BELGRADE LAKES INSTITUTE FOR ADVANCED RESEARCH - SCIENTIFIC JOURNAL*

Volume 12 Number 5A – 1 May 2012 (updated 5 May 2012 3:41 A.M.)

Glenn A. Baxter, P.E., Editor

EDITORIAL - Your Editor, Glenn A. Baxter, P.E., has joined NPA, the Natural Philosophical Alliance, and they have asked me to speak at their July, 2012 international conference (See www.k1man.com/H) in New Mexico and submit a summary paper of my paper, Not So Fast, Dr. Einstein (See www.k1man.com/c1) for their 2012 conference transactions. I have accepted. See www.k1man.com/c13 Also asked and accepting to speak was Dr. Chung Y. Lo. Dr. Lo appears to agree with your editor's conclusions about the many errors in Dr. Einstein's relativity theory and derivations thereof, most notably $E = MC^2$. We have asked Dr. Lo to also speak and present a paper at the August, 2012 physics colloquium in Portland, Maine. Dr. Lo's credentials are incredible (PhD from MIT), and joins he the very short list of world wide scientists at the doctoral level who challenge Dr. Einstein's relativity theory. Heading this list is Dr. Daniele Sasso of Italy. We also feature papers by your editor and also Electrical Engineer Greg Volk who also disagrees with Dr. Einstein. Other authors include John Huang.

Dr. Chung Y. Lo

Dr. Lo writes:

I am a theoretical physicist and mathematician. I have been in the field of gravitation doing research for about 20 years. My major work is on theoretical developments related to general relativity and rectifying its mathematical and conceptual errors. I discovered many "experts" actually understand general relativity very poorly. I proved that $E = mc^2$ is only conditionally valid; and this would affect some currently popular theories. I also discovered the charge-mass interaction that is and would be responsible to many puzzles in physics. I have a Ph.D. in mathematics from Queen's University, Canada, and a D. Sc. in physics from MIT, USA. I learned general relativity from Professor Steven Weinberg, a Nobel Laureate and mathematics from Professor I. Halperin, FRSC.

FEATURED LETTERS

From: Glenn A. Baxter, P.E. <glennbaxterpe@aol.com>

To: jhynecek <jhynecek@netscape.net>

Cc: dgsasso <dgsasso@alice.it>

Sent: Thu, May 3, 2012 6:07 am

Subject: Re: Relativity and NPA

My Dear Dr. Hynecek,

Well my case is in the first page of www.k1man.com/c12 Study that page carefully. It is exactly where Dr. Einstein went wrong. The speed of light, relative to any observer, is not constant, as Dr. Sasso also agrees with me. See www.k1man.com/k I also prove this in www.k1man/c1

And yes, Maxwell is wrong about some things. This has nothing to do with practical electronics. Only physics PhD candidates really dig in to Maxwell's equations very seriously. They are also good for the soul! But NPA member and Electrical Engineer Harry Rickter (not certain of the last name) stated during last Saturday's NPA video teleconference "Maxwell was wrong!" You can listen to that at www.k1man.com/Catt

Sorry, Dr. Hynecek, but Dr. Einstein was dead wrong about Special Relativity and all its derivatives, including E = MC^2 Dr. Feynman agreed with me that energy from an atomic bomb comes from electrostatic forces and not conversion of mass. My anti-neutron theory says that mass conversion only happens during electron-positron annihilation. See www,k1man.com/c2

I appreciate your time and responses very much.

Glenn A. Baxter, P.E.

From: Jerry Hynecek <jhynecek@netscape.net>
To: Glenn A. Baxter, P.E. <glennbaxterpe@aol.com>
Sent: Wed, May 2, 2012 10:22 pm
Subject: Re: Relativity and NPA

Dear Mr. Baxter.

It is difficult for me to sieve through all your disconnected and mostly ad hoc statements. After all it is your paper, so you need to present it in such a way that the conclusions are clearly understandable to anyone who reads it. The statement " My analysis is correct" has no meaning. My analysis is also correct and Einstein's analysis as well. So, what exactly is wrong with SRT and where is your equivalent theory?

Please condense the proof to a more manageable and concise form, so that the assumptions are clearly backed up by formulas. The statements without backing up by math have no meaning. An example of a concise paper is attached. Please follow the same template including the group theory verification of your version of SRT.

Since SRT uniquely follows directly from Maxwell theory of EM fields it follows that according to your findings and simple logic the EM field theory is also wrong. I find this difficult to believe, since all of the modern electronics is based on these equations.

Good luck,

Jerry Hynecek

From: Jerry Hynecek <jhynecek@netscape.net>
To: Glenn A. Baxter, P.E. <glennbaxterpe@aol.com>
Sent: Wed, May 2, 2012 5:32 pm
Subject: Re: Relativity and NPA

Dear Mr. Baxter,

I am sorry, but the SRT is not wrong.
My explanation of the train platform effect is attached.
Your paper derivation has several hidden assumptions that you are not explicitly stating or perhaps not even aware of.

This leads to a wrong conclusion.

Best regards,
Jerry Hynecek

On 5/2/2012 11:49 AM, Glenn A. Baxter, P.E. wrote:

Dear Dr. Hynecek,

Please read the first page of the attached paper. Special Relativity is
wrong. See also Dr. Sasso's papers at www.k1man.com/k
Regards,

Glenn A. Baxter, P.E.

From: Jerry Hynecek <jhynecek@netscape.net>
To: Glenn A. Baxter, P.E. <glennbaxterpe@aol.com>

Sent: Wed, May 2, 2012 9:45 am
Subject: Re: Relativity and NPA

Dear Mr. Baxter.

Thank you for the invitation, however, I have to decline.
I am not an expert in this field and the papers I write is just for my hobby.
My view on the topic of relativity is as follows:
The SRT is essentially correct when applied to inertial systems
and only the GRT is wrong and needs a fundamental rework.

Best regards,
Jerry Hynecek

On 5/2/2012 8:26 AM, Glenn A. Baxter, P.E. wrote:

Dear Dr. Hynecek,

I see that we are fellow speakers at NPA this year. I have attached my paper for your review. I am now reading your papers. Can you speak in Portland, Maine at the August 18, 2012 physics colloquium?

2012 PHYSICS COLLOQUIUM IN PORTLAND, MAINE -17 August 2012

We are now calling for papers and inviting speakers for the 18 August 2012 Physics Colloquium, to be held in Portland, Maine. The theme for the 2012 Colloquium will be the effect of Special Relativity on Electromagnetic Theory as described by Maxwell's equations. Reference: Electromagnetic Theory by Dr. Julius Stratton, McGraw-Hill, New York and London, (Maple Press, York, Pa.), 1941. (see www.k1man.com/physics). The 13 August 2011 Physics Colloquium scheduled in Portland, Maine focused on the effect of the non constant nature of the speed of light on 21st century physics. Accepted papers for presentation at the 2012 colloquium will be distributed to all registered attendees before the colloquium so they can be studied and even discussed, which will greatly improve the effectiveness and efficiency of the colloquium itself. Attendees are cordially invited to dinner in Portland on Friday evening, August 17, 2012 at 7:00 p.m. to informally meet and to also discuss physics. Please register for the colloquium (free) and/or the dinner (off the menu) by sending an E-mail to Institute@K1MAN.com

Best regards,

Glenn A. Baxter, P.E.

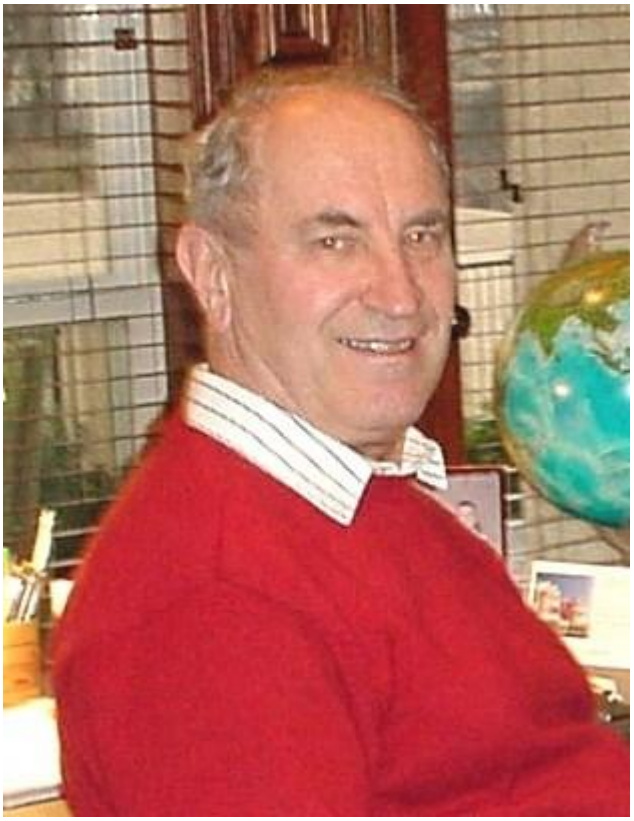
Dr. Jerry Hynecek

Engineer

Interests: General Relativity Theory **Age:** 71

Dr. Jaroslav Hynecek, Jaroslav (Jerry) Hynecek (M'73?SM'00) Received the Dipl. Ing. degree in electrical engineering from Czech Technical University (CTU), Prague, in 1962. Received the Ph.D degree in electrical engineering from Case Western Reserve University (CWRU), Cleveland, OH, in 1974. From 1962 to 1969, he worked at the A. S. Popov Research Institute, Prague, and as an Assistant Professor of physics at CTU, Podebrady. From 1974 to 1976 he worked at CWRU. In 1976, he joined Texas Instruments, Inc. Dallas and achieved the position of TI Fellow in 1990. In 1998, he founded a consulting corporation, ISETEX, Inc., Allen, TX, where he is CTO. He has published 51 papers and is

author or co-author of 85 issued U.S patents. Dr. Hynecek received the Paul Rappaport award for the best paper published in any IEEE Electron Devices Society journal during 1983, 2003 Walter Kosonocky award, and three NASA Group Achievement Awards. In 1978 he invented Virtual Phase CCD Technology that became the basis for the Pinned Photodiode concept and reduction of dark current by accumulation of holes at the Silicon-Silicon dioxide interface. In 1993 he invented ?Impactron? a charge multiplying CCD image sensor that is the solid state equivalent of vacuum tube Image Intensifiers. He has also participated in numerous image sensor related conferences and workshops as a member of the paper selection committees or as a session chairman or cochairman. Dr. Hynecek served as Assoc. editor for IEEE TRANSACTIONS ON ELECTRON DEVICES from 1997 until 2006.



Dr. Jerry Hynecek

PAPERS

EXPERIMENTAL EVIDENCE TO DATE REGARDING SPECIAL RELATIVITY IS WRONG – by Glenn A. Baxter, P.E. copyright 18 April 2012

Glenn A. Baxter, P.E., Physicist, Licenses Professional Engineer

As shown in www.k1man.com/c1, Dr. Einstein's Special Relativity famous "time slowing down" formula was derived, analogous to a train car moving from left to right with an observer sitting on a train platform, and a light beam coming across the train car toward the observer. I define time as that ticked off (starting from T = 0) by five clocks, previously synchronized at T = 0 while sitting next to each other.

The train car in the analogy is travelling from left to right at velocity v relative to the train platform. When the light arrives at the near side of the train car, the observer, on the train platform, in line with the light path, will be looking along the hypotenuse of a right triangle formed with another side being distance vt, where t is the elapsed time for the light to cross the train car, and the remaining side being the width of the car.

Thus, the observer on the train platform sees the longer hypotenuse path travelledby the light, and an observer on the near side of the train car simply sees the light coming straight across the car along a shorter path. If you assume that light speed is constant, relative to both observers, then, since distance is ct, then a greater distance travelled by the light must be explained by a larger t, as did Dr. Einstein, and his resulting conclusion that time must have actually slowed down on the car.

Or, the relative velocity of the light must have increased, as claimed by your author. The reason for this claim is that for an observer on an overpass to the right will also see the light travel a longer path than an observer on the train at the front of the car. An observer on an overpass behind the car will see the light travelling a shorter path than an observer on the train car in the rear of the car. Dr. Einstein's incorrect analysis would require the clock in the front of the car to slow down and the one in the rear of the car to speed up. That is a contradiction, and thus Dr. Einstein was wrong. Correct, is relative velocity changing and not absolute time ticked off by the clocks. QED!
Now, any experiment designed to confirm this analysis by your author needs to be done at 0 degrees with respect to the velocity of the train car. If an experiment measures light at 90

degrees, it will of course agree with Dr. Einstein's incorrect formula since you are not distinguishing whether time slowed down or relative velocity increased. Just look at the clocks later! They will all still be synchronized.

Your author's experiment at www.k1man.com/c1-7, however, is correct, at 0 degrees, DOES distinguish between time slowing down or relative velocity increasing, and practical as well as accurate enough to confirm the Baxter Doppler formula and disprove the incorrect Dr. Einstein relativistic Doppler formula.

SPECIAL RELATIVITY MATH DISPROOF ON ONE PAGE – Copyright 21 April 2012 –8:20 A.M. by Glenn A. Baxter, P.E*. Institute@k1man.com 207 242 2143 www.k1man.com/v www.k1man.com/physics

ABSTRACT

We present easy to understand mathematical disproof of Dr. Einstein's Special Relativity on the first page of this paper and discuss why all the so called existing "proofs" of Special Relativity are incorrect. We are in agreement with Dr. D. Sasso that "Special Relativity is obsolete." See www.k1man.com/k

ARGUMENT

Three ticking clocks are synchronized while sitting next to each other.

Consider a thought experiment analogous to Dr. Einstein's 1905 derivation of his famous "time slowing down" formula, t = t' [square root of (1 – v^2/c^2)]

You sit on a train platform. Your time (being recorded on a note pad from your previously synchronized clock number3) is "prime" time, t'

I am on the near side of a moving train (from left to right) and record time t on my note pad from clock number 2.

Assume c is constant for us both, as did Dr. Einstein.

A light pulse is flashed at t = 0 on clock 1 across the train toward us both and reaches me on the near side of the train car at t = t on my clock number 2. I measure the distance vector toward me across the train as ct, the first leg of a triangle.

You measure the base vector of the triangle created by the train moving at v relative to you from left to right during the time it took for the light to cross the train in time t for me on clock 2 and time t' for you on clock 3, which is length vt'

You are situated so that when the light reaches me, you are looking straight along the hypotenuse of the triangle (the third leg). You think the light travelled that longer hypotenuse, and I think it went just across the train on leg 1, distance ct for me. Now we use the Pythagorean theorem:

(ct)^2 + (vt')^2 = (ct')^2 Now solve for t.

t = (t') [square root of (1 – v^2/c^2)] This Is Dr. Einstein's famous 1905 (and incorrect) "time slowing down" formula. QED As seen, my time "slows down" due to relative uniform motion, according to Dr. Einstein. If v = c, my time slows to zero, and, of course, v can never exceed c, also according to Dr. Einstein.

Now we repeat the experiment with me at the front of the train car and you on the forward overpass. A light pulse is flashed from the middle of the train at t = 0 and reaches the front at a different t = t, and I see it travelling distance ct. You see it travelling ct' + vt'

Now solve ct = ct' + vt' for t

t = ct'/c + vt'/c = t'(1 + v/c) so if v = c then t = 2t' or time has now "speeded up" for me, etc. Time clocks cannot both slow down and speed up on the same train car; a contradiction, and therefore Special Relativity is wrong. QED

Thus, every encyclopedia, every physics text, tens of thousands of physics papers, "experimental proofs," etc., are all wrong. The very foundation of 21st century physics is wrong All of Dr. Einstein's conclusions from the above, including E = MC^2, are wrong. Aristotle was even wrong, remember?

EXPERIMENTAL PROOF

Now, any experiment designed to confirm this analysis by your author needs to be done at 0 degrees with respect to the velocity of the train car. If an experiment measures light at 90 degrees with respect to velocity, it will of course agree with Dr. Einstein's incorrect formula since you are not distinguishing whether time slowed down or whether relative velocity increased. Just look at the clocks later! They will all still be synchronized.

Your author's experiment at www.k1man.com/c1-7, however, is correct, at 0 degrees; DOES distinguish between time slowing down or relative velocity increasing, and is practical as well as accurate enough to confirm the Baxter Doppler formula and disprove the incorrect Dr. Einstein relativistic Doppler formula.

DOES LIGHT "TAKE ON" THE SPEED OF THE SOURCE (TRAIN)?

When light is flashed at t = 0 forward from the middle of a train car moving ahead at velocity v and arriving at the car front at t = t, just as the car front reaches the overpass ahead, the light travels a

distance ct as measured on the train and ct + vt' as measured by you right at the underpass. A light flashed forward from the train platform just adjacent to the light flash on the car at t = t' = 0 will just travel ct' on the ground, as the light on the car has already travelled ct + vt' and reaches the overpass ahead of the light flashed from the train platform. So, yes, the light does "take on" the speed of the source relative to the destination of the light which has the relative velocity with respect to the source. But you can also consider the train as being "fixed" at velocity v = 0, when the light is flashed at t = 0 and the overpass considered as travelling toward the train car at velocity = v and the overpass "meeting the light flash part way." In that sense, the light flash does not "take on" velocity v. In the case of the light flash from the platform, the light travels at velocity c and the overpass does NOT "meet the flash part way" since there is no relative velocity, and this light flash and the overpass meet LATER than when the light flash from the train and overpass meet.

Suppose A and B are in relative motion v. Light is flashed from A toward B at t = 0. You consider B as going to meet the flash from A "part way." Or, you could consider the light as having "taken on" v and moving at c + v. The light travels for millions of light years. But, at t = 1 micro second, B slows down to v = 0 relative to A and does not "tell" A. What happens to the velocity v "taken on" by A? A does not "care." A does not slow down (shed v "taken on") and does not have to do anything unusual. The relative velocity is suddenly v = 0, and A will "know" when it meets B millions of years later. Just look at the clocks and find that the relative speed was c rather than c + v, and no relativistic Doppler shift as Dr. Einstein would have predicted! See www.k1man.com/c1-7 .

Greg Volk, Physicist, Electrical Engineer

39 Questionable Assumptions in Modern Physics – by Greg Volk – volks@comcast.net www.k1man.com/Volk1

Refrence-Frame Independent Dynamics , Or How To Get Off Einstein's Train – by Greg Volk www.k1man.dom/Volk2

- **Light and Heat (2011)** [Updated 1 day ago]

by John Huang read the paper: www.k1man.com/Huang1

ABSTRACT:

Heat is the most important energy we need. There are two ways to transport heat. One is called radiation and the other one is by contact. However, people should know that both of them are collisions. You may wonder how can we call a soft touch, the contact of a hot iron or fire, a collision? Even an energy radiation, with very fast speed, is not considered a collision. Because we don't think an energy pack has a boundary so that we should name the radiation related activities as absorption and emission, isn?t it?

However, if we consider a photon is a particle, then, collision will be a proper word for radiation. My idea is that if one of the collision parties is a photon, then, the collision is named radiation. If both parties in a collision are photons then the collision is related to the transportation of heat but the possibility of that kind of collisions is so tiny that people can ignore it for the time being. When the technology is ready to detect that kind of collision then people can name it and study it. If at least one of two parties in a collision contains atoms then it is the 2nd way of transporting heat and people can measure the temperature of the party with atoms. I don't have a good name for it yet, let me call it ?contact? for now. I will explain my definition in more detail.

Light is a pulse or a ray of photons. Light is a wave and photons move along a cycling path. However, if photons have no charge, then people should not say light is electromagnetic wave (EM wave), isn't it? Only if photons have charges, the name of EM wave can make some sense. I will say even if photons have charges, the name of EM wave is still a miss guiding. The main reason is a photon may go to a direction that nothing is before it, but a cycling electronic field makes sense only when there is another photon around that moving photon. Isn't it? Light is the main topic of my paper. I will show you how people misunderstand the light in more detail.

John Huang

PAPERS

www.viXra.org

We submit this Scientific Journal each month to www.viXra.org. Also, our August 18, 2012 Portland, Maine physics colloquium is featured daily on our short wave radio program heard world wide 24/7 over the International Amateur Radio Network (IARN) on 14.275 MHz. upper side band (single sideband) and 3.890 MHz. lower side band. If you would like to be a guest on our Physics/Mathematics Section of my

weekly short wave radio program, produced each Saturday, telephone 207 242 2143, and leave a message as to when is the best time for us to call you back. You can purchase a little portable short wave SSB receiver to listen to this short wave program every day (in the entire United States or in the entire world) at Radio Shack for about $100. I have the little Grundig G, about the size of a paper back book.

Dr. Rodney Bartlett's Interesting Paper:

www.k1man.com/f300 - The non-Higgs, revised electroweak unification, revised gravitation, and explained dark energy/dark mater – By Dr. Rodney Bartlett

PHYSICS - MATHEMATICS SHORT WAVE RADIO PROGRAM

International Amateur Radio Network programming is 27/7 daily and is simulcast on the short wave frequencies of 3.890 MHz., Lower Sideband, 7.242.5 MHz, Lower Sideband, and 14.275 MHz. Upper Sideband + - QRM. Live telephone call ins will be taken at 207 242 2143, and/or you can also participate in the live video conferences on Saturdays via computer at the above referenced URL The video conference sponsor, NPA (the Natural Philosophical Alliance), is at www.k1man.com/H

The Physics/Mathematics Today segment on IARN seeks a special guest each week, preferably a former Nobel winner. Let us know if you are interested in coming on the program or have any suggestions. Our previous guest was chemistry Nobel winner Dr. John Pople of Northwestern University.

You can purchase a portable short wave receiver (about the size of a paper back book) to listen daily to these short wave programs from Radio Shack or most any radio dealer for about $100. We have the tiny Grundig G5 SSB (as opposed to AM of FM) portable short wave receiver here at the Belgrade Lakes Institute For Advanced Research – See www.k1man.com/physics

This week over IARN we feature the 28 April 2012 NPA video teleconference with Professor Ivor Catt, on Electromagnetic Energy; the audio is also available now at www.k1man.com/Catt. The exhibits are available at www.k1man.com/h1b The actual video recording will be posted at www.k1man.com/physics as soon as it is available.

LETTERS

See www.k1man.com/Josh15 - This is a very important dialectic between Glenn A. Baxter, P.E. and "pure" mathematician Josh Grams. The dialectic is ongoing and digs deeply into the detailed analysis and mathematics of Not So Fast, Dr. Einstein by Glenn A. Baxter, P.E. (www.k1man.com/c1) To get the up to the minute latest version of this interesting dialectic click on www.k1man.com/Josh15

See also the forums regarding all this at www.k1man.com/z

OTHER PAPERS

Papers by Glenn A. Baxter, P.E. www.k1man.com/v

Papers by Dr. Daniel Gezari www.k1man.com/k4

Papers by D. Sasso www.k1man.com/k

Papers by Dr. M.S. Khan www.k1man.com/k8

Paper by Dr. Karl V. Thompson's paper www.k1man.com/k9

Papers by Dr. Johannes C. Valks www.k1man.com/k1

Papers by Prof. Daniel Y. Cahill www.k1man.com/k2

Papers by Dr. Sanjay Wagh www.k1man.com/k5

Papers by Dr. Johannes C. Valks www.k1man.com/k1

Papers by JOSEPH A. RYBCZYK www.k1man.com/k3

Papers by Cochetklov Victor Nikolayevick www.k1man.com/k6

Papers by Dr. Z Y. Wang www.k1man.com/k7

"To kill an error is as good a service, and sometimes even better than, establishing a new truth or fact."

Charles Darwin

"Great causes are never tried on the merits; but the cause is reduced to particulars to suit the size of the partisans, and the contention

is ever hottest on minor matters." - Ralph Waldo Emerson - From his essay "Nature" 1844

2012 PHYSICS COLLOQUIUM IN PORTLAND, MAINE -17 August 2012

We are now calling for papers and inviting speakers for the 18 August 2012 Physics Colloquium, to be held in Portland, Maine. The theme for the 2012 Colloquium will be the effect of Special Relativity on Electromagnetic Theory as described by Maxwell's equations. Reference: Electromagnetic Theory by Dr. Julius Stratton, McGraw-Hill, New York and London, (Maple Press, York, Pa.), 1941. (see www.k1man.com/physics). The 13 August 2011 Physics Colloquium scheduled in Portland, Maine focused on the effect of the non constant nature of the speed of light on 21st century physics. Accepted papers for presentation at the 2012 colloquium will be distributed to all registered attendees before the colloquium so they can be studied and even discussed, which will greatly improve the effectiveness and efficiency of the colloquium itself. Attendees are cordially invited to dinner in Portland on Friday evening, August 17, 2012 at 7:00 p.m. to informally meet and to also discuss physics. Please register for the colloquium (free) and/or the dinner (off the menu) by sending an E-mail to Institute@K1MAN.com

BELGRADE LAKES INSTITUTE FOR ADVANCED RESEARCH -

SCIENTIFIC JOURNAL - PREVIOUS ISSUES: www.k1man.com/p

*** THE INSTITUTE'S MISSION STATEMENT:

The Belgrade Lakes Institute For Advanced Research was founded in 1999 to study original scientific work of great thinkers going back as far as possible (even thousands of years) to reexamine ideas in search of hints or inspiration which might apply to current scientific progress in physics. The late Dr. Richard Feynman**** is an Honorary Member of the Institute, and his lectures and publications serve as a corner stone for our work and model for our thinking and efforts. Other examples of great thinkers and scientists would include people such as Michael Faraday, Maxwell, Euler, Cantor, Lavoisier, Lise Meitner, Otto Hahn, Bohr, De Broglie, Planck, Avogadro, Boltzmann, Compton, Schrodinger,Dr. xSA Albert Einstein, Newton, Leibnitz, Pythagoras, Descartes, and many others. Membership in the Institute is by application and majority of votes timely cast by the general membership. For more information call the USA number 207 242 2143 or E-mail Institute@K1MAN.com Articles for the Scientific Journal are invited. Our mail address is Belgrade Lakes Institute For Advanced Research, 310 Woodland Camp Road, Box 440, Belgrade Lakes, Maine 04918 USA www.k1man.com/physics

****Richard Feynman

Richard Feynman (1918–1988), American physicist and Nobel laureate. Feynman shared the 1965 Nobel Prize in physics for his role in the development of the theory of quantum electrodynamics, the study of the interaction of light with atoms and their electrons. He also made important contributions to the theory of quarks (particles that make up elementary particles such as protons and electrons) and superfluidity (a state of matter in which a substance flows with no resistance). He created a method of mapping out interactions between elementary particles that became a standard way of representing particle interactions and is now known as Feynman diagrams. Feynman was a noted teacher, a notorious practical joker, and one of the most colorful characters in physics.

Feynman was born in New York City. As a child he was fascinated by mathematics and electronics and became known in his neighborhood as "the boy who fixes radios by thinking." He graduated with a bachelor's degree in physics from the Massachusetts Institute of Technology (MIT) in 1939 and obtained a Ph.D. degree in physics from Princeton University in 1942. His advisor was John Wheeler, and his thesis, "A Principle of Least Action in Quantum Mechanics," was typical of his use of basic principles to solve fundamental problems.

During World War II (1939-1945) Feynman worked at what would become Los Alamos National Laboratory in central New Mexico, where the first nuclear weapons were being designed and tested. Feynman was in charge of a group responsible for problems involving large-scale computations (carried out by hand or with rudimentary calculators) to predict the behavior of neutrons in atomic explosions.

After the war Feynman moved to Cornell University, where German-born American physicist Hans Bethe was building an impressive school of theoretical physicists. Feynman continued developing his own approach to quantum electrodynamics (QED) at Cornell and then at the California Institute of Technology (Caltech), where he moved in 1950.

Feynman shared the 1965 Nobel Prize in physics with American physicist Julian Schwinger and Japanese physicist Tomonaga Shin'ichirō for his work on QED. Each of the three had independently developed methods for calculating the interaction between electrons, positrons (particles with the same mass as electrons but opposite in charge) and photons (packets of light energy). The three approaches were fundamentally the same, and QED remains the most accurate physical theory known. In Feynman's *space–time* approach, he represented physical processes with collections of diagrams showing how particles moved from one point in space and time to another. Feynman had rules for calculating the probability associated with each diagram, and he added the probabilities of all the diagrams to give the probability of the physical process itself.

Feynman wrote only 37 research papers in his career (a remarkably small number for such a prolific researcher), but many consider the two discoveries he made at Caltech, superfluidity and the prediction of quarks, were also worthy of the Nobel Prize. Feynman developed the theory of superfluidity (the flow of a liquid without resistance) in liquid helium in the early 1950s. Feynman worked on the *weak interaction*, the *strong force*, and the composition of neutrons and protons later in the 1950s. The weak interaction is the force that causes slow nuclear reactions such as beta decay (the emission of electrons or positrons by radioactive substances). Feynman studied the weak interaction with American physicist Murray Gell-Mann. The strong force is the short-range force that

holds the nucleus of an atom together. Feynman's studies of the weak interaction and the strong force led him to believe that the proton and neutron were composed of even smaller particles. Both particles are now known to be composed of quarks.

The written version of a series of undergraduate lectures given by Feynman at Caltech, *The Feynman Lectures on Physics* (three volumes with Robert Leighton and Matthew Sands, 1963), quickly became a standard reference in physics. At the front of the lectures Feynman is shown indulging in one of his favorite pastimes, playing the bongo drum. Painting was another hobby. In 1986 Feynman was appointed to the Rogers Commission, which investigated the Challenger disaster—the explosion aboard the space shuttle Challenger that killed seven astronauts in 1986. In front of television cameras, he demonstrated how the failure of a rubber O-ring seal, caused by the cold, was responsible for the disaster. Feynman wrote several popular collections of anecdotes about his life, including *"Surely You're Joking Mr. Feynman"* (with Ralph Leighton and Edward Hutchings, 1984) and *What do YOU Care What Other People Think?* (with Ralph Leighton, 1988).

** Mr. Baxter has a degree in Industrial Engineering from the University of Rhode Island and is a Licensed Professional Engineer in Illinois and Maine. He is a graduate of Vermont Academy, which honored him in 1993 as a Distinguished Alumnus with the Dr. Florence R. Sabin Award. It was at Vermont Academy as a student where Mr. Baxter attended a talk and met the very popular relativity author James A. Coleman(7). Mr. Baxter has been doing research in relativity and physics ever since and is currently Executive Director of the Belgrade Lakes Institute for Advanced Research. His current interests include physics, philosophy, and theology.

FORUMS www.k1man.com/z

Glenn A. Baxter, P.E., Executive Director,
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Glenn A. Baxter, P.E., at his home in Belgrade Lakes, Maine U.S.A.

Glenn A. Baxter, P.E., age 4, with his dad, Frank H. Baxter (Bachelor of Science Degree, Mechanical Engineering, 1914, Rhode Island State College), and President of Frank H. Baxter Associates, 370 Lexington Avenue, New York City. See www.k1man.com/fhb and also www.k1man.com/w10 and www.k1man.com/Loons