

KRONOS FUSION ENERGY

FOR A CLEAN & LIMITLESS ENERGY FUTURE

KRONOS FUSION ENERGY S.M.A.R.T (SUPERCONDUCTING, MINIMUM-ASPECT-RATIO TORUS)





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PREPARE FOR THE FUTURE OF CLEAN ENERGY

In America's race for energy independence and supremacy, Kronos Fusion Energy Incorporated is well on its way to introducing the ultimate clean energy solution.

Kronos is currently gathering resources and developing partnerships in advance of introducing the first Superconducting, Minimum-Aspect-Ratio Torus (S.M.A.R.T) Spherical Torus (or Spherical Tokamak).

S.M.A.R.T is being designed by leading fusion-industry experts Carl Weggel and Bob Weggel, as well as Paul Weiss (UCLA/Harvard) and Konstantin Batygin (Caltech).

Our Kronos Fusion Energy Simulations are being built through partnerships with Caltech, Virginia Tech, SavantX, D-wave, Digital Reality, Booz Allen, & ORNL amongst others.





LEAD Q40 DESIGNERS CARL WEGGEL & BOB WEGGEL

Carl and Bob Weggel are the lead designers of Kronos' Fusion Energy Incorporated Generator S.M.A.R.T (Superconducting, Minimum-Aspect-Ratio Torus).

Between them, they have a century's worth of experience in the fusion energy industry and have led major fusion energy projects with the Department of Energy and Department of Defense, as well as, universities and private industry. These products hold world records in superconducting magnets and tokamak designs.



Carl Weggel





Bob Weggel

S.M.A.R.T SPHERICAL TOKAMAK BENEFITS

- Ultra-High-Field, High Temperature
 Superconducting (HTS), Aneutronic,
 Baseload Power Plant
- Up To Q-40 Energy Output
- Soonest To Reach The Market (Anticipated)
- Compact
- Modest Cost



KRONOS FUSION ENERGY GENERATORS



LEAD S.M.A.R.T DESIGNERS

Carl & Bob Weggel





PROPOSED TIMELINE

PROTOTYPE (DEUTERIUM & TRITIUM) 2027 COMMERCIALIZED VERSION (Tritium + Helium-3) 2032



PROJECTED PROJECT COSTS

EIGHT-YEAR BUILD COST \$700-\$900M

YEARLY OPERATIONS COST (POST-GOING LIVE) \$80M PER YEAR







ENERGY REQUIREMENTS



Minimal energy requirements are needed until Year 8, except for a few tests of the transformers and refrigerator in Year 7. Afterwards, there will be a steady draw of power of ~25 MW.

During most of this time, this energy will be directed to power the refrigerator (to re-cool the supercritical helium). During a "run" of SMART, power will be redirected to the plasma-heating devices.

ENERGY OUTPUT

During runs of SMART and when magnetohydrodynamic (MHD) processes.,[1] [2] are included in the budget, this power--of up to 40 MW, or more--will be "dumped" as heat into the secondary cooling system.

*** All numbers are estimates. ***





ABOUT THE SPHERICAL TOKAMAK

The tokamak, a torus-shaped machine that looks a little like a donut, is believed to be the foundation upon which fusion energy will be built.

At play are central magnetic field coils along the torus' long and short axis that confine plasma particles. Running along these magnetic field coils, the plasma currents can reach mega-ampere levels, which are comparable to the most powerful lightning bolts.

Harnessing the high energy of the plasma particles at this level is a prerequisite to creating fusion energy.

"Fusion energy scientists believe that tokamaks are the leading plasma confinement concept for future fusion power plants. (Source: Department of Energy)



SPHERICAL TOKAMAK (ST) vs. MODERATE TORUS

Although historically the more traditionally shaped tokamak was believed to be the most efficient torus design, research now indicates that a Spherical Tokamak (ST), may be the more efficient design.

The ST has a shape closer to that of a sphere, similar somewhat to a cored apple. Mathematically speaking, it has a reduced aspect ratio (A = Major Radius, R0 / Minor Radius a, or A = R0 / a).

To date, the ST has demonstrated a better track record for its beta (ratio of plasma to magnetic pressure) efficiency. It also indicates better stability, suppression of "kink" modes and "ballooning" modes, and better "bootstrap" currents.

These "bootstrap" currents, or supplemental currents created by colliding particles, are key to developing the ST model's potential for steady-state, or ongoing, operation.



VS.



ENERGY OUTPUT OF THE SPHERICAL TOKAMAK

"...an advanced breeding blanket, which is designed to breed, extract, and process the nuclear fuel and heat energy necessary for a self-sufficient, electricity-generating reactor. The blanket is a complex, multi-function, multi-material engineered system (structure, breeder, multiplier, coolant, insulator, tritium processing), with many scientific and technological issues in need of resolution."

Magnetohydrodynamic (MHD) processes are critically important for a dual coolant lithium lead (DCLL) breeding blanket (BB) concept.

A pressure drop in the European DCLL blanket design can be minimized when the liquid metal breeder (PbLi) is decoupled electrically from the ferritic-martensitic structure (EUROFER) using insulating ceramic-based flow channel inserts (FCIs).

The impact of the FCI on the velocity profile and the pressure drop in the DCLL front poloidal channels is being studied and two-dimensional momentum and induction equations for fully developed flows are solved numerically using the ANSYS-Fluent simulation platform under DCLL-relevant conditions (Ha = 7.57 10³, Re = 2.27 10⁴).

Velocity and pressure drop in the PbLi flows have been computed for a channel without FCI and for three possible alumina-based FCI designs: two types of sandwich FCI and one naked FCI.





ENERGY OUTPUT OF THE SPHERICAL TOKAMAK



In order to analyze thermal effects in the blanket, the obtained velocity profiles are used as inputs to solve the 3D Energy Equation.

"Heat transfer has direction as well as magnitude. The rate of heat conduction in a specified direction is proportional to the temperature gradient, which is the rate of change in temperature with distance in that direction.

Heat conduction in a medium, in general, is three-dimensional and time dependent, and the temperature in a medium varies with position as well as time..." (Source: Wright State University)

The computations of the temperature distribution in the DCLL poloidal front channel with a prototypical exponentially varying heat generation profile are obtained using convective boundary conditions. Results show the effect of the FCI and MHD phenomena on heat transfer.



KRONOS FUSION ENERGY GENERATORS

Kronos Fusion Energy is now on the cusp of launching the infrastructure needed to deliver efficient fusion energy on a large-scale level.

3 powerful generators will become commercially available within the next 12 years.





Q10 FUSION ENERGY DRIVE

S.M.A.R.T.

Kronos Fusion Energy Fusion Energy Base Power Unit S.M.A.R.T (Superconducting, Minimum-Aspect-Ratio Torus)

- Design Led By: Carl Weggel & Bob Weggel
- Launch Date: May 2035
- Beta Version: March 2030

The S.M.A.R.T. Fusion Generator will enable energy independence for the United States, while enhancing security and exceeding energy output requirements set by all current Global Green Energy agencies. One S.M.A.R.T. fusion energy generator can provide complete, clean energy independence for a small city.

The technology powering the generator is based on decades of research by industry leaders, including researchers at Kronos.

The anticipated timeline for the release of S.M.A.R.T. is within the next 12 years over two iterations.

The beta version is expected to be available by March 2030 while the official commercial launch date of the generator is planned for May 2035.





S.M.A.R.T. TACTICAL

S.M.A.R.T. Tactical (Superconducting, Minimum-Aspect-Ratio Torus)

- Design Led By: Carl Weggel & Bob Weggel
- Launch Date: May 2035
- Beta Version: March 2030

Kronos portable and rugged S.M.A.R.T. Tactical Mobile fusion micro generators will provide compact and powerful clean energy for a multitude of tactical applications.

Each generator can meet the energy needs of an entire deployed tactical Brigade. One unit could potentially power turbine engines in MBT and Rotary aircraft, providing near unlimited range and enhanced payload capability.

The anticipated timeline for the release of the S.M.A.R.T. Tactical unit is within the next 12 years over two iterations.

The beta version is also expected to be available by March 2030 with a final launch of May 2035 expected for the commercially available product.





K-FED S.M.A.R.T (Superconducting, Minimum-Aspect-Ratio Torus)

- Design Led By: by Undisclosed
- Launch Date: May 2031
- Prototype: Available March 2028

With its potential to revolutionize space travel, fusion energy could decimate flight times and increase payload capacity by a factor of 10.

Kronos' algorithms and simulations will accelerate and Improve existing design and build times of fusion drive designs, resulting in a safer, more efficient and more powerful energy supply.

The anticipated timeline for the release of Q10 is within the next 12 years over two iterations.

Once the model is complete, there is an anticipated 8-year timeline until the release of Q10. The beta version is expected to launch in March 2028.



10 KRONOS INNOVATIONS

- HTS ReBCO Conductor (Kronos' Version)
- Deuterium Helium-3 Fusion
- Using Ice to Minimize Vertical Stress
- Exploit Ultra-High-Strength Materials
- Optimally Slanting Toroidal Field Coils
- Employ Rigid "Bucking" Posts
- The Carl + Bob Weggel Magnet
- Using Fusion Energy Simulations (ML / AI + Quantum Algorithms)
- Nanotechnology Applications
- Graphite-Fiber Overwrap (Patented Technology)



HTS ReBCO CCONDUCTOR Kronos Patented Approach Designed by: Carl Weggel, Bob Weggel, Konstantin Batygin, and Paul Weiss





HTS ReBCO CCONDUCTOR

Kronos Patented Approach

Designed by: Carl Weggel, Bob Weggel, Konstantin Batygin, and Paul Weiss

Rare Earth Barium Copper Oxide or ReBCO tape is a high-energy, superconducting tape that can conduct energy with zero electrical resistance.

"The design of ultra-high-field magnets, capable of reaching 50 tesla and higher, is feasible using the latest high critical current density REBCO tape. (Source: University of Wisconsin)

Because of the brittle nature of the material, however, it has only been recently that scientists have figured out how to construct REBCO into the long, tapelike strips needed to conduct the electricity inside the torus.

Kronos' magnet scientist [1] is currently computing algorithms to study resizing sections of the REBCO tape to achieve greater conductivity over current REBCO tape specifications.



In the quest for sustainable fusion energy, an igniting mechanism that is safe, easy to produce and easy to store is a necessity. General intelligence, including that from experts at the Department of Energy, has traditionally suggested that a deuterium – tritium fuel is the best solution.

The current best bet for fusion reactors is deuterium-tritium fuel. This fuel reaches fusion conditions at lower temperatures compared to other elements and releases more energy than other fusion reactions. (Source: Department of Energy)

As seen from the graphic above, the combination yields an energy output of 17.6 MeV per reaction.

To avoid certain R&D challenges including structural Material damage from energetic neutrons, fusion scientists are interested also in aneutronic fusion reactions (such as deuterium-helium-3 and proton-boron fusion) even though these fusion reactions occur at higher ion temperatures than for deuterium and tritium. (Source: Department of

Energy)



Kronos is producing fuel based upon combining the nuclei of deuterium and helium-3, which yields a proton and an alpha particle, with an energy output that surpasses the deuterium – tritium output at 18.4 MeV per reaction

Deuterium is easy enough to harness, as it is an isotope of hydrogen, the most abundant element in the universe. It is readily accessible on planet earth, with seawater providing an excellent source. One in 5,000 hydrogen atoms in seawater are deuterium atoms.

Helium-3 is less common. This one-neutron isotope of helium is formed when cosmic rays bombard helium-4 (in the solar wind that is produced naturally through fusion in the sun.)

Earth's atmosphere and magnetic field repel ionized helium 3, which means there are minimal quantities on Earth. Small quantities of helium-3 can be obtained from primordial deposits as well as in by-products of tritium decay from fission reactors and nuclear weapons.

Kronos' patented approach [1] includes building a tritium breeding program. Tritium, which has a half-life of 12.3 years, decays into Helium 3. When operational, Kronos' patented Tritium breeding approach which uses a particle accelerator, could provide a consistent source of Helium 3 for our Kronos S.M.A.R.T generators. It could also provide Helium 3 on a commercial level for other fusion energy operators. This text is new/updated.



USING ICE TO MINIMIZE VERTICAL STRESS

Kronos Patented Approach Designed by: Carl Weggel and Bob Weggel

This Kronos-patented approach includes inserting an expandable container into a position situated between the arms--and their adjacent arm gaps--that connect the toroidal fields. A liquid is injected into the container, which expands upon freezing.

The frozen liquid and freezing temperature of the surrounding container effectively pre-stresses the toroidal field coils which subsequently minimizes the vertical heat stress that occurs when the coils are energized.



EXPLOIT ULTRA-HIGH-STRENGTH MATERIALS

Kronos Patented Approach Designed by: Carl Weggel and Bob Weggel

Kronos' patented approach to the tokamak deign exploits ultra-high-strength materials, such as nitrogenstrengthened, high-manganese stainless steels, including Nitronic 40, Nitronic 50 and AISI Type 216, as well as graphite fiber, graphene, and other material Innovations

Nitronic 40 is a high-strength, austenitic stainless steel with low magnetic permeability. Common applications include instrument or hydraulic tubing, but it is also found in bar and sheet.

Nitronic 50 (22-13-5) is an even tougher, corrosion-resistant stainless steel commonly used for saltwater and marine applications.

AISI Type 216 is an austenitic nonstandard grade stainless steel and is widely known for its excellent corrosion resistance, toughness and strength.



OPTIMALLY SLANTED TF COILS

Kronos Patented Approach Designed by: Carl Weggel and Bob Weggel

Research shows that using slanted (or tilted) coils requires less current than traditional coils. These optimally slanted planar Toroidal Field (TF) coils will minimize the overturning moment (torque) on the TF magnet.



SCALING TOKAMAK DEVICES THROUGH RIGID BUCKING POSTS

Kronos Patented Approach Designed by: Carl Weggel, Bob Weggel, and Konstantin Batygin

With the high fields and compactness of the Advanced Torus (AT) device, mechanical stresses from electromagnetic loads are a critical issue.

To alleviate stresses on the center post, Kronos uses a "bucking" cylinder solution to distribute the Toroidal Field (TF) loads. This approach essentially engineers' connections to support (buck) the Toroidal Field (TF) and the Central Solenoid (CS) off one another, so that forces significantly cancel one another when both coils are energized and are supported by this central plug.

This approach reduces necessary current drive and heating, while offering improved stability in the form of higher safety factor and removal of low order rational flux surfaces



BUILDING AN AFFORDABLE TEST DEVICE



The development of the rigid bucking post is significant as it enables the Advanced Torus (AT) reactor to be scaled down into a lower power device in a more compact size.

The reduced size and power demands offer the possibility of fusion energy production and plasmas sustained in steady (ongoing) state in an affordable, compact device.

The prospect of an affordable test device could close the loop on net-electric production.



THE CARL & BOB WEGGEL MAGNET

Kronos Patented Approach Designed by: Carl Weggel and Bob Weggel

The central magnetic field coils along the torus' long and short axis that confine plasma particles are the key to fusing deuterium and tritium. These fusion energy magnets, which are measured in tesla, are 10 times more powerful than the magnets utilized by the average medical MRI machine.

In essence, the magnet serves as a highly efficient, high-temperature superconductor (HTS) that repels the super-heated plasma and keeps it from touching and therefore disintegrating the metal walls of the torus.



FUSION ENERGY SIMULATIONS Machine Learning / Artificial Intelligence + Quantum Algorithms Designed by: Sultan Meghji, Carl Weggel, Bob Weggel, Paul Weiss,

Konstantin Batygin, Priyanca Ford

Of the 88 Kronos Fusion Energy patents for 2022, approximately 40 are related to machine learning and artificial intelligence simulations, including repair & maintenance, fusion energy output, remote handling systems and more.





NANOTECHNOLOGY APPLICATIONS

Kronos Patented Approach Designed by: Carl Weggel, Bob Weggel, and Paul Weiss

Utilizing various information devices, nanotechnology applications will determine locations of damage, position a 3D printer adjacent to an opening in the generator, and insert microparticles or nanoparticles through the opening.

Likewise, nanotechnology is being used to identify other areas requiring service and/or repair.





GRAPHITE-FIBER OVERWRAP

Kronos Patented Approach Designed by: Carl Weggel

To aid in the high-temperature transfer of plasma, wrapping some or all parts of the fusion generator will provide extra rigidity, thereby increasing fusion energy efficiency.

Kronos' patented approach to the tokamak utilizes ultra-high-strength materials such as graphite fiber and a graphene wrap.





KRONOS FUSION ENERGY PATENTED TECHNOLOGY

Improving Fusion Energy Output Utilizing Machine Learning [63 / 330,280] Simulating Fusion Generator Components and Processes [63 / 331,989] Restoring Plasma-Facing Components of a Fusion Generator Using Additive Manufacturing [63 / 334,577] Repair and Maintenance of Fusion Power Plants Using 3-D Printing [63 / 335,539] Fabrication and Maintenance of Fusion Generator Components using Graphene-Based Components [63 / 351,627] Improving Fusion Energy Output by Simulating Heat Absorption and Cooling System Components and Processes [63 / 335,403] Integrated Safety Management Systems for Fusion Power Plants [63 / 335,513] Maintenance of Fusion Generator Utilizing Microparticles or Nanoparticles [63 / 338,494] Integrated Systems and Methods for Ensuring Safety of Fusion Power Plants [63 / 337,710] Systems and Methods for Improving Fusion Energy Output by Simulating Material Interactions Within a Fusion Generator [63 / 341,631] Systems and Methods for Utilizing Simulations or Controlling a Fusion Generator [63 / 341,597] Smart Particles for Fusion Generator Component Maintenance and Repair [63 / 346,480] Remote Handling Systems for Fusion Power Plants [63 / 344,550] Maintenance and Control Systems For a Vacuum Vessel of a Fusion Power Plant [63 / 344,549] Systems and Methods for Installation or Assembly of Components in a Fusion Power Plant [63 / 349,217] System for Prestressing Toroidal Field Coils of a Fusion Generator [17 / 878,507] S.M.A.R.T – Superconducting, Minimum Aspect Ratio Torus for Increasing Fusion Efficiency [17 / 878,550] Systems, Methods and Storage Media for Fusion Energy Enterprise Resource Planning Utilizing Blockchain [63 / 395,795] Mitigation Algorithm for Improving Fusion Energy Output [63 / 397,254] Magnetic Dynamics Algorithm for Improving Fusion Energy Output [63 / 397,261] Plasma Dynamics Algorithm for Improving Fusion Energy Output [63 / 397,259] Plasma Control Algorithm or Improving Fusion Energy Output [63 / 397,258] Systems and Methods for Improving Fusion Energy Output by Circumventing Energy Loss and Mechanical Damage within a Fusion Generator [63 / 398,926] Fueling Algorithm for Improving Fusion Energy Output [63 / 397,266] Heat Transfer Algorithm for Improving Fusion Energy Output [63 / 397,263] Systems and Methods for Improving Fusion Energy Output by Simulating Processes of a Spherical Tokamak[63 / 390,951] Systems, Methods and Storage Media for Accelerating Blanket Component Material Development in a Fusion Generator [63 / 400,255] Systems, Methods and Storage Media for Improving Fusion Energy Output by Optimizing Fusion Generator Components and Processes [63 / 400,552] Systems and Methods for Improving Fusion Energy Output by Utilizing Quantum Plasma Dynamics Simulations [63 / 359,616] Systems and Methods for Stabilizing Plasma in a Fusion Generator [63 / 391,994] As the world moves into a new frontier of energy production, Americans are poised to reap the benefits of this new paradigm.

For Kronos Fusion Energy Incorporated, new energy solutions will be commercially available in just a little more than a decade. These products will continue to grow as we move forward to a future powered by sustainable energy systems.

The world stands on the cusp of a new eraone powered by unlimited exploration and unlimited clean energy solutions.



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MILITARY + LEGISLATIVE

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KRONOS FUSION ENERGY

Certain information set forth in this presentation contains "forward-looking information", including "futureoriented financial information" and "financial outlook", under applicable securities laws (collectively referred to herein as forward-looking statements). Except for statements of historical fact, the information contained herein constitutes forward-looking statements and includes, but is not limited to, the (i) projected financial performance of the Company; (ii) completion of, and the use of proceeds from, the sale of securities; (iii) the expected development of the Company's business, projects, and joint ventures; (iv) execution of the Company's vision and growth strategy, including with respect to future M&A activity and global growth; (v) sources and availability of third-party financing for the Company's projects; (vi) completion of the Company's projects that are currently underway, in development or otherwise under consideration; (vi) renewal of the Company's current agreements; and (vii) future liquidity, working capital, and capital requirements. Forward-looking statements are provided to allow potential investors the opportunity to understand management's beliefs and opinions in respect of the future so that they may use such beliefs and opinions as one factor in evaluating an investment

FOR A CLEAN & IMITLESS ENERGY FUTURE