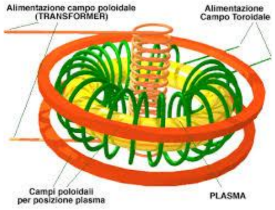
SELF-GRAVITATED, LEVITATIED TOKAMAK

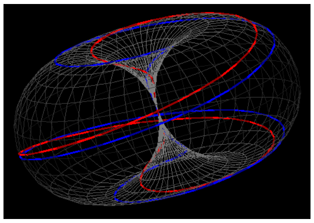
We show in ill. 1 a common stationary tokamak -- a device that uses a powerful magnetic field to confine plasma in the shape of a torus.



Ill 1.

Our conceptual tokamak superstructure can self-gravitate and levitate due to its rotating superimposed tori (**ill. 2, fig. 2, 3**) and quantum propulsion per my new quantum fusion theory and model.

There, compressed plasma and its vortex in type II superconductors would vertically propel that craft in Coriolis force via longitudinal axis and then propel it forward in quantum thrust vectoring (Ill. 2). We deal here with levitation in Meissner effect and **quantum supercavitation.**



Ill. 2

Due to metamaterials in which an increasing amount of magnetic flux penetrates the material in Abrikosov vortex, that craft will be invisible.

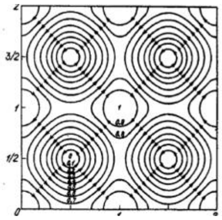


Fig. 1

Vortex lattice with constant | | lines obtained by A. A. Abrikosov.

1. Abrikosov, A. A. “New Developments in the Theory of HTSC (High Temperature Superconductors)”, Materials Science Division, Argonne National Laboratory, United States Department of Energy, Office of Energy Research,(Sept. 1994).
2. Abrikosov, A. A. "On the magnetic properties of superconductors of the second group", Soviet Physics JETP 5, 1174 (1957), page scans of the original article.

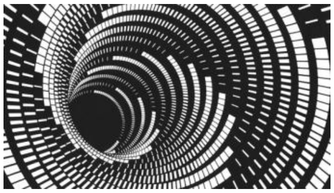


Fig. 2 Internal structure of the levitated tokamak

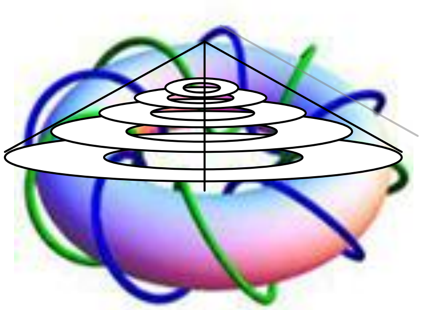


Fig. 3 Self-gravitated, levitated tokamak

Self-gravitation

Our tokomak can self-gravitate due to the following phenomena:

a system *N* of self-gravitating bosons or fermions can by the loss of total energy gain gravitational energy and hit up. If the particle number *N* is smaller than a critical number *NF/crit* (Plank mass/m)3 for fermions and *NB/crit* (Plank mass/m)2 for bosons, the system can heat up to temperatures and concentrate to densities such that some particles will reach a quantum ground state, functional of the total particle number. By further cooling of the system, the *N* particles approach the well-known fully condensed or fully degenerate configurations. For bosons, the appearance of a quantum condensed state leads to a phase transition of the first kind. For fermions or bosons the systems increase their temperature and condense to configurations for which a general relativistic treatment is mandatory. The concept of maximum temperature for a self-gravitating Bose or Fermi system is feasible:

PACS 05.30 Fk - Fermion systems and electron gas.
PACS 05.30 Jp - Boson systems.
PACS 97.10 - Stellar characteristics.

Consider also the role of the Drinfeld double *DSU*(2) in the context of 3D Riemannian loop quantum gravity. This constitutes our **self-gravitating quantum system** in the Fock space of the free self-gravitating field: the vacuum is the unique *DSU*(2) invariant state, one-particle states correspond to *DSU*(2) unitary irreducible simple representations and any multi-particles states are obtained as the symmetrized tensor product between simple representations. The associated quantum field is defined by the usual requirement of covariance under *DSU*(2). Then, we apply a *DSU*(2)-invariant self-interacting potential and explicitly compute the lowest order terms (in the self-interaction coupling constant λ) of the propagator and of the three-point function. Finally, we compute the lowest order quantum gravity corrections (in the Newton constant *G*) to the propagator and to the three-point function.

A Bose-Einstein condensate of cold atoms is a superfluid and thus responds to rotation of its container by the nucleation of quantized vortices. If the trapping potential is sufficiently strong, there is no theoretical limit to the rotation frequency one can impose to the fluid, and several phase transitions characterized by the number and distribution of vortices occur when it is increased from zero to infinity. In this note we focus on a regime of very large rotation velocity where vortices disappear from the bulk of the fluid, gathering in a central hole of low matter density induced by the centrifugal force.

The envisioned supercavity might be created as an **electro-magnetic bubble** that repels air in a magneto-gravitic propulsion system.

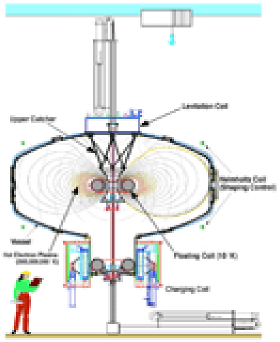
The method makes use of H energy to create a magnetic bubble or mini-magnetosphere. The magnetosphere is produced by the injection of plasma on to the magnetic field of a small (< 1 m) dipole coil tethered to the projectile. In this way, it is possible to attain unprecedented speeds for minimal energy and mass requirements. Since the magnetic inflation is produced by electromagnetic processes, the material and deployment problems associated with the mechanical sails are eliminated.

Researchers at the University of Missouri have devised a method of creating and launching rings of plasma through open air
Now, in general, it's very easy to produce plasmas in a vacuum, and to control them with massive electromagnets. Most of our attempts at controlled nuclear fusion, which involves the creation of high-energy deuterium-tritium plasma, have required immensely powerful electromagnets to create and/or control the plasma. (See: 500MW from half a gram of hydrogen: The hunt for fusion power heats up.) The University of Missouri, however, has devised a method of creating plasma that creates its own magnetic field, which acts as a containment field as it travels through open air.

Ref.:

The Levitated Dipole eXperiment

LDX is a novel experimental device designed to explore the physics of plasma confinement in a magnetic dipole field. What makes it unique? Besides levitating a 1/2 ton superconducting ring, we have conducted the first experimental test on the theory of plasma confinement by adiabatic compressibility. Since the dipole field resembles the field of a planetary magnetosphere we can develop and test models of space weather using two state-of-the-art laboratory experiments, LDX at MIT and and CTX at Columbia. LDX is collaboration between Columbia University's Dept. of Applied Physics and the MIT Plasma Science & Fusion Center and is funded by the NSF/DOE Partnership in Basic Plasma Science and Engineering.



▸LDX Overview Visualization of fields [without Helmholtz](#) and [with Helmholtz](#) coils.

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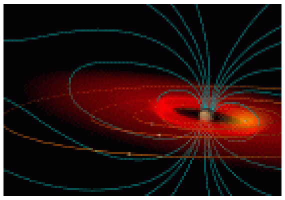

▸[Publications and reports](#) Explore the theoretical foundations of the LDX project, including **tantalizing evidence from nature that the concept may be the answer to the fusion energy problem**.

Image courtesy: [John Spencer](#), [Lowell Observatory](#)

▸[Tritium suppressed D-D fusion](#) The proposal for tritium-suppressed D-D fusion and the understanding of the turbulent pinch in magnetically confined plasma are new developments in fusion science that create an alternate and potentially advantageous technology pathway for fusion energy.

Publications

M.E. Mauel, J. Kesner, Fusion Technologies for Tritium-Suppressed D-D Fusion, White Paper prepared for FESAC Materials Science Subcommittee (2011)

A. C. Boxer, R. Bergmann, J. L. Ellsworth, D. T. Garnier, J. Kesner, M. E. Mauel and P. Woskov., Turbulent inward pinch of plasma confined by a levitated dipole magnet, *Nature-Phys.* , **6**, 207 (2010).

D.T. Garnier, A.C. Boxer, J.L. Ellsworth, J. Kesner and M.E. Mauel, "Confinement improvement with magnetic levitation of a superconducting dipole", Nuc. Fus 49 (2009) 055023

A. C. Boxer, D. T. Garnier, M. E. Mauel, Multichannel, microwave interferometer for the Levitated Dipole Experiment, Review of Scientific Instruments, V. 80, Issue 4 DOI: 10.1063/1.3095684, 2009.