Scientific Research Laboratory

Contents

Introduction of H4D

Elio Battista Porcelli

ORCID ID

orcid.org/0000-0002-3033-3792

Websites

Scientific research LAB - Works and patents

Education (4) Sort

Universidade Cruzeiro do Sul: Sao Paulo, SP, Brazil
2008-08 to 2010-06-01

Master of Science in Theoretical and Computational Physics

Source: Elio Battista Porcelli — Created: 2016-02-07

FASP - Faculdades Associadas de São Paulo: São Paulo, São Paulo, Brazil
1999-07 to 2000-08-01

Post-Graduation - Telecommunications Systems Specialist

Source: Elio Battista Porcelli — Created: 2016-02-07

Universidade Presbiteriana Mackenzie: Sao Paulo, SP, Brazil
1987-08 to 1990-12-01

Graduation -Technology in Electronics (Old Operational Engineering)

Source: Elio Battista Porcelli — Created: 2016-02-07

Instituto Federal de Educação Ciência e Tecnologia de São Paulo: Sao Paulo, SP, Brazil
1980-01 to 1983-12-01

Technical high school in Telecommunication

Source: Elio Battista Porcelli — Created: 2016-02-07

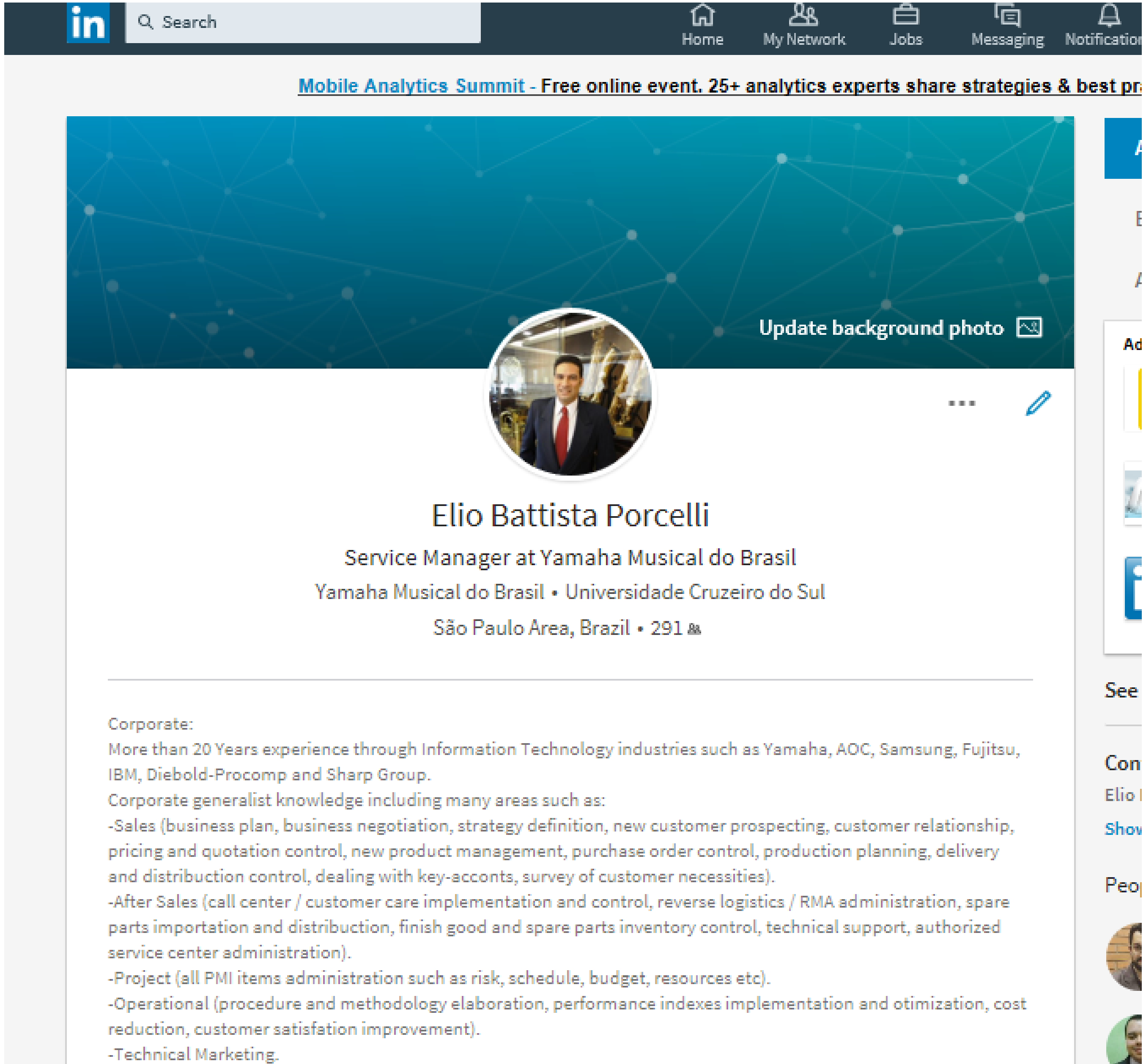
Employment (1) Sort

H4D Scientific Laboratory: São Paulo, São Paulo, Brazil
2015-02 to present

Researcher

Source: Elio Battista Porcelli — Created: 2016-02-07

Introduction of H4D



Introduction of H4D

Dr. Victo dos Santos Filho - Research Partner

Formação acadêmica/titulação

- 1998 - 2001 Doutorado em Física Teórica
  Instituição: Instituto de Física Teórica (IFT) - Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP) - São Paulo, Brasil
  Título: Dinâmica não-linear em sistemas bosônicos com interação atrativa de dois corpos
  Orientador: Dr. Lauro Tomio
  Co-orientação: Arnaldo Gammal
  Financiamento: CAPES
- 1990 - 1994 Mestrado em Supercondutividade Aplicada
  Instituição: Fundação de Tecnologia Industrial, FTI, Brasil
  Título: Cálculo, dimensionamento e fabricação do magneto supercondutor tipo Pista de Corrida
  Orientador: Dr. Daltro Garcia Pinatti
  Financiamento: CNPq
- 1989 - 1992 Graduação em Licenciatura em Física
  Instituição: Universidade Estadual Paulista Júlio de Mesquita Filho, UNESP, Campus de Guaratinguetá - São Paulo, Brasil
- 1985 - 1988 Graduação em Ciências com Habilitação em Matemática
  Instituição: Universidade Salesiana de Lorena (UNISAL), Brasil
- 2001 - 2005 Pós-Doutorado
  Instituição: Instituto de Física Teórica (IFT-UNESP), São Paulo, Brasil
  Financiamento: FAPESP

Academic Background

- Doctorate in theoretical Physics
- Masters in applied Supercondutivity
- Graduation in physics degree
- Degree in Science with qualification in mathematics
- Postdoctoral in Physics

Objectives

- Information / Research Sharing

- Getting Partnership

- Encourage Research on the Topic

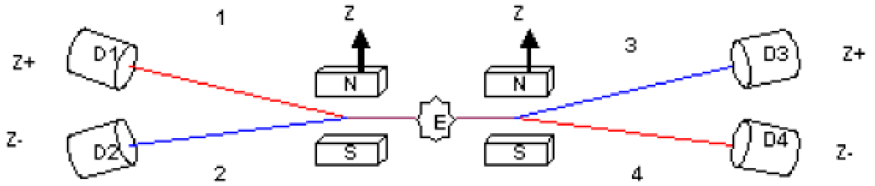
Theme

Can the preexisting condition of generalized quantum entanglement between dipoles explain anomalous forces in some devices?

Quantum Entanglement

Quantum entanglement is a physical phenomenon that occurs when pairs or groups of particles are generated or interact in ways such that the quantum state of each particle cannot be described independently of the others, even when the particles are separated by a large distance—instead, a quantum state must be described for the system as a whole.

EPRB experiment using a Stern- Gerlash setup



$$|\text{Spin Singlet}\,\rangle = \frac{1}{\sqrt{2}}|Z+;Z-\rangle - |Z-;Z+\rangle$$

Entanglement is now being studied in diverse fields ranging from quantum computation matter to quantum gravity

Quantum Entanglement

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Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?

A. Einstein, B. Podolsky, and N. Rosen
Phys. Rev. **47**, 777 – Published 15 May 1935

Physics See Focus story: What's Wrong with Quantum Mechanics?

Article Citing Articles (5,881) PDF Export Citation

ABSTRACT

In a complete theory there is an element correspond
for the reality of a physical quantity is the possibility
system. In quantum mechanics in the case of two ph
operators, the knowledge of one precludes the know
of reality given by the wave function in quantum mec
cannot have simultaneous reality. Consideration of t
system on the basis of measurements made on anot
leads to the result that if (1) is false then (2) is also f
description of reality as given by a wave function is r

Received 25 March 1935

DOI: https://doi.org/10.1103/PhysRev.47.777

Mathematical Proceedings of the Cambridge Philosophical Society

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Article Metrics

Volume 31, Issue 4 October 1935, pp. 555-563

Discussion of Probability Relations between Separated Systems

E. Schrödinger
DOI: https://doi.org/10.1017/S0305004100013554 Published online: 24 October 2008

Abstract

The probability relations which can occur between two separated physical systems are discussed, on the assumption that their state is known by a representative in common. The *two families* of observables, relating to the first and to the second system respectively, are linked by at least *one match* between two definite members, one of either family. The word *match* is short for stating that the *values* of the two observables in question determine each other uniquely and therefore (since the actual labelling is irrelevant) can be taken to be *equal*. In general there is but one match, but there can be more. If, in addition to the first match, there is a second one between canonical conjugates of the first mates, then there are infinitely many matches, every function of the first canonical pair matching with the same function of the second canonical pair. Thus there is a complete one-to-one correspondence between *those* two branches (of the two families of observables) which relate to the two degrees of freedom in question. If there *are* no others, the one-to-one correspondence persists as time advances, but the observables of the first system (say) change their mates in the way that the latter, i.e. the observables of the second system, undergo a certain continuous contact-transformation.

Non-local Potential

Theoretical Insight into the Connection between the Gravity and the Generalized Quantum Entanglements

The “free” particle 2 undergo a change of its momentum when the other entangled partner (particle 1) hits a potential barrier.

Elio B. Porcelli, São Paulo, Brazil

Abstract

Much of the known dynamic of the particles is governed by local interactions such quantum mechanics also adds the possibility of the dynamics be governed by nor entangled particles. Here, by using the formalism of quantum mechanics, it is sho system of two particles, where a negligible or null interaction happens each other known interactions, the momentum of a particle varies considering that the other p potential well. This article theorizes qualitatively a much larger system, so that all quantum entanglement and consequently this generality explains possibly the ma

Keywords: quantum entanglement, nonlocal potential, generality, gravity.

$$\hat{H}\Psi_1 = -\frac{\hbar^2}{2m_1}\frac{d^2}{dx_1^2}\Psi_i - \frac{\hbar^2}{2m_2}\frac{d^2}{dx_2^2}\Psi$$

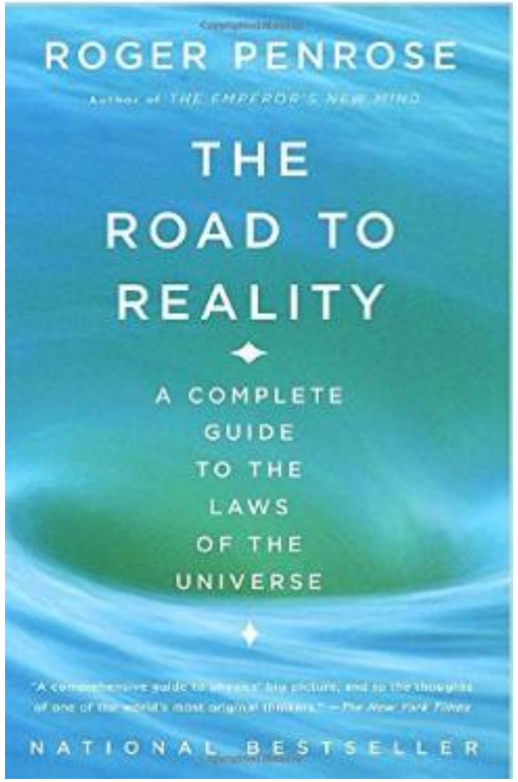
Schröndinger equation for the syst

PORCELLI, E. B. **Study of the phenomenon of quantum entanglement in systems of two particles.** 2010. 66 f. Dissertação (Mestrado em Astrofísica e Física Computacional)–Universidade Cruzeiro do Sul, São Paulo, 2010.

ABSTRACT

This work concerns to the study of quantum entanglement between two particles, since its origin in the article of the “gedankenexperiment” of Einstein, Podolski e Rosen (EPR) in 1935 – that originated the famous EPR paradox – until Bennett´s article of teleportation in 1993. It is a wide study of the formalism and the history of the evolution and the consolidation of quantum entanglement concept, shown in detail. At last, by using the formalism of quantum mechanics, it is shown that in an entangled system of two particles, where no interaction happens with each other as well as the outside world via local known interactions, one of the free particles undergoes an immediate change of its momentum when the other partner particle hits an infinite potential well

Entanglement Chain



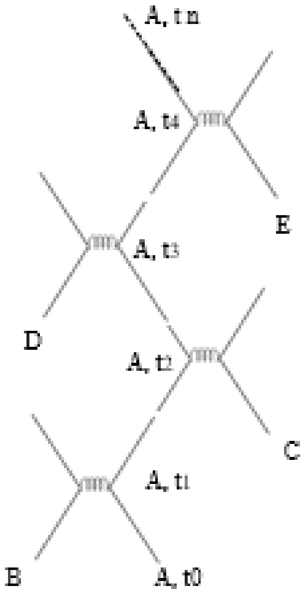
"Schröndinger evolution, away from an initial unentangled state almost always leads to increasing entanglements. So why do the ordinary objects of experience appear as separated independente things? "
Roger Penrose

$$i\hbar\frac{\partial}{\partial t}|\Psi(t)\rangle = \hat{H}(t)|\Psi(t)\rangle$$

$$\hat{U}(t) = \exp\left(-i\frac{\hat{H}t}{\hbar}\right)$$

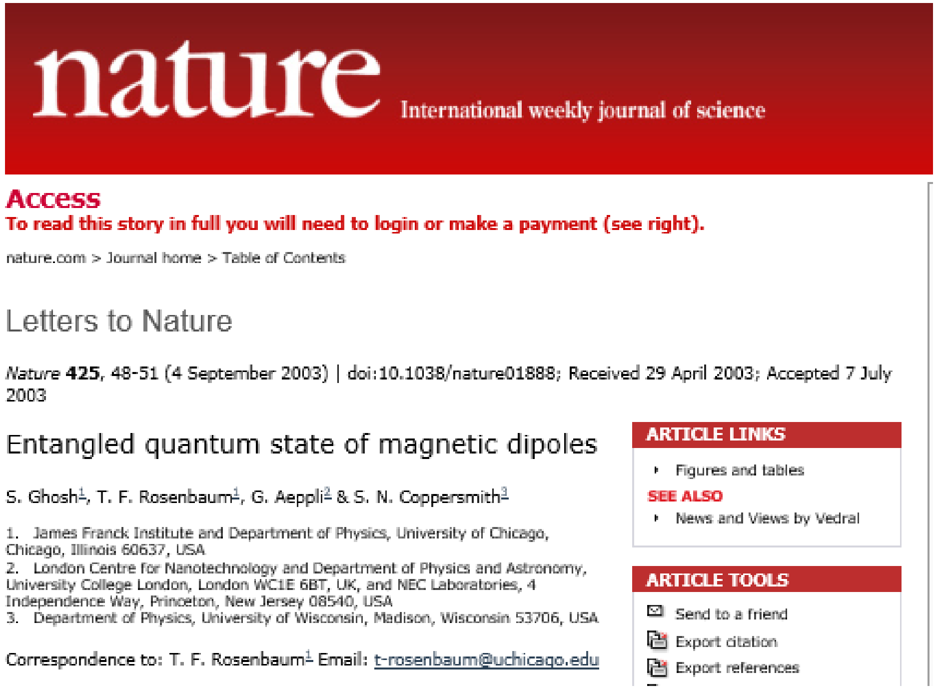
$$|\Psi(t)\rangle = \hat{U}(t,t_0)|\Psi(t_0)\rangle$$

$$|\Psi_A(t_n)\rangle = \hat{U}_A(t_n)|\Psi_A(t_0)\rangle$$



Entanglement chain between the particle A and n others

Everything is Entangled



nature International weekly journal of science

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Letters to Nature

Nature **425**, 48-51 (4 September 2003) | doi:10.1038/nature01888; Received 29 April 2003; Accepted 7 July 2003

Entangled quantum state of magnetic dipoles

S. Ghosh[1], T. F. Rosenbaum[1], G. Aeppli[2] & S. N. Coppersmith[3]

1. James Franck Institute and Department of Physics, University of Chicago, Chicago, Illinois 60637, USA
2. London Centre for Nanotechnology and Department of Physics and Astronomy, University College London, London WC1E 6BT, UK, and NEC Laboratories, 4 Independence Way, Princeton, New Jersey 08540, USA
3. Department of Physics, University of Wisconsin, Madison, Wisconsin 53706, USA

Correspondence to: T. F. Rosenbaum[1] Email: t-rosenbaum@uchicago.edu

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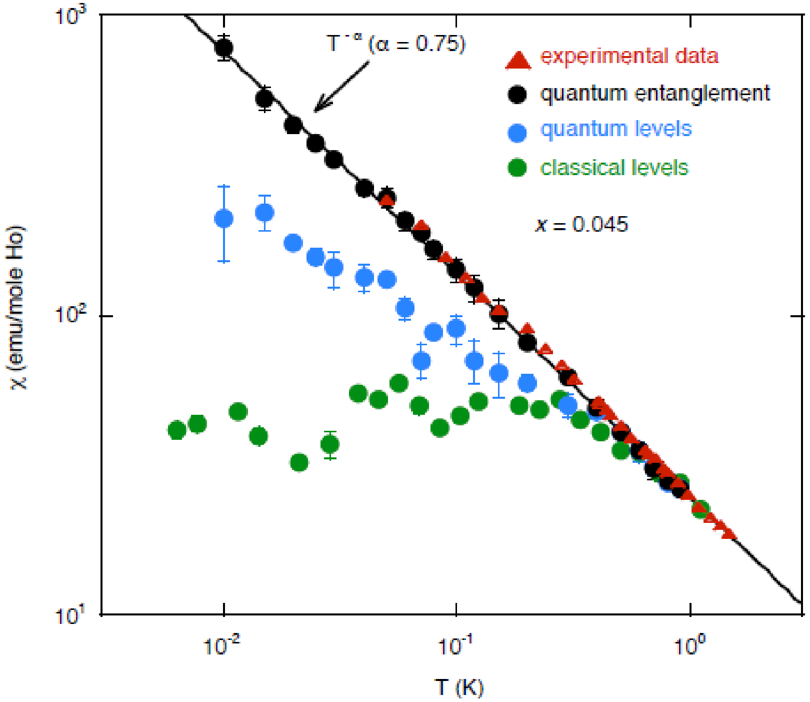
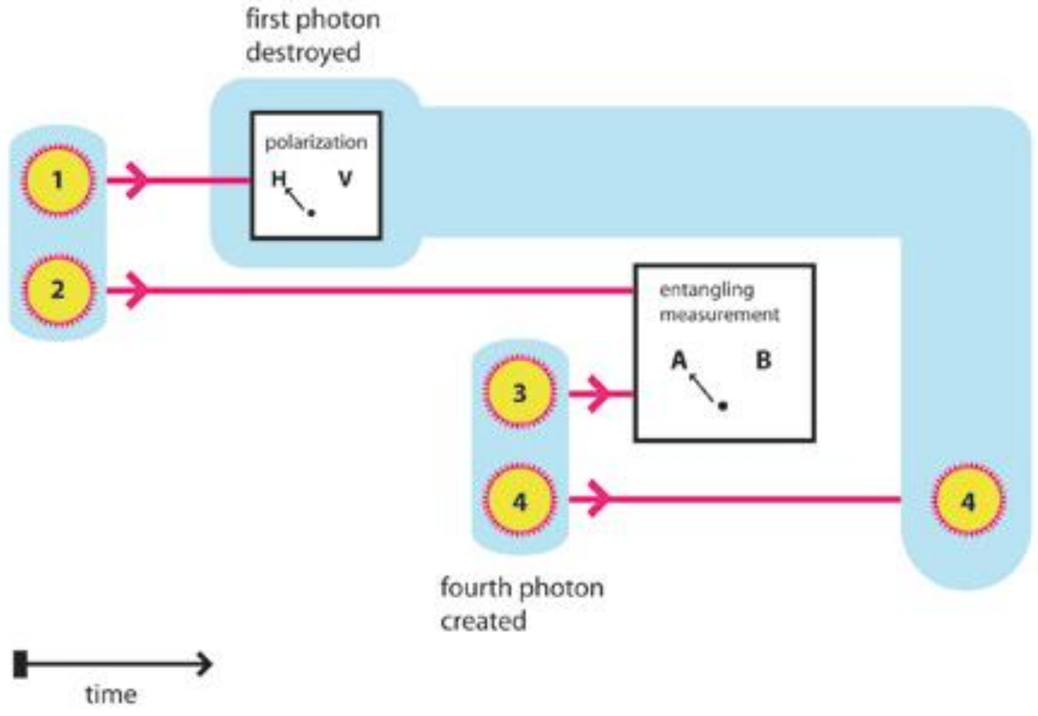


The Curie curve law curve of magnetic susceptibility χ_m versus temperature can only be explained if all internal magnetic dipoles (spins) of insulating salt be quantum entangled each other.

Many other properties of quantum entanglement on the macroscale have been discovered !

Everything is Entangled

Quantum entanglement, between photons that never coexist



Theoretically, new particles created from the quantum vacuum (after the Big Bang, they have been created continuously..) become entangled with other ones already destroyed.

Everything is Entangled

PHYSICAL REVIEW LETTERS

Entanglement Swapping between Photons that have Never Coexisted

E. Megidish, A. Halevy, T. Shacham, T. Dvir, L. Dovrat, and H. S. Eisenberg
Phys. Rev. Lett. **110**, 210403 – Published 22 May 2013

ABSTRACT

The role of the timing and order of quantum measurements is not just a fundamental question of quantum mechanics, but also a puzzling one. Any part of a quantum system that has finished evolving can be measured immediately or saved for later, without affecting the final results, regardless of the continued evolution of the rest of the system. In addition, the nonlocality of quantum mechanics, as manifested by entanglement, does not apply only to particles with spacelike separation, but also to particles with timelike separation. In order to demonstrate these principles, we generated and fully characterized an entangled pair of photons that have never coexisted. Using entanglement swapping between two temporally separated photon pairs, we entangle one photon from the first pair with another photon from the second pair. The first photon was detected even before the other was created. The observed two-photon state demonstrates that entanglement can be shared between timelike separated quantum systems.

Received 3 January 2013

DOI: https://doi.org/10.1103/PhysRevLett.110.210403

Everything is Entangled

Physics Letters B 718 (2012) 233–236

Contents lists available at SciVerse ScienceDirect

Physics Letters B

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Everything is entangled

Roman V. Buniy[a,*], Stephen D.H. Hsu[b]

[a] Schmid College of Science, Chapman University, Orange, CA 92866, United States
[b] Institute of Theoretical Science, University of Oregon, Eugene, OR 97403, United States

A R T I C L E   I N F O

Article history:
Received 14 September 2012
Accepted 20 September 2012
Available online 25 September 2012
Editor: M. Trodden

A B S T R A C T

We show that big bang cosmology implies a high degree of entanglement of particles in the universe. In fact, a typical particle is entangled with many particles far outside our horizon. However, the entanglement is spread nearly uniformly so that two randomly chosen particles are unlikely to be *directly* entangled with each other – the reduced density matrix describing any pair is likely to be separable.

Answering Penrose:
Some small subsystems are mostly entangled with particles far beyond the horizon, and two randomly chosen small subsystems are unlikely to be directly entangled with each other.

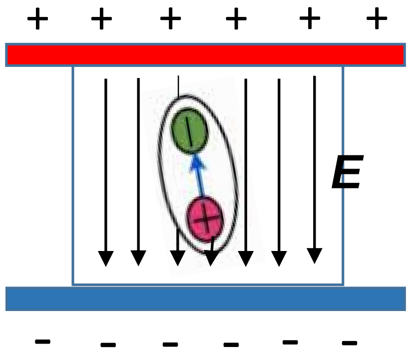
It is worth investigating the effect of non-local potentials considering the **pre-existing** condition of **generalized quantum entanglement** !

Lets make the transition energy of a myriad of particles using a strong local potential…

Explaining Anomalous Forces in Solenoids and Capacitors

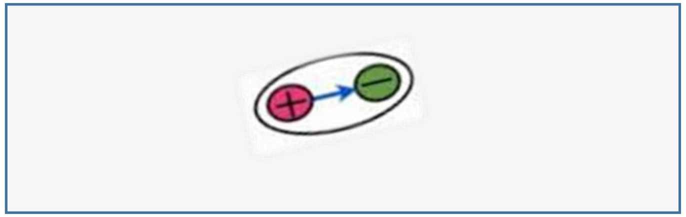
Single electric (molecular) dipole of the capacitor

Local Potential



Dipole pair ↕

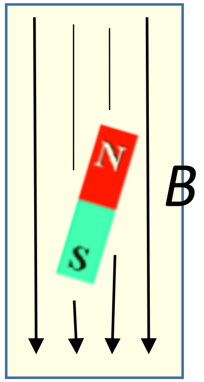
Non-local Potential



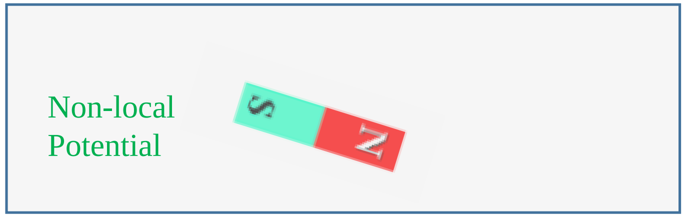
Single electric (molecular) dipole of the floor

Single magnetic (molecular) dipole of the solenoid core

Local Potential



Dipole pair ↕



Single magnetic (molecular) dipole of the floor

Displacement of entangled dipoles according to the momentum conservation principle just considering non-local interaction between them !

Entangled states of dipole pair

$$|\Psi_1\rangle = \frac{|01\rangle - |10\rangle}{\sqrt{2}}$$

$$|\Psi_2\rangle = \frac{|01\rangle + |10\rangle}{\sqrt{2}}$$

$(|0\rangle)$ Oriented along field

$(|1\rangle)$ Oriented against field

e.g. transition energy of electric dipole

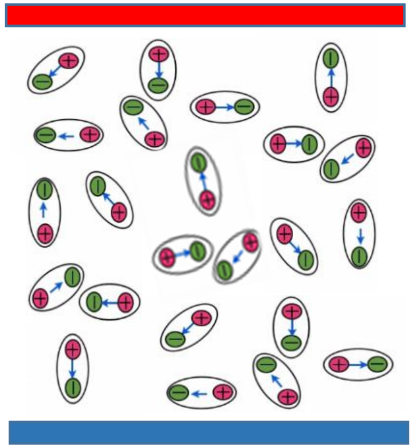
$$\hbar\omega_i = |\vec{d} \cdot \vec{E}|$$

Explaining Anomalous Forces in Solenoids and Capacitors

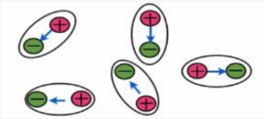
Any calculation is “hard” regarding a myriad of dipoles in the dielectric or core magnetic using the quantum mechanics framework.

Capacitor

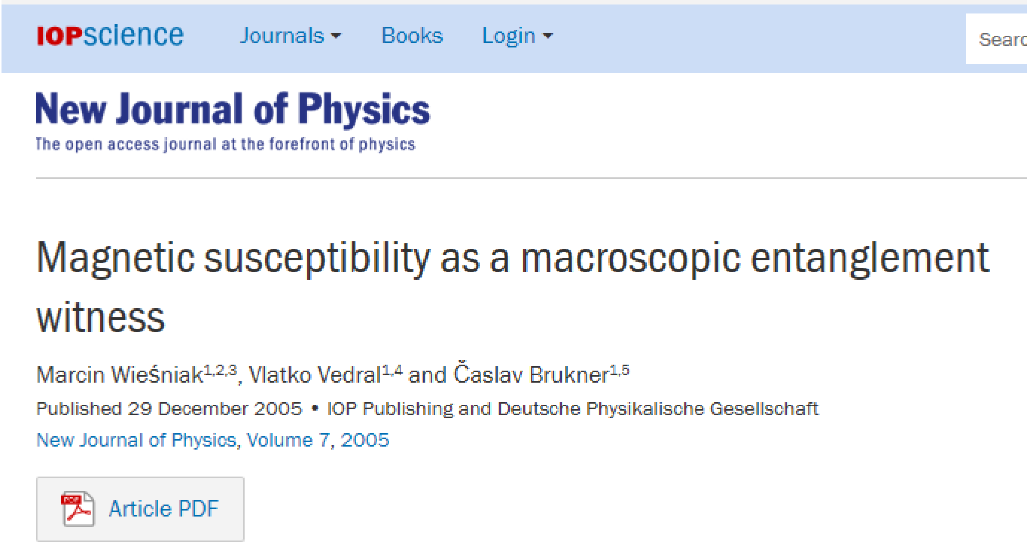
Dielectric



Electric dipoles of the environment



Use Macroscopic observables* such as Magnetic Susceptibility. χ_m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New Journal of Physics
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Magnetic susceptibility as a macroscopic entanglement witness

Marcin Wieśniak[1,2,3], Vlatko Vedral[1,4] and Časlav Brukner[1,5]

Published 29 December 2005 • IOP Publishing and Deutsche Physikalische Gesellschaft

New Journal of Physics, Volume 7, 2005

Article PDF

$$\underbrace{1 - \frac{kT\bar{\chi}}{Ns}}_{\text{Non-local properties}} + \underbrace{\frac{\langle \vec{M} \rangle^2}{N^2 s^2}}_{\text{Local properties}} \leqslant 1$$

Macroscopic quantum complementary Relation -> inequality

*defined as the total value of a physical quantity over a collection of quantum systems.

Explaining Anomalous Forces in Solenoids and Capacitors

"Non-local" dipolar force for magnetic solenoids

$$F = \frac{0.102}{16\pi^2}\frac{SBI}{\theta}$$

$\mu_r = 1 + \chi_m$. $B = \frac{\mu_0 \mu_r N I}{L}$

$E_m = SBI$

In this case, the electric permittivity χ_e is also considered a quantum entanglement witness such as the magnetic susceptibility χ_m

E_m amounts to the summation of energy eigenvalues of all magnetic dipoles

"Non-local" dipolar force for symmetric capacitors*

$$F = \frac{0.102}{16.\pi^2}\frac{\epsilon_r - 1}{\epsilon_r + 2}\epsilon_0 A E^2$$

$\epsilon_r = 1 + \chi_e$

$$\frac{\epsilon_r - 1}{\epsilon_r + 2} = \frac{4\pi N\alpha}{3}$$

Clausius-Mossotti relation presents macroscopic variables as relativity permittivity ϵ_r and microscopic variables as atomic polarizability α

"Non-local" dipolar force for asymmetric capacitors*

$$F = \frac{0.102}{16.\pi^2}\frac{\epsilon_r - 1}{\epsilon_r + 2}\frac{A_1^2}{A_2}.\epsilon_0.E^2$$

$$\frac{1}{8\pi^2}$$

$$\frac{-\hbar^2}{2m}\frac{d^2\psi}{dx^2} + V\psi = E\psi \qquad \hbar = \frac{h}{2\pi}$$

Typical constant term of quantum equations (Schröndinger equation).

*They have some similar elements of dielectrophoresis force equations

Explaining Anomalous Forces in Solenoids and Capacitors

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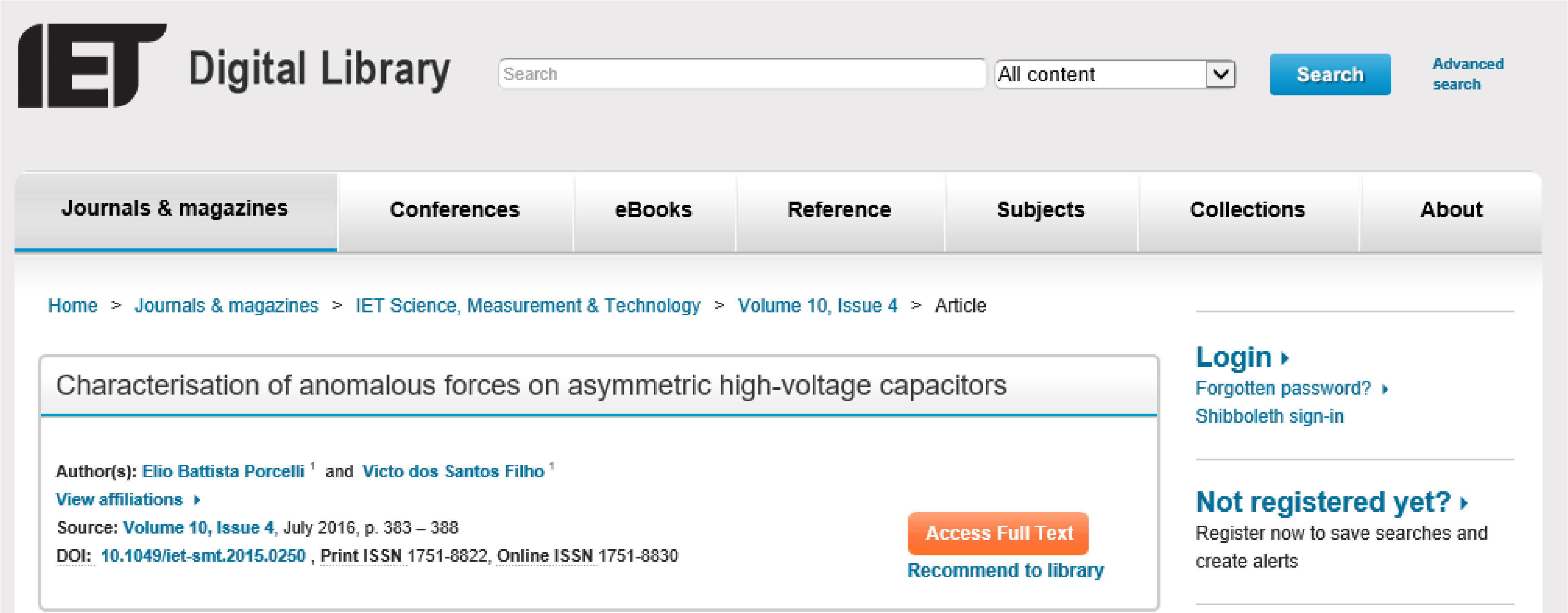
2. Elio B. Porcelli, and Victo S. Filho, On the anomalous forces of high voltage symmetrical capacitors

Explaining Anomalous Forces in Solenoids and Capacitors



Explaining Anomalous Forces in Solenoids and Capacitors

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Anomalous Effects from Dipole-Environment Quantum Entanglement
(Vol-4,Issue-1,January 2017)

Author(s):

Elio B. Porcelli, Victo S. Filho

Keywords:

BB effect, anomalous forces, magnetic cores, capacitors, Clausius-Mossotti relation.

Abstract:

In this work, we analyze anomalous effects observed in the operation of two different

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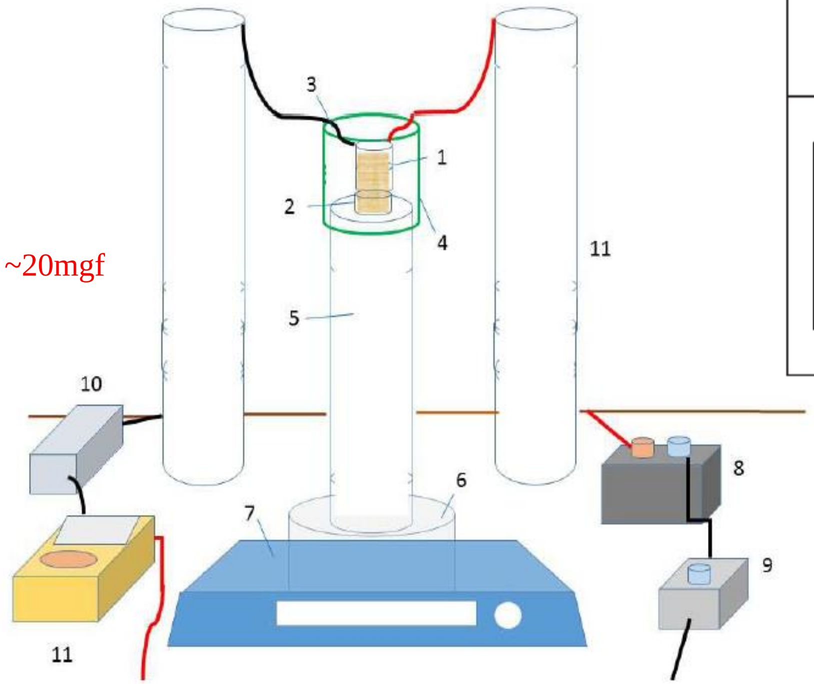
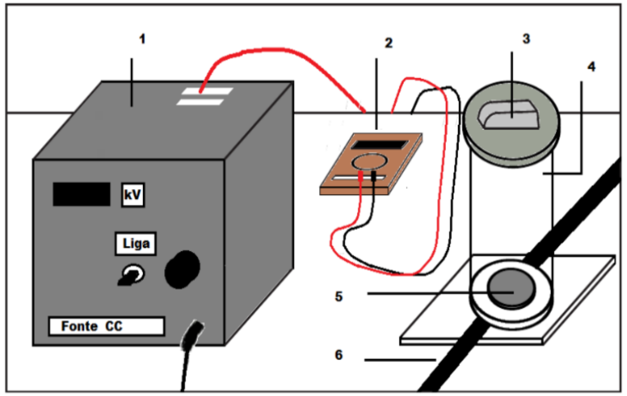
Journal TOCs

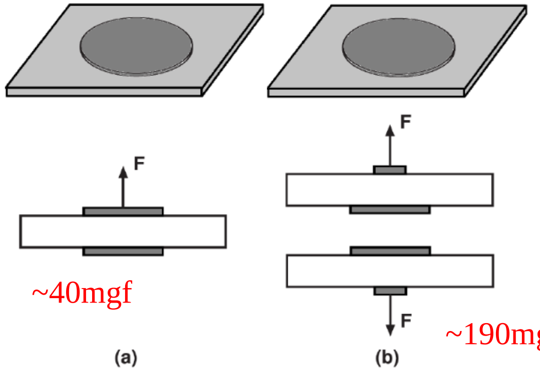
Explaining Anomalous Forces in Solenoids and Capacitors

~20mgf



Above: our experiment of magnetic core using a milligram digital scale

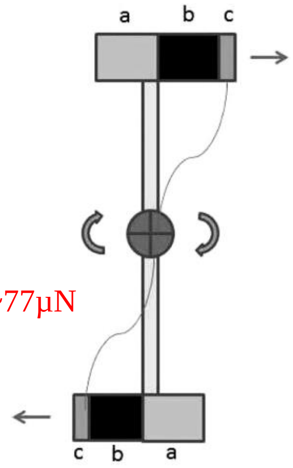




~40mgf

~190mgf

~77μN

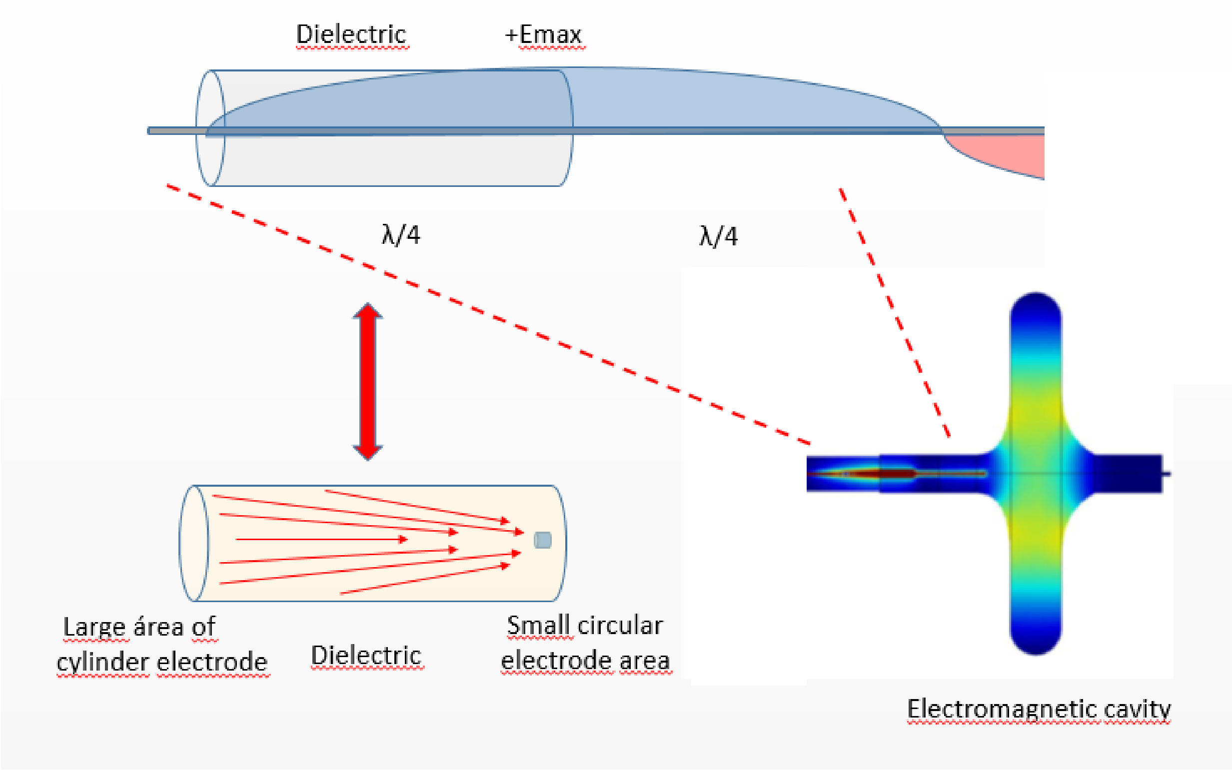


Above: Our experiments with symmetric and asymmetric capacitors using accelerometer.

Left: Experiment with asymmetric capacitor implemented by NASA and J. Naudin.

Remark: it was reduced the “local” interactions between device and environment to it become negligible in our experiments and the measurements seem to be in accordance with the “non-local” dipolar force equations!

Beyond Solenoids and Capacitors > EM Drive with Dielectric



Cannae cavity

Pillbox shape

PFTE dielectric

935 MHz RF

Torsion pendulun

Standing wave (electric field) inside the cylinder dielectric -> asymmetric capacitor

Axial (thrust) force measured by NASA -> 40 µN

$$F = \frac{0.102}{16.\pi^2}\frac{\epsilon_r - 1}{\epsilon_r + 2}\frac{A_1^2}{A_2}.\epsilon_0.E^2$$

We are still getting more data for calculation...

Beyond Solenoids and Capacitors > EM Drive with Dielectric

AIAA 2014-4029

ropulsion and Energy Forum
ly 28-30, 2014, Cleveland, OH
0th AIAA/ASME/SAE/ASEE Joint Propulsion Conference

Anomalous Thrust Production from an RF Test Device Measured on a Low-Thrust Torsion Pendulum

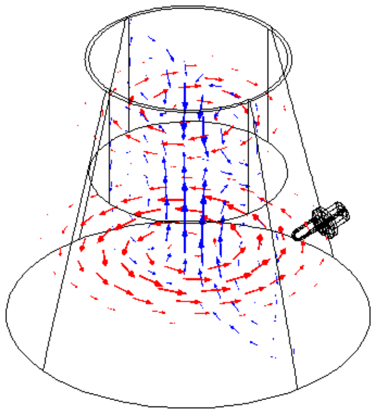
David A. Brady*, Harold G. White†, Paul March‡, James T. Lawrence§, and Frank J. Davies**
NASA Lyndon B. Johnson Space Center, Houston, Texas 77058

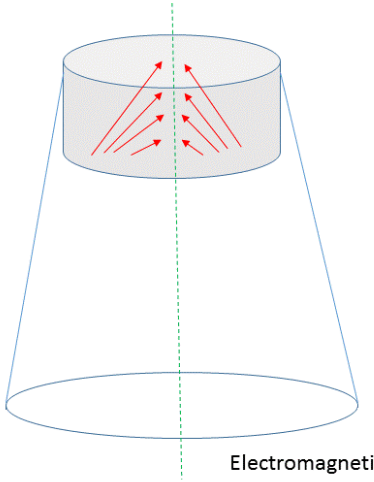
This paper describes the test campaigns designed to investigate and demonstrate viability of using classical magnetoplasmadynamics to obtain a propulsive momentum transfer via the quantum vacuum virtual plasma. This paper will not address the physics of the quantum vacuum plasma thruster (QVPT), but instead will describe the recent test campaign. In addition, it contains a brief description of the supporting radio frequency (RF) field analysis, lessons learned, and potential applications of the technology to space exploration missions. During the first (Cannae) portion of the campaign, approximately 40 micronewtons of thrust were observed in an RF resonant cavity test article excited at approximately 935 megahertz and 28 watts. During the subsequent (tapered cavity) portion of the campaign, approximately 91 micronewtons of thrust were observed in an RF resonant cavity test article excited at approximately 1933 megahertz and 17 watts. Testing was performed on a low-thrust torsion pendulum that is capable of detecting force at a single-digit micronewton level. Test campaign results indicate that the RF resonant cavity thruster design, which is unique as an electric propulsion device, is producing a force that is not attributable to any classical electromagnetic phenomenon and therefore is potentially demonstrating an interaction with the quantum vacuum virtual plasma.

Nomenclature

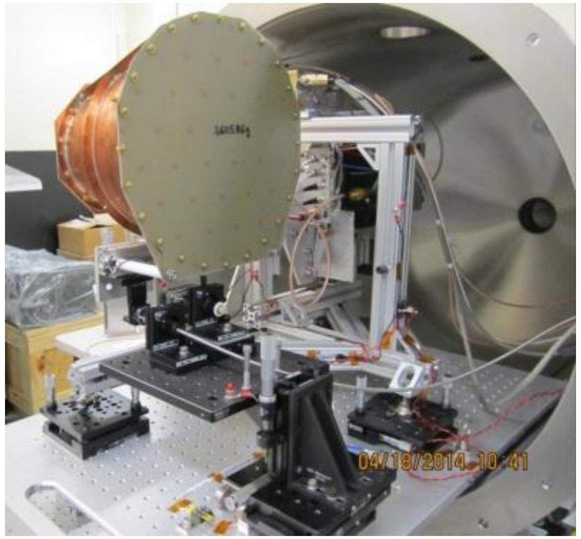
α_{power} = Specific mass of spacecraft power system, kg/kW$_e$
α_{prop} = Specific mass of spacecraft propulsion system, kg/kW$_e$

Beyond Solenoids and Capacitors > EM Drive with Dielectric





Electromagnetic cavity
TE012 mode



Tapered cavity

RF dielectric
Resonator

Torsion pendulun

~ 1880 MHz RF

Roger Shawyer's design

Standing wave (electric field) inside the cylinder dielectric -> asymmetric capacitor

Axial (thrust) force measured by NASA (30 ~120 μN)

We are still getting more data for calculation...

$$F = \frac{0.102}{16.\pi^2}\frac{\epsilon_r - 1}{\epsilon_r + 2}\frac{A_1^2}{A_2}.\epsilon_0.E^2$$

Beyond Solenoids and Capacitors > EM Drive with Dielectric

JOURNAL OF PROPULSION AND POWER

Measurement of Impulsive Thrust from a Closed Radio-Frequency Cavity in Vacuum

Harold White,* Paul March,† James Lawrence,‡ Jerry Vera,§ Andre Sylvester,¶
David Brady,** and Paul Bailey††
NASA Johnson Space Center, Houston, Texas 77058

DOI: 10.2514/1.B36120

A vacuum test campaign evaluating the impulsive thrust performance of a tapered radio-frequency test article excited in the transverse magnitude 212 mode at 1937 MHz has been completed. The test campaign consisted of a forward thrust phase and reverse thrust phase at less than 8×10^{-6} torr vacuum with power scans at 40, 60, and 80 W. The test campaign included a null thrust test effort to identify any mundane sources of impulsive thrust; however, none were identified. Thrust data from forward, reverse, and null suggested that the system was consistently performing with a thrust-to-power ratio of 1.2 ± 0.1 mN/kW.

Nomenclature

a	=	acceleration, m/s^2
B	=	magnetic field, T
c	=	vacuum speed of light, m/s

II. Experimentation

A. Facilities

The thrust measurements were made using the low-thrust torsion pendulum at NASA Johnson Space Center. This torsion pendulum is

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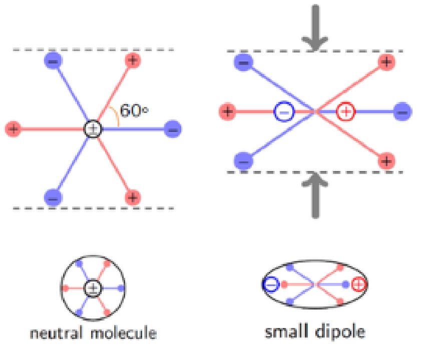
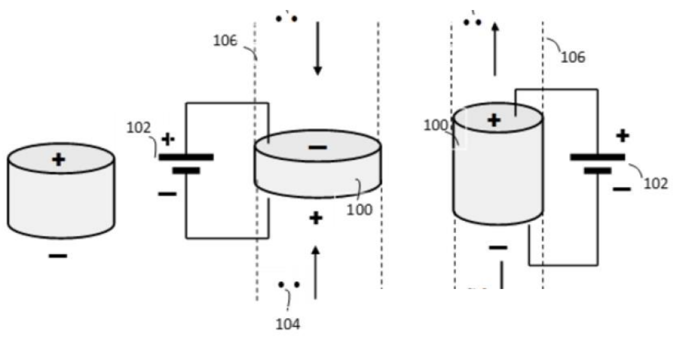




Experiment of induction "non-local" force using PZT4 ceramic disc in the direct mode

Repulsive and acttrative force detection using accelerometer (~ 98μN)

Parameter	Description	Direct mode	Converse mode
V	Voltage	applied from the outside	internally generated
T	Tickness of the disc		
F	Mechanical Force	internally generated	applied from the outside
S	Strain	internally generated	applied from the outside
A	Circular area of the disc		
Y	Young modulus		
g33	Piezoeletric parameter	valid	valid
D	Axial deformation		
f	"Non-local" Force	externally induced	externally induced

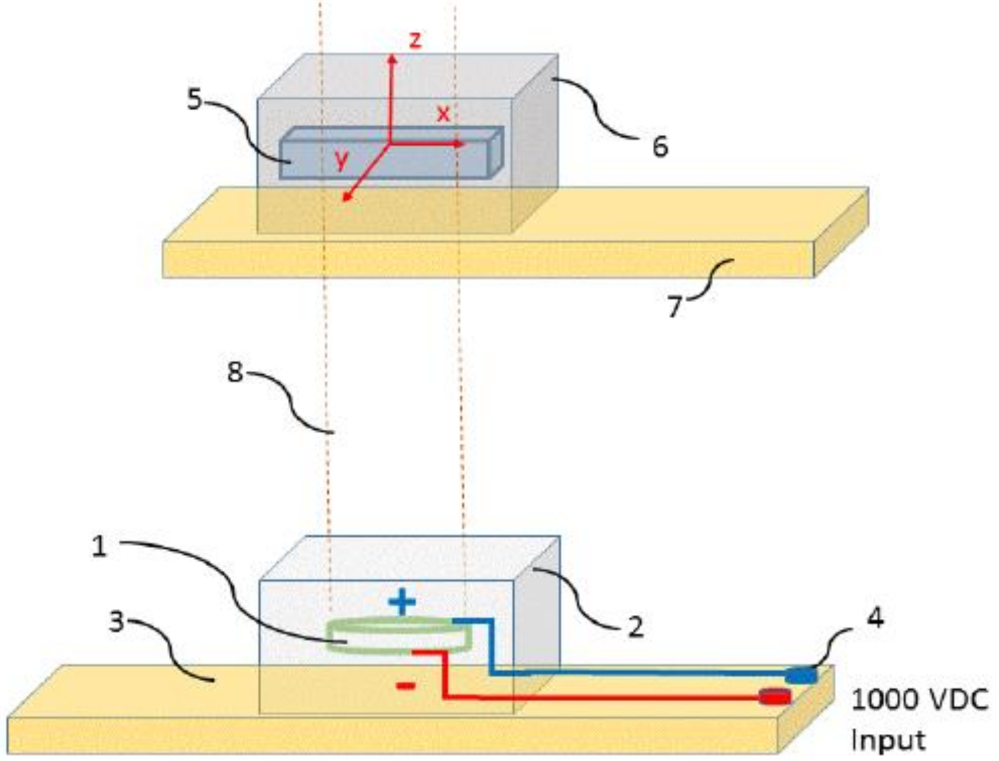
g33 = V . T / F

F = V . T / g33

S = F / A

D = S / Y

f = F . D



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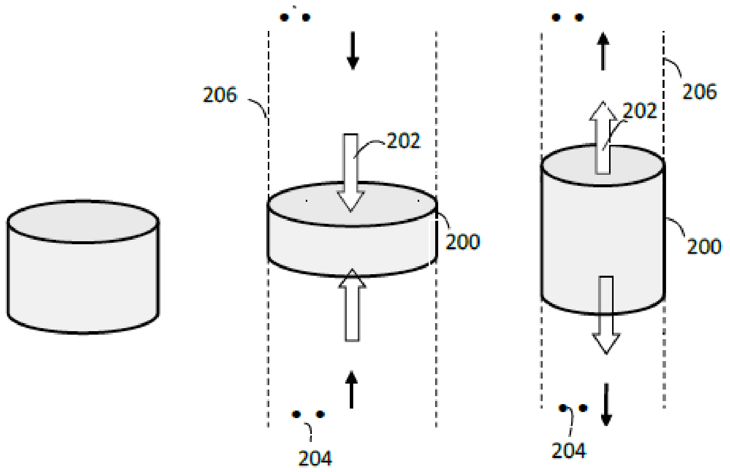

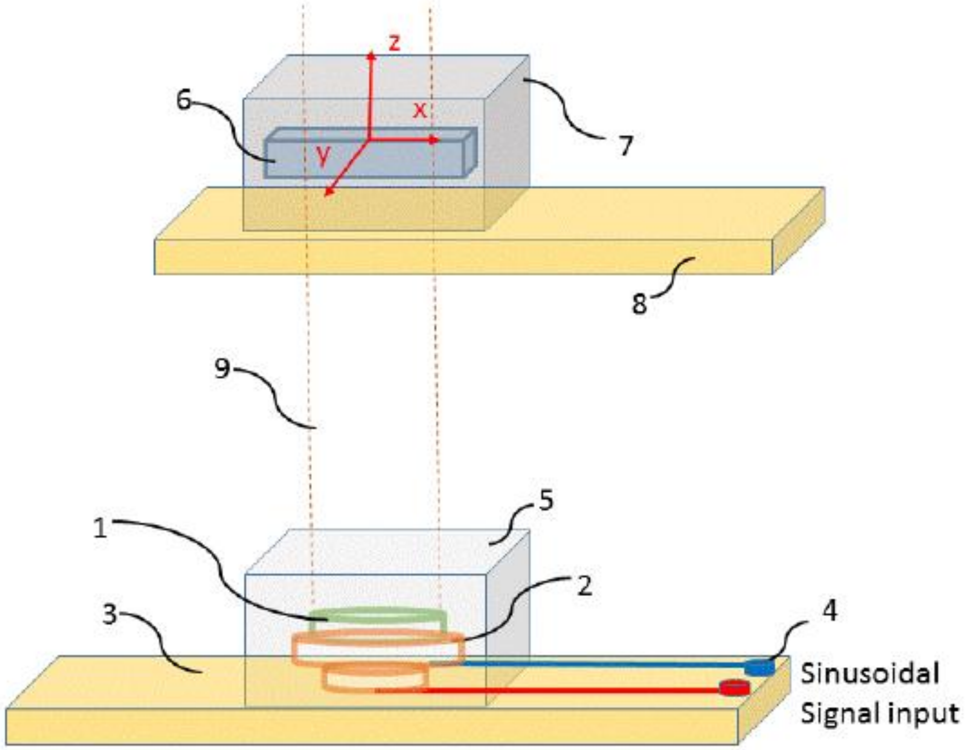

g33 = V . T / F

F = V . T / g33

S = F / A

D = S / Y

f = F . D ⟺ $$F = \frac{0.102}{16.\pi^2}\frac{\epsilon_r - 1}{\epsilon_r + 2}\epsilon_0 A E^2$$

Correspondence between the formules:
We are still getting more data for calculation

Beyond Solenoids and Capacitors > Piezoelectrics

Physics > General Physics

Induction of Forces Performed by Piezoelectric Materials

Elio B. Porcelli, Victo S. Filho

(Submitted on 6 Dec 2016)

We describe the phenomenon of generation of an external field of forces from piezoelectric materials subjected to the application of electric fields or mechanical stress. The piezoelectric materials are shown as being capable of producing induction forces in external objects and we conclude that the nature of the forces generated are not originated from the traditional interactions. Further we specifically assert that the generation of forces by the piezoelectric materials is ruled by the hypothesis of preexisting condition of generalized quantum entanglement between the molecular structure of the material bulk and the surrounding environment. In addition the widely spread coupling of the molecules with the environment can be manifested from the so-called direct effect or the converse effect in piezoelectric materials and this coupling is not intermediated by acoustic waves or electromagnetic fields. We show that the novel effect has a theoretical explanation consistent with the generalized quantum entanglements and the direction of the induced forces depends on either the direction of the mechanical force or the electric field applied in these materials.

Comments: 17 pages, 7 figures
Subjects: General Physics (physics.gen-ph)
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From: Victo Dos Santos Filho [view email]
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Challenges

- Develop a computing simulation of entangled quantum dipole system to accomplish the classical (macroscopic) observables

$$\mathbf{H} = \hbar \sum_{i=1}^{N} \omega_i \hat{S}_i^z + \hbar \sum_{i \neq j}^{N} \Omega_{ij} \hat{S}_i^+ \hat{S}_j^-$$

$$F = \frac{0.102}{16.\pi^2} \frac{\epsilon_r - 1}{\epsilon_r + 2} \frac{A_1^2}{A_2} . \epsilon_0 . E^2$$

- Magnetic saturation of the cores

- Breakdown voltage of dielectric

- Need to increase the dielectric constant x breakdown voltage

- Weak force value readings x noise (acoustic, seismic, thermal etc)

- Measure the geometry (3D map) of the external induction region

- Plot graphics with reasonable range of variables (voltage, current etc)

- Improve the “non-local” effects usually weak (almost imperceptible)

- Check other signature of “non-local” effects like interaction speed

Thank you!!

Danke!!

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