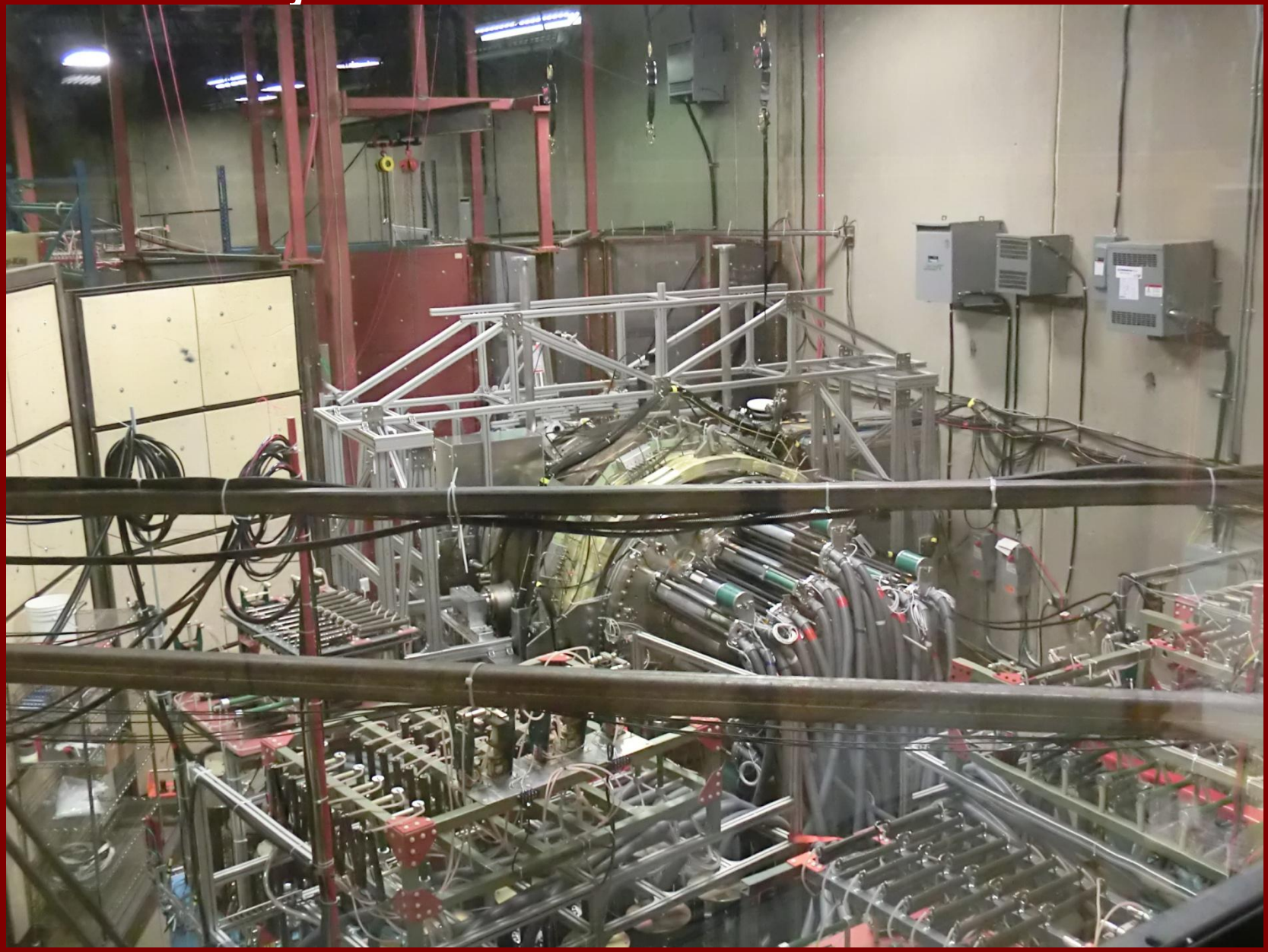
# Plasma Injector Simulation



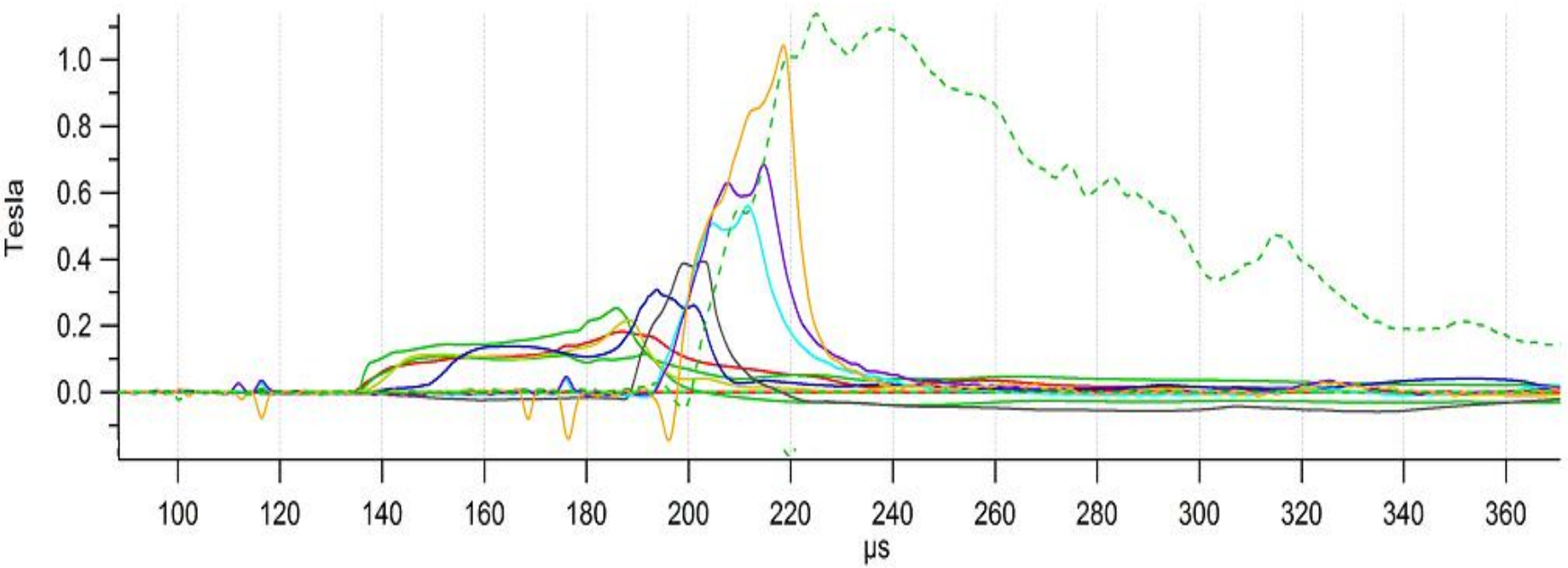
# Plasma Injector I



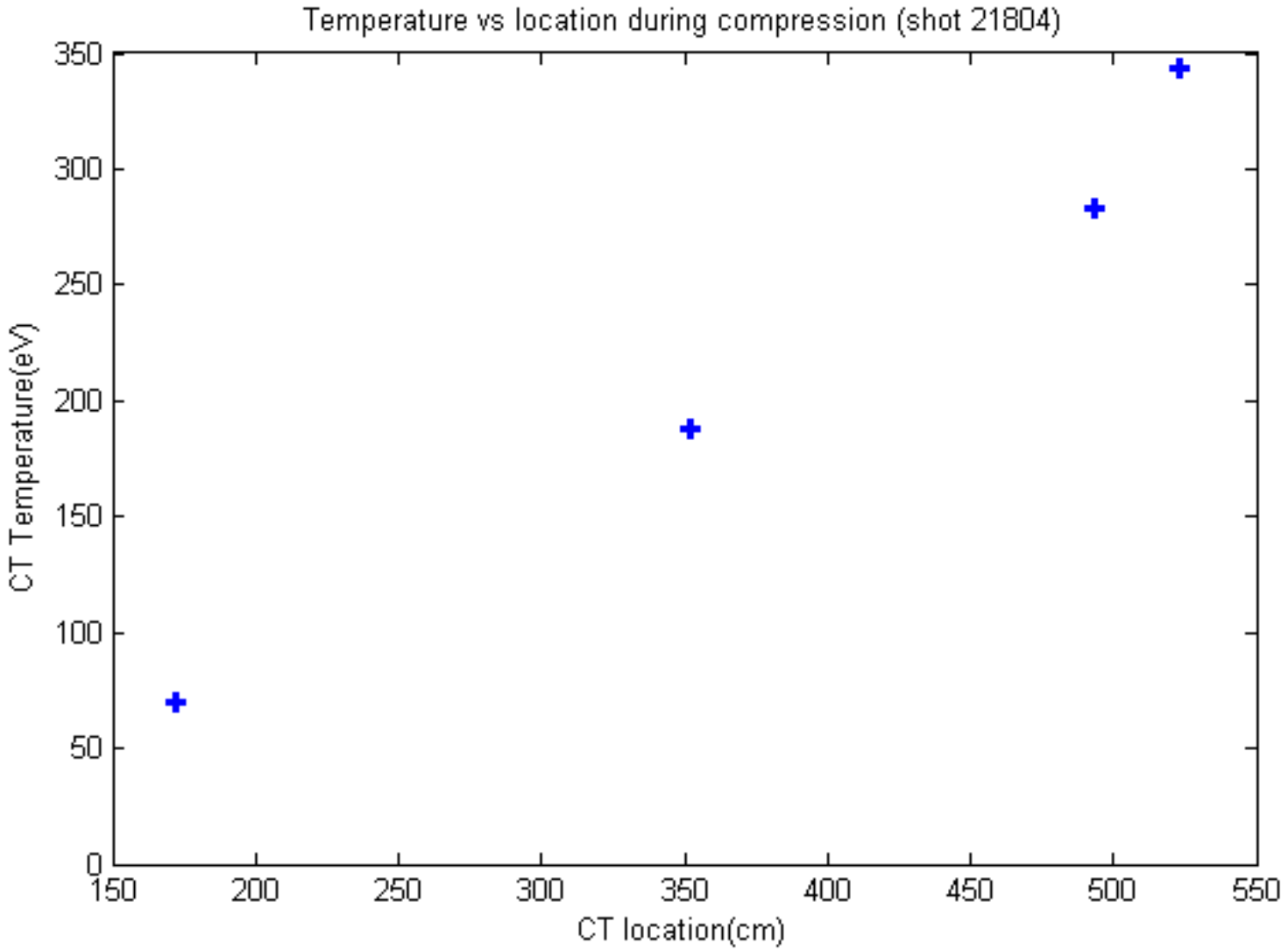
# Plasma Injector II



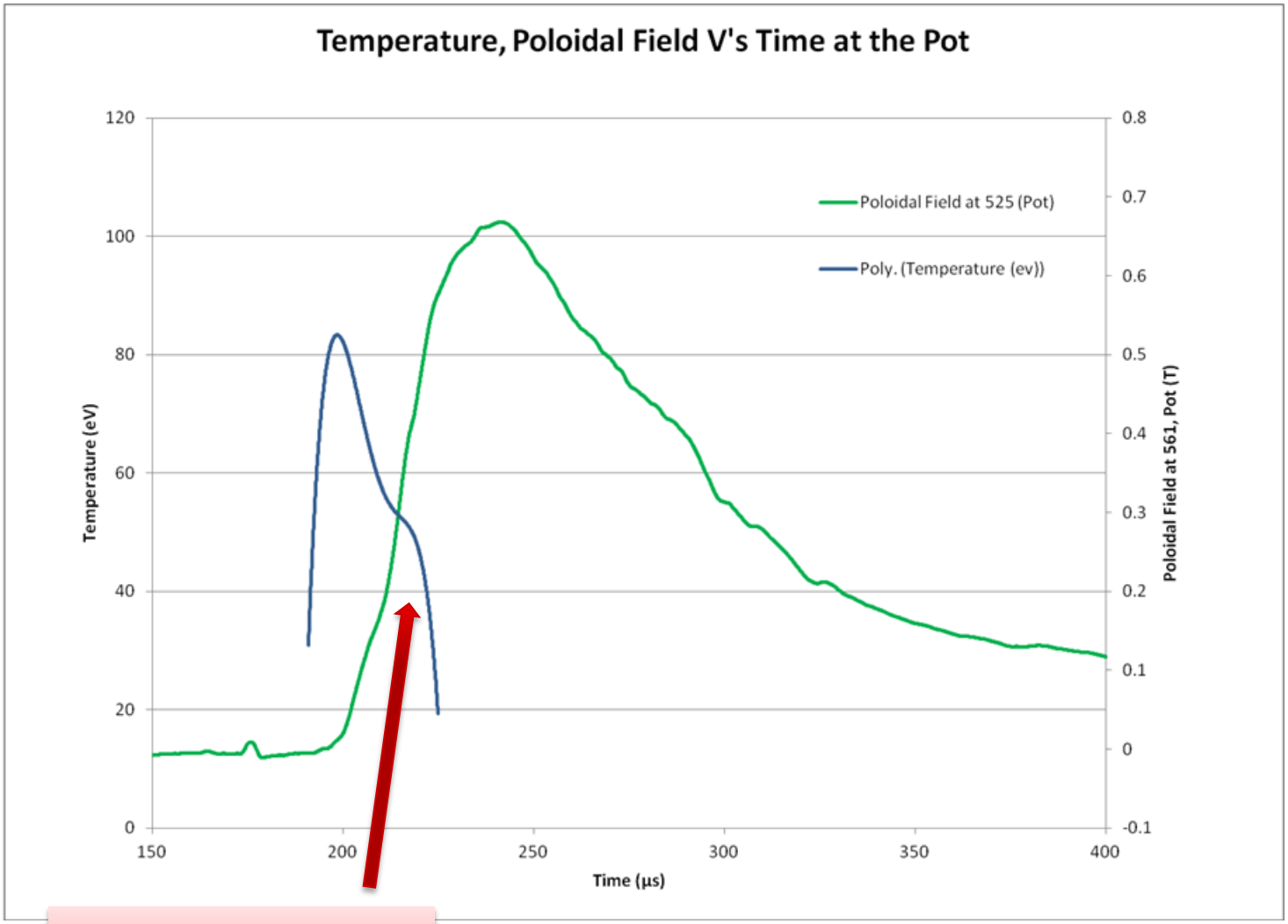
# Magnetic Fields



# Plasma Temperature from ion doppler



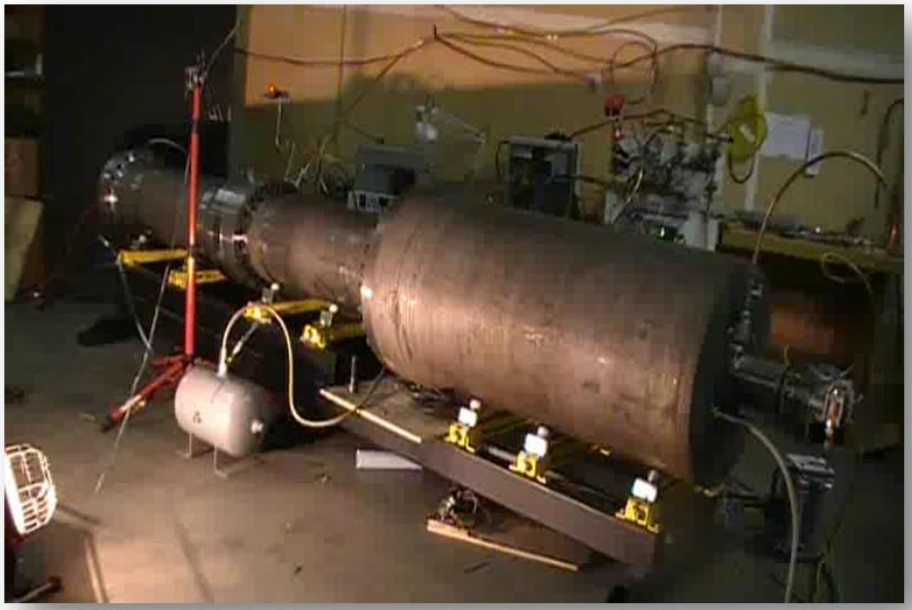
# Compressible Plasma Challenge




Plasma rapidly cools when entering pot

# Acoustic Driver Development

- Full scale piston for servo development
- Servo control meeting requirements
- Material failures at higher velocities successfully addressed



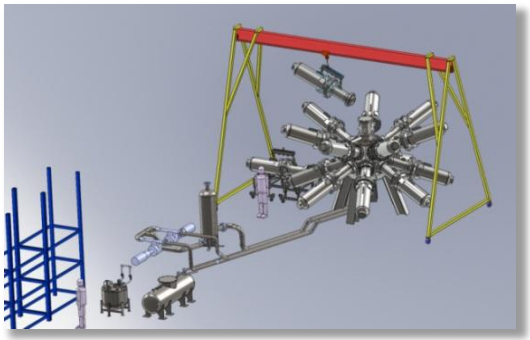
| **Single Piston Requirements** | **Impact Velocity** (m/s) | **Impact Timing** (μs) |
|---|---|---|
| Target | 50 | ± 10 |
| Achieved | 50 | ± 5 |

# Vortex Progress

**July, 2009**
**Financing**

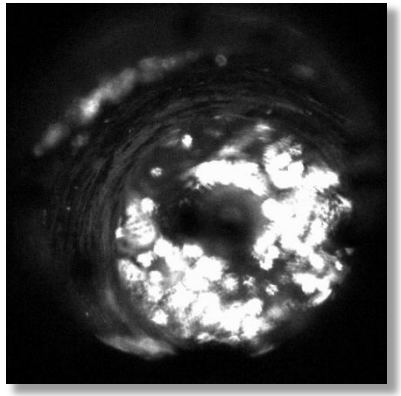
**October, 2010**
**Water Sphere**
**Constructed**

**Mini-Sphere Design**
**and Construction**



**April, 2012**
**First Mini-**
**Sphere Vortex**

**July, 2012**
**First Vortex**
**Collapse**

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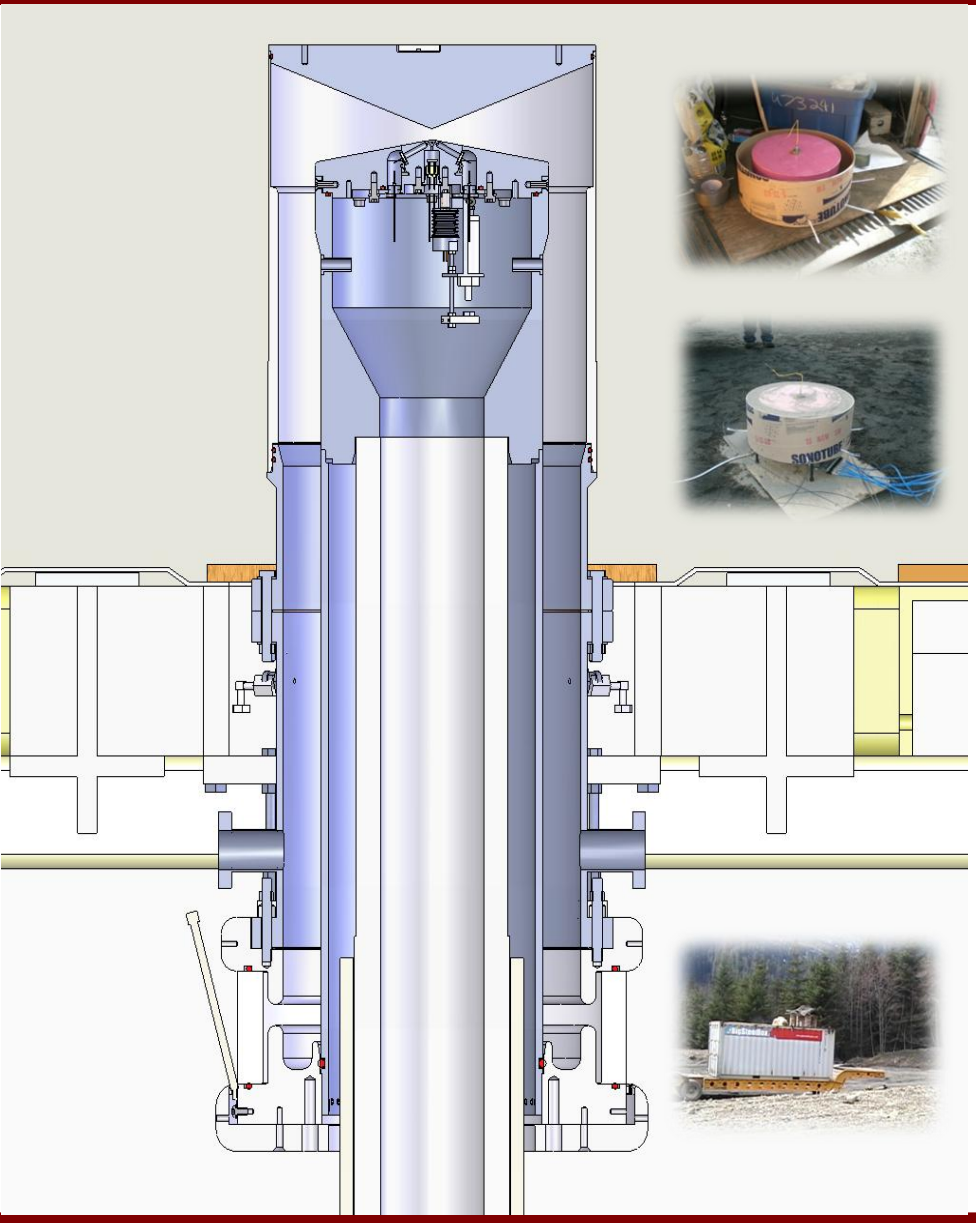
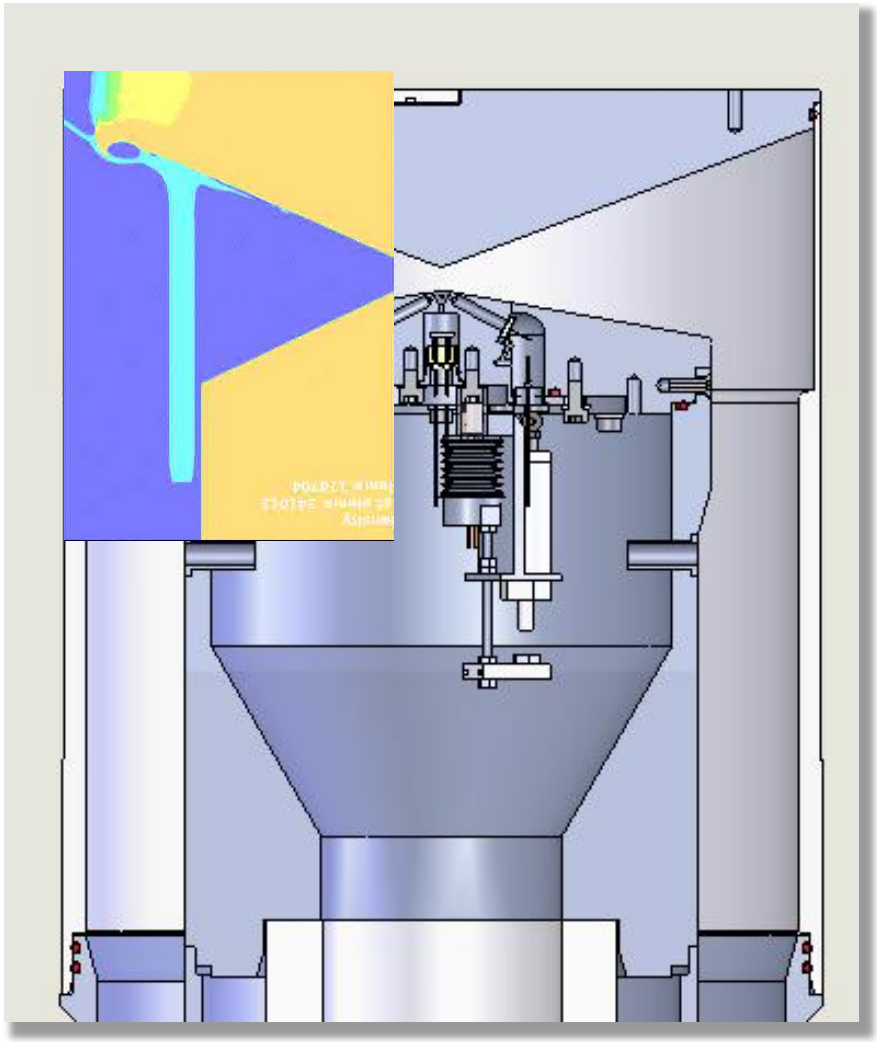
# Vortex collapse

# Plasma Compression Experiments





# Science Objectives

Experiments designed to verify:

a) Plasma heat loss

b) Plasma / wall interaction

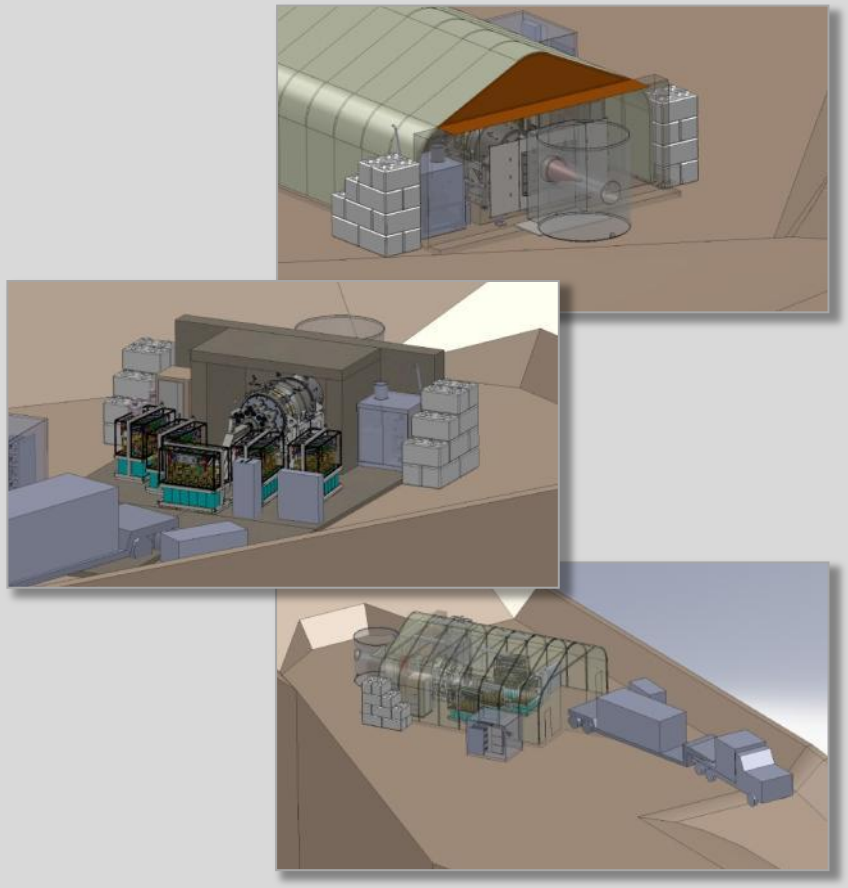
## PC Small Tests

- Achieve 10 keV

## PC Large Tests

- Achieve 10 keV, $10^{20}cm^{-3}$, 10µs

✓ **Equivalent net gain**



# Objectives for Phase II – Subsystem Development

## Full Scale Component Design and Test

Plasma Injector

| Temperature | Density | Lifetime |
|---|---|---|
| ✓ | ✓ | *Target is 100 µs* |

Acoustic Driver

| Impact Velocity | Impact Timing | Vortex Collapse |
|---|---|---|
| ✓ | ✓ | *On Track. Commissioning Now.* |

## Plasma Compression Tests

| | | |
|---|---|---|
| Small Tests | *Ongoing* | |
| Large Tests | *Starting in 2013* | *Net Gain Experiment* |

## Build Strategic Relationships

| | | |
|---|---|---|
| Customer / Partner | Cenovus Energy - Invested 2011 | ✓ |


Clean energy.
Everywhere.
Forever.
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