Pazar Okumanız olsun…

biraz uzun olabilir yazım,

çay veya kahvenizi yanınıza alın.

esas maksadım okurken sizleri eğlendirmektir..!

yanı sıra bir kaç bilmediklerinizi de duyurmak / öğretmek.

Şu karanlık günlerimizde aklınızı biraz olsun siyasetten alıkoyabiliyorsam mutlu olurum…

Siz de artık kıymetimi bilin!

Konu başlığımız:

Türk'ün Rölativite ile İmtihanı

ve/ya

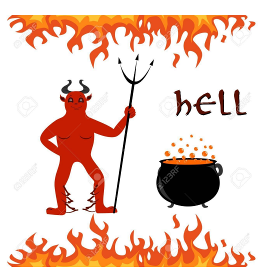
Hüseyin Yılmaz'ın Rölativite ye Katkıları

Sırası ile yazımda geçen isimler:

Adrian Bjornson, Hüseyin Yılmaz, Albert Einstein, Adolf Hitler, Hüseyin Eğinç, İlber Ortaylı, Behram Kurşunoğlu, Feza Hoca (Gürsey), Erdal Bey (İnönü), Yavuz Nutku, Mustafa Kemal Atatürk, Nazım Hikmet Ran, Recep Avcı, Nejat Veziroğlu, Oktay Sinanoğlu, Cengiz Yalçın, Burhan Cahit Ünal, Metin Arık, Ercüment Ortaçgil, Selman Akbulut ve Türk Matematik Derneği

Öncelikle İTÜ den sınıfdaşım ve Doğu Karadeniz den hemşerim şimdi Şikago da *Vedat Batu* ya
Hüseyin Yılmaz

hususunda yazımın sonunda linkini vereceğim Adrian Bjornson' un makalesini gün ışığına çıkardığı için teşekkür ederken, makalede rapor edilen katkıların doğruluğunu varsayarak, yazıma bilinen bir fıkra ile başlamak istiyorum:



cehennem kazanında kaynayan kişilerden kafasını yukarı çıkartanlara şeytan hemen müdahale eder ve tekrar kaynar suyun içine batırırmış.. fakat kafayı kaldıran *türk ise, nasılsa onu diğer türkler aşağı çeker düşüncesi ile, şeytan kendisini türkler için yormazmış...*

Halbuki Hazar Türkleri müslümanlıktan 400 sene önce musevi dinini kabul etmişler… ve bugün çok bilmiş Hüseyin Eğinç den öğreniyorum ki Hitler' in katlettiği yahudiler Filistinden olmayıp aslında Hazar Türklerinden miş… bir başka çok bilmiş İlber' e şu soruyu sormalı: Albert Einstein Hazar Türk ü olmasın?...

Son iki senedir Einstein' in çalışmaları hususunda kafa yoran, önce Special Theory of Relativity (STR) yi ve şimdi de General Theory of Relativity (GTR) yi masaya yatırıp anlamaya çalışan Vedat'ın ön yazısından bazı satırlar:

"ilişikdeki 50 sayfalık makale Adrian Bjornson (March 2013) tarafindan dört yıl kadar önce yazılmış olmalı. Şimdilik nerede yayinlandigi konusunda bilgi verilmiyor. Bu uzun makaleyi okurken ilginc buldugum bazi kisimlari asagiya aldim. Bunlar, yazilanlari daha kolay anlamama yardimci oldu. Sizler icin de oyle olacagini umuyorum. Burada en dikkate deger noktalar Huseyin Yilmaz (İTÜ Elektrik Fakultesi, 1951 mezunu) GTR konusunda yaptigi calismalarına sitayişkar (övücü, y.a.) olarak değinilmesidir. Huseyin Yilmaz adini ilk defa bir kac yil once Nejat Veziroglu'ndan duymustum. Bu bilgiye dayanarak Huseyin

*Yılmaz hakkinda bilgi edinmeye calistim ve **Introduction to the Theory of Relativity and the Principles of Modern Physics** baslikli 1965 yilinda yayinlanan kitabinin varligindan haberdar oldum ve bu kitabi getirttim. Recep Avcı da ayni kitabi getirttigini soylemiști. Ancak, bahsi geçen makalede de yazılılanlara karșın nicin Huseyin Yilmaz'in GTR ye katkilarina deginilmiyor? Bunu anlamakda zorlanıyorum...“*

y.a.: Anlaşılan o ki Hüseyin Yılmaz (HY) bahsi geçen makalenin yazıldığı sene 2013 de hakkın hikmetine kavuşmuş. Öğrenciliğimin Matemtiksel Fizik Kitapları yazarları Morse & Feshbach ın ilk yazarının "***In at the Beginnings: A Physicist's Life"*** kitabına göre
Denizli Lisesi

mezunu Hüseyin Yılmaz TC devlet bursu ile Amerikaya gitmiş ve MIT Fizik Bölümüne doktora öğrencisi olarak kabul edilmiş:

Still another student we took a chance on came from Turkey. Huseyin Yilmaz had been a shepherd boy who battled his family to let him go to school. He eventually earned a Turkish government scholarship to the National University at Ankara. I heard of him from a friend in the American Embassy in Ankara. My friend wrote that the young man seemed to have promise and that money could be found to fly him to Boston if MIT could pay him enough to stay alive while he studied physics. We decided to take the gamble and accepted him. He had trouble with his visa and did not arrive in September. One Sunday morning in October he rang the front doorbell of our home in Winchester, a few miles out of Boston. He had an Istanbul newspaper under one arm, a box of Turkish delight under the other, and stars in his eyes. He had just landed that morning, had found his way to MIT and thence to our home, an achievement requiring intelligence and initiative of the first order, as anyone familiar with Boston public transport will admit. He obtained his Ph.D. degree in just three years, passing all his courses with top grades. He is now president of his own small electronics company just outside Boston.

Hüseyin Yılmaz'ın internete düşen akademik yayınları:

Wave functions and transition probabilities of light atoms.
Type: Thesis Phy 1954
Authors: Yilmaz, Huseyin

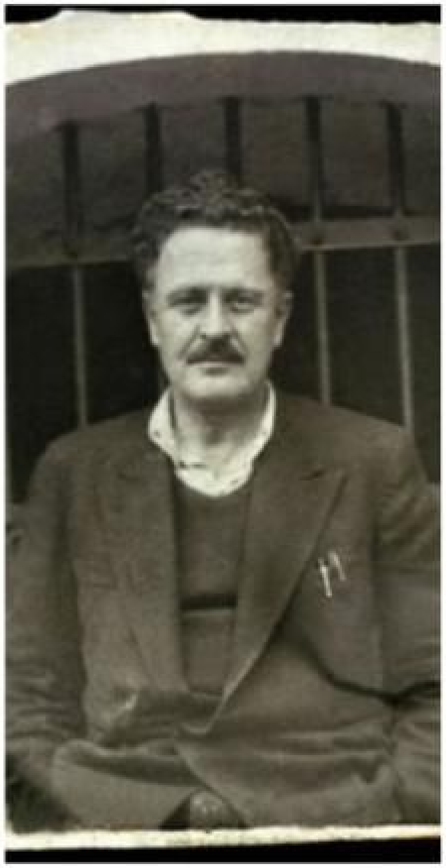
Tables for the variational determination of atomic wave functions
Type: Book Published 1956
Authors: Morse, Philip M. Yilmaz, Huseyin
QC174.2.M886

Introduction to the theory of relativity and the principles of modern physics.
Type: Book Published 1965
Authors: Yilmaz, Huseyin
QC6.Y5

Vedat Batu HY nin kendi memleketi Türkiyede tanınıp tanınmadığını sordu. Valla ben bile, ki kulağım epey deliktir, bu akşam öğrendim HY nin 2013 de ölmüş olduğunu... Hüseyin Yılmaz ismini ilk defa 1971 senesinde Texas dan Berkeley e yeni transfer edilmiş o zamanın meşhur rölativisti Rainer Sachs dan duymuştum. Rainer hafta sonları, Korkut Bardakçı' nın evinden pek de uzakta olmayan evininin büyük bahçesini öğrencilerin ziyaretine açar ve sevgili eşi pasta ile çay-kahve servisi yapardı. Bir pazar günü ben de sarışın-"aptal" kız arkadaşımla bu toplantıların birisine katılmaya gittiğimde Sachs Türk olduğumu farkedince, HY nin kitabını kastederek şöyle (aşağılayıcı) cümleleler kurmuştu:

"*Yılmaz kendini ne sanıyor? He thinks these laws of physics fell from the sky?"* O zamanki anladığıma göre Rainer Yılmaz' ın fizik denklemlerini pat diye yazıp onlarla oynaşmasına bozuluyor, bu denklemlerin nereden nasıl geldiklerine aldırış etmediğini kastediyordu... ben Berkeley den ayrıldıktan seneleeeer sonra duydum ki Rainer ailesini ve fiziği genç bir kız öğrencisi için terketmiş... benim yazılarımda seks (& no lies) olmazsa olmaz, resimsiz hiç olmaz..!

Adrian Bjornson' un makalesi, içeriğini doğru kabul edersek, "*türkün türke propagandası*" olamayacağına göre, insan şunu sormadan edemiyor:
Hüseyin Yılmaz Türk ilim-bilim dünyasında neden tanınmıyor? O yıllarda Anadolu nun kırsal bağrından çıkmış kaç tane adamımız var MIT ye girebilmiş ve 3 senede hem de Teorik Fizik de doktorasını almış? Ayrıca kendisi İTÜ de lisans seviyesinde mühendislik okumuş, (gerçi mühendislik bilimleri arasında elektrik en fazla matematiğin ve fiziğin okutulduğu bir daldır), bu arkadaş MIT de direk fizikde doktora yapmış. Yani o 3 sene içinde gerekli fiziği de öğrenmiş. Doktorasındaki buluşlarını anlattığı mektubunun Einstein e ancak ölüm döşeğinde ulaşması bana Nazım' ın Atatürk e yazdığı o meşhur mektubun hikayesini anımsatıyor:



NAZIM HİKMET'İN ATATÜRK'E MEKTUBU

"Cumhurreisi Atatürk'ün Yüksek Katına,
Türk Ordusunu 'isyana teşvik' ettiğim iddiasıyla 'on beş yıl ağır hapis' cezası giydim. Şimdi de Türk Donanmasını 'isyana teşvik etmekle' suçlanıyorum.
Türk inkılabına ve senin adına and içerim ki suçsuzum.
Askeri isyana teşvik etmedim.
Kör değilim ve senin yaptığın her ileri dev hamleyi anlayabilen bir kafam, yurdumu seven bir yüreğim var.
Askeri isyana teşvik etmedim.
Yurdumun ve inkılapçı senin karşında alnım açıktır.
Yüksek askeri makamlar, devlet ve adalet, küçük bürokrat ve gizli rejim düşmanlarınca aldatılıyorlar.
Askeri isyana teşvik etmedim.
Deli, serseri, mürteci, satılmış; inkılap ve yurt haini değilim ki, bunu bir an olsun düşünebileyim.
Askeri isyana teşvik etmedim.
Senin eserine ve sana, aziz olan Türk dilinin inanmış bir şairiyim. Sırtıma yüklenen ve yükletilecek hapis yıllarını taşıyabilecek kadar sabırlı olabilirdim. Büyük işlerinin arasında seni bir Türk şairinin felaketi ile alakalandırmak istemezdim.
Bağışla beni. Seni bir an kendimle meşgul ettimse, alnıma vurulmak istenen bu 'inkılap askerini isyana teşvik' damgasının ancak senin ellerinle silinebileceğine inandığımdandır.
Başvurabileceğim en inkılapçı baş sensin.
Kemalizm ve senden adalet istiyorum.
Türk inkılabına ve senin başına and içerim ki, suçsuzum."

Bu mektup Atatürk'e ulaşamadı.
Atatürk ağır hastaydı.
Nazım Hikmet'in akrabası Ali Fuat Cebesoy'un çabaları da yetmedi.
Cebesoy okul yıllarından beri arkadaşı olan Atatürk'e olayı ancak hasta yatağında iletebildi, Atatürk, "görüyorsun ne durumdayım, Mareşal'i darıltmadan siz bir çözüm bulun" dedi.

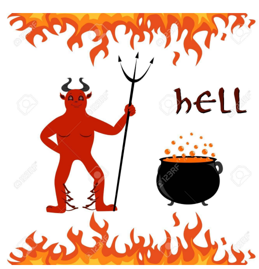
Kaynaklar:Soner YALÇIN,Hürriyet - Uğur MUMCU,''Uyan Gazi Kemal''

Bu iki mektup gönderilen kişilerin (AE ve MKA) ellerine ölümlerinden önce geçseydi (ahh şu "***what if***" ler yokmu...) belki de bu dünya daha başka olurdu… yani paralel evrenler…

Neden, neden, örneğin Vedat, Yavuz Nutku ve benim Of - Çaykara dan hemşehrimiz ***Behram Kurşunoğlu***, ki kendisi de GTR üzerine çalışmış ve o da Albert in teorisinin yanlış kendisininkinin daha doğru olduğunu iddia ettiğinde Einstein' in kendisine "*kimin doğru olduğunu zaman gösterecek*" dediğini duymuş birisi ve hatta bir de resim çektirmişler beraberce:

valla bu resimde ikisi de bana sanki Hazar türkleriymiş gibi gözüküyor…

Şimdi Vedat Soruyor: Neden Behram Hüseyin Yılmaz' a sahip çıkmamış, elinden tutmamış?



Benzer soru ***Feza Gürsey*** Hocamız için de sorulabilir, ***Erdal Bey*** için de… Her iki hocamız da Boston - New York - Princeton kulvarlarında gayet de iyi ve itibarlı tanınan, hatta Feza Hocamızın "*Nobele en yakın Türk*" olarak da bilindiği ve ayrıca yine Feza Hocamızın GTR konusunda da çalıştığı (Paris ve Pisa seminerleri), ve hatta doktora tezleri yönettiği de bilinirken, bütün bunlara rağmen bu hocalarımızın hiç olmazsa bizlere olsun Hüseyin Yılmaz hususunda konuşmuş olmamalarının bir izahı olsa gerek.. Bugün görüyorum ki tanımadığım bilmediğim iskandinav isimli birisi HY nin Gravitasyon Teorisi üzerine 4 kitap yazmış ve sanki fiziğin bütün problemleri çözülmüş gibi bir hava takınmış… Hele hele son Nobel in üzerinde hala kuşkulu bulutların gezdiği LIGO deneyine Einstein in teorisinin testi ayağına Nobel verilmiş olması, diğer taraftan Adrian Bjornson' un makalesinde Hüseyin Yılmaz'ın teorisinin AE ninkine nazaran hem matematiğinin kesin hem de deneye daha yakın olması… yoksa HY bir başka Nobel kaçıran adamımız mıy dı? Unutmayalım, bir de Kurşunoğlu nun nötrino olayı var, (tabi bir de Oktay Sinanoğlu vak'a mız bulunuyor...)

Aşağıda linkini vereceğim makalenin içeriğine göre: Her ne kadar Hawking ve Penrose Einstein denklemlerinden kara delikler, singulariteler, evrenin başlangıcı Big Bang (Büyük Patlama) vbg matematiksel öngörüler yapmışlar ve bunların varlıkları hususunda matematiksel teoremler ispatlamışlarsa da Einstein hiç bir zaman GTR de singularitelerin olabileceğine inanmamış. Biliyorsunuz AE Kuantum Mekaniğine de inanmadan geçip gitti bu dünyadan. Makalenin yazarı Adrian Bjornson 2000 ile 2003 yılları arasında 3, son olarak da ***Nisan 1***, 2017 de HY üzerine 4. Kitabını yayımlamış:

1. **How Was Our Universe Created?**
2. **The Scientific Story of Creation**
3. **The Mystery of Creation**
4. ***What Makes the Universe Expand?***

Bütün bu kitaplar Hüseyin Yılmaz ın GTR ı üzerine yazılmış. Ve kitaplarının tanıtımlarından aldığım şu cümleleri beraber okuyalım:

"Einstein explained that gravity is not an attractive force as Newton claimed; it is a curvature of space. The orbit of the earth around the sun follows the curvature of space caused by the gravity of the sun. The theoretical foundation of General Relativity is profound, but Einstein was unable to derive rigorous equations to specify his theory. After the death of Einstein, Yilmaz solved this problem, and thereby refined the Einstein theory. The Yilmaz theory, published in 1958 in the prestigious Physical Review, shows that the curvature of space due to gravity makes the universe expand. Curvature of space acts like an attractive force within our solar system, but like a repulsive force over cosmological distances.

To explore the mysteries of cosmology, the author gives a simple yet scientifically accurate explanation of Einstein s General theory of Relativity. The Yilmaz refinement of the Einstein theory predicts an infinitely old Steady-State universei in which energy radiated from stars is converted into diffuse matter that compensates for the universe expansion. Our universe had no beginning and will have no end.

From the flawed Einstein equations, Big Bang cosmologists derive physically impossible concepts, like Black Holes. They shun the Yilmaz theory, which makes their sophisticated mathematics obsolete. Einstein strongly opposed singularity predictions of his theory. Yet cosmologists insist that the billions and billions of galaxies in our universe, each with billions and billions of stars, were originally squeezed into a microscopically small singularity, which exploded with a Big Bang 13.8 billion years ago, a period only 3 times the age of our earth.

Adrian Bjornson' a göre HY nin şu ktatkıları da var:

(Aman bunları Witten takımı duymasın!)

A fundamental problem that Einstein faced is that his gravitational field equation is in consistent with quantum mechanics. String Theory is a complicated mathematical theory that tries to make the Einstein gravitational field equation consistent with quantum mechanics. This highly publicized theory postulates that physical reality is made up of infinitesimal and unobservable vibrating strings, which vibrate in eleven independent dimensions (seven of which are unobservable). Analyses by Yilmaz [13] and by Alley [12] have proven that the Yilmaz gravitational field equation is consistent with quantum mechanics. This finding makes research on String Theory irrelevant. Einstein had the wisdom to realize that a Unified Field Theory may be achievable, and should lead to great advances in physics. Since the Yilmaz theory is consistent with quantum mechanics, it should provide the key for achieving Einstein's elusive Unified Field Theory.

Özet olarak: iki Türk, ilki Behram Kurşunoğlu, ikincisi Hüseyin Yılmaz, Einstein'in teorilerine düzeltmeler yapıp daha iyi bir hale getirmişler, neden dünya ve de en azından memleketlerinde bu konularda tanınmazlar? Benim aklıma gelen: yukarıda bahsettiğim hocalarımız HY e sahip çıkmamalarının nedeni HY nin Fizikde kalmayıp yani akademiden ayrılıp tekrar mühendisliğe geri dönmüş olması olabilir mi? Fakat HY akademisyenlerce kabul görmediği için geri mühendisliğe gitmiş olamaz mı?

Görünen o ki Türk Fizikçileri Hüseyin Yılmaz' a sahip çıkmamışlar. HY de bu olaya kafayı takmamış. Mühendislik yapmış, optik konusunda japonlarla çalıştığını ve bir takım patent sahibi olduğunu duymuştum. Bilmiyorum ama belki de HY akademik hayat yerine parayı tercih etmiş olabilir…

Metin (Arık) Hoca, gel beraber ***Ercüment Ortaçgil*** in connection / curvature ları ile yeni bir gravitasyon teorisi kuralım… yani şu gravitasyon işini (de) millileştirelim..!

Son zamanlarda bizim Türk Metematik dünyamızda HY nin hikayesine benzeyen bir durum yaşanmakta: ***Selman Akbulut*** ve Türk Matematik Derneği ilişkileri bana sanki HY hikayesini anımsatmakta… yalnız şu açılardan farklı bir durum var: HY memleket ile lişkilerini kesmiş gibi, Türkiyedeki üniversitelerle teması hiç olmamış, memlekete (a la Korkut Bardakçı) gelip gitmemiş dahi olabilir. Selman ise neredeyse her senenin yarısını Türkiyede geçirir ve de pek çok Türk öğrenci yetiştirmiş ve hala da yetiştirmektedir. Dolayısı ile Selman sahipsiz olmadığı gibi kendisi Türk Matematiğini de sahiplenmiştir!

Çok isterdim Hüseyin Yılmaz ile bir röportaj yapmış olmayı, işde benim açımdan bu da bir başka missed opportunity… kaçırılmış fırsat! çok geç başladım ben şu röportaj işine. Cengiz Yalçın' ı bitirdiğimi de sanmayın! Kolum iyileşmek üzere, artık araba kullanabiliyorum, umuyorum yakında Burhan Cahit Ünal hocamız için Datça yollarında olacağım… hep sizler için! Şu karanlık günlerimizde aklınızı biraz olsun siyasetten alıkoyabiliyorsam mutlu olurum… Siz de artık kıymetimi bilin!

Adrian Bjornson' un makalesinin linki aşağıda mavi renkli satır, ve ardından içeriğinden Vedat Batu' nun sizin için seçtikleri, benim de 2 yerde yorumlarım var:

Simple Explanation of Einstein's General Theory of Relativity

Adrian Bjornson (March 2013)

1,1,0 Introduction

The Artificial Complexity of the Einstein Theory

After Einstein presented his General theory of Relativity in 1916, a myth evolved that Einstein's theory was so complicated that only a handful of brilliant scientists could understand it. This myth reinforced the public's image of Einstein's genius and helped to make him a celebrity. The supporters of Einstein recognized the greatness of Einstein' theory, and **so they accepted the Einstein myth even though they knew it was false. Actually, the primary mathematical complexity of the Einstein theory involves the mathematical theory of curved space that was developed by Ricci and Riemann, which Einstein incorporated into his General Relativity theory.** The Einstein theory itself is profound, and the work of a great genius, but it does not take a genius to understand that theory.

1,1,1 Special Relativity

The Speed of Light Paradox

The Einstein theory of Relativity evolved from a paradox associated with measuring the speed of light. Let us review the history of our understanding of light propagation. Since the time of the ancient Greeks, it has been known that sound is a wave that propagates by vibrating the air. But what is light? Is it a stream of particles, or is it a wave like sound? Since light can travel through a vacuum, it was postulated that all space was filled with a mysterious invisible medium called the aether, and **a light wave propagates by vibrating the aether.**

Although Maxwell's equations showed that an aether medium was not needed to allow light propagation, Maxwell still included the aether concept in his technical paper. **The probable reason for this is that the meaning of the "speed of light" is confusing without an aether medium to act as a reference.**

***Vedat Batu (VB)*:** *Buna katiliyorum. Siz ne dersiniz?*
y.a.:
Zaten Maxwell kafası karıştığı için, yani bir ortam olmadan dalga nasıl hareket ederi anlamadığı için, (gereksiz yere) "ether var olmalı" demiş geçmiş. Halbuki maxwell denklemlerinde ether diye bir şey yok! onlar sadece matematiksel ifadeler, eşitlikler. Benim anladığım ether in var olması için matematiksel bir neden zaten yok, ayrıca fiziksel sebep olduğu da nerden malum? ışık hala anlaşılmış bir olay değildir arkadaşlar. elektron da öyle, dolayısı ile elektrik de...!!!

şu an ether in var olmasını gerektirecek hiç bir fiziksel veya matematiksel gerekçe yok diye biliyorum ben. yanılıyorsam lütfen düzeltin! bana bir kelime öğretenin zarrabı olurum ben, yani bol bahşiş veririm..

The Einstein Relativity Theory

The equations derived by Einstein are also called the Lorentz Transformation Equations. However, Lorentz applied his equations to explain the effect of motion relative to the hypothetical aether, whereas Einstein used them to explain the effect of motion between two observers moving at different velocities. **The physical assumptions for deriving the two sets of equations were different, but they yielded the same equations**.

VB: *Esas onemli olan da bu oluyor. Yani Einstein ve Lorentz STR denklemleri tamamen ayni oluyor.*

y.a.: *bunu matematik olarak anlamanın / çözümlemenin mümkün olacağını sanıyorum. şayet relativite dersi veriyor olsaydım öğrencilerime vereceğim ilk ev / araştırma ödevi şu olurdu: gösterin ki Maxwell denklemleri Galilean Transformasyonları altında değil ama Poincare Transformasyonları altında envariantdırlar.*

Buradan da şu çıkıyor: STR Lorentz den de AE den de önce Maxwell denklemlerinde varmış zaten! Netekim STR nin Poincare tarafından AE ve Lorentz den önce keşfedildiği de Fransızlar tarafından ispatlı bir şekilde iddia edilir. Kısacası AE ve Lorentz in denklemlerinin aynı olması tesadüf olmayıp, bu konuda fiziğin önüne geçmiş olan matematiğin sihirli (esrarengiz) gücünü gösterir…(Wigner).

1,1,2 General Relativity

Soon after Einstein published his basic theory of Relativity in 1905, he recognized that it has serious theoretical limitations. His theory was based on the postulate that the speed of light is exactly constant, which is true when velocities are constant. **However, Einstein proved by approximate calculations that the speed of light varies when the velocity changes, i.e., when acceleration occurs. He also concluded that acceleration and gravity are indistinguishable, and so the speed of light must also vary in a gravitational field. Consequently, Einstein needed to generalize his theory of Relativity so that it accounts for the effects of acceleration and gravity.** After Einstein presented his General theory of Relativity in 1916, he regarded his basic theory as a “Special Case” of General Relativity, and so his basic theory was called the Einstein “Special theory of Relativity”.

Let us compare the effects of acceleration and gravity. When we sit in a parked airplane before takeoff, we are forced downward in our seats because of the force of gravity. When the airplane begins to take off, we are forced against the backs of our seats because of the airplane acceleration. Einstein concluded that these two forces, due to acceleration and gravity, are equivalent. With this principle, he was able to calculate the approximate relativistic effects due to gravity by calculating those produced by acceleration.

Comparison of the Newtonian and Einstein Theories of Gravity

But what is gravity? Isaac Newton postulated that celestial bodies exert gravitational forces that attract matter to them. As the earth travels in its orbit around the sun, the sun exerts a gravitational force on the earth that pulls the earth toward the center of the sun, and this gravitational force keeps the earth from flying off into space. For example, when you twirl a ball on a string, the force on the string makes the ball move along a circular path. If you release the string, the ball travels away along a straight line at constant velocity (except for the downward drop due to gravity). Similarly, if one could magically remove the Newtonian gravitational force that is exerted by the sun on the earth, the earth would theoretically fly off into space along a straight line at constant velocity.

Einstein disputed this Newtonian concept of gravity. Einstein concluded that gravitational force is an artifice that does not actually exist. Einstein postulated that the gravitational field of the sun curves the space around it, and the earth travels on a curved path around the sun that follows this curvature of space. **The gravity of the sun does not exert any force on the earth.**

The Mathematical Theory of Curved Space.

To generalize his Relativity theory, Einstein needed a rigorous mathematical theory that characterized motion in curved space. He found this in the Riemann-Ricci mathematical theory of curved space.

In 1852, the German mathematician Bernhard Riemann (1826-1866) presented the metric equation, which is a general mathematical principle for specifying curved space. The metric equation describes the shortest distance between two points in curved space. Riemann was unable to develop his concept in detail, because he contracted tuberculosis in 1862, and died four years later at age 39.

The Italian mathematician, Gregorio Ricci (1853-1925), used the curved-space principle of Riemann as the foundation for a comprehensive mathematical theory, which Ricci called the Absolute Differential Calculus. Ricci published his mathematical theory in 1901 with the help of his student, Tullio Levi-Civita (1873-1941). In 1923, Levi-Civita published in Italian an updated version of this theory. An English translation of this book is available as a Dover reprint. [3]

Unfortunately the monumental contributions of Ricci and Levi-Civita to General Relativity theory have been largely ignored. The mathematical foundation for General Relativity is commonly referred to as Riemannian geometry. However this foundation was really the calculus of curved space developed by Ricci, which was a major extension of the Riemannian geometric principle.

The Principle of Covariance

In his original paper of Relativity, Einstein wrote about measurements made by observers moving at different velocities. In a general sense, this involves measurements made relative to coordinates that are moving at different velocities. The purpose of Relativity theory is to transform measurements properly between different coordinates.

Einstein described this concept in terms of the Principle of Covariance, which states that the laws of physics should be formulated so that they are independent of the coordinate system. The fundamental requirement for satisfying the principles of Relativity is to achieve Covariance in the transformation equations.
Einstein concluded that gravity and acceleration produce curvature of space. The Riemann-Ricci mathematical theory of curved space provided a rigorous mathematical tool for applying this concept and for achieving a Covariant theory that satisfies the principles of Relativity. Einstein needed to develop a "Gravitational Field Equation" that would constrain the Riemann-Ricci mathematical theory so that its curvature of space is established by gravity and acceleration.

The basic Riemann-Ricci mathematical theory was expressed in general form in terms of multidimensional space. Einstein applied this curved-space theory in four dimensions, because Relativity theory has four dimensions, three spatial dimensions plus time.

The Metric Tensor

The Riemann-Ricci mathematical theory is expressed in terms of tensors. The principle of a tensor is explained in Story [2], starting on page 137. The basic tensor is the metric tensor, which describes the shortest distance between two points in curved space. One can directly calculate all of the relativistic effects of any physical model from the components of the metric tensor.

The metric tensor is denoted (gab). The subscripts (a, b) are indices that can each take on the four values 0, 1, 2 and 3, which represent the four dimensions of relativistic space-time. The index 0 represents the time dimension, and the indices 1, 2, 3 represent the dimensions of three dimensional space. Since index (a) has four possible values, and (b) has four possible values, there are 4x4 or 16 components of the metric tensor (gab). The 16 components of the metric tensor are displayed in the following array called a “matrix”: …….

Often 12 of these components are zero, and the only non-zero components are the four that fall on the diagonal from the upper left to the lower right. This is called a diagonal metric tensor, which has the following form: ………

The Einstein General theory of Relativity can be solved analytically only when the metric tensor is diagonal. If the metric tensor is not diagonal, the calculations of General Relativity result in millions of terms, and can only be solved on a computer. Since computers were not available in

Einstein’s day, Einstein could only apply his theory to very simple physical models that yielded diagonal metric tensors.

Computer Solutions of the Einstein Gravitational Field Equation

Einstein died in 1955. About a decade later, powerful computers became available for scientific research. One of the first applications was the use of computers to solve the very complicated equations of General Relativity. Because of the ”Myth of Einstein”, discussed in the Introduction (1,1,0), the public believed that only a near-genius could understand the Einstein General theory of Relativity. Consequently, scientists performing computer studies of the Einstein theory were held in high esteem, and so this became a popular area for study.

Solving these complicated equations on a computer is a difficult technical task, because the equations must be solved backward, which requires an iterative computer program. Sophisticated computation techniques are required to make the computer program converge to a solution. On the other hand, it does not take a “genius like Einstein” to solve the Einstein equations on a computer. As this article has demonstrated, all of the equations of the Einstein General theory of Relativity are precisely specified.

Among the first results of this computer research was to prove that the Einstein gravitational field equation definitely predicts: (1) a massive neutron star must collapse to form a Black Hole singularity, and (2) the universe must have begun as a singularity at the instant of the Big Bang. These computer studies have led to extensive cosmology research, which has convinced the scientists that our enormous universe must have began about 15 billion years ago as a singularity that was microscopic in size, even though our universe has many billions of galaxies, each containing many billions of stars comparable to our sun.

In these cosmology studies, the Einstein gravitational field equation is treated as absolute truth. Although Einstein strongly rejected the singularity concept, scientists performing these studies insist that the Einstein gravitational field equation (which Einstein developed in an intuitive manner) must be exactly correct. The cosmologists are using Einstein's great prestige to prove that physically impossible Big Bang and Black Hole singularities have indeed existed.

1,1,3 Yilmaz Theory

Derivation of the Yilmaz Metric Tensor In the 1950's, as part of his PhD research at the Massachusetts Institute of Technology, Huseyin Yilmaz studied Einstein's General theory of Relativity.

Yilmaz examined an approximate calculation that Einstein had performed to determine the wavelength shift of light produced by a gravitational field. Yilmaz discovered that he could solve this problem exactly. (This Yilmaz analysis is presented in Story [2], Appendix E, and a simplified version is presented in the website article 1,2 Simple Derivation of the Yilmaz Theory.) This applies to any spherically symmetric celestial body, and so it applies accurately to our sun, despite its 160,000 to one variation of density.

When Yilmaz developed his metric tensor solution, he mailed it to Einstein. Unfortunately Einstein was too sick to read it, and died soon thereafter.

Comparison with the Schwartzschild Solution

Let us compare this Yilmaz solution with the Schwartzschild solution. The metric tensor components g00 and g11 for the Schwartzschild solution are ……..

(The Schwartzschild solution is expressed in polar coordinates, and so its g22 and g33 components cannot be directly compared with the Yilmaz solution.) Equation 39 for the Schwartzschild solution is the same as the approximation for g00 of the Yilmaz theory given in Eq 34. The relation (g11 =

-1/g00) in **Eq 40 is the same as relation for the Yilmaz theory in Eq 36**.

The maximum value for 2(m/r) in our solar system occurs at the surface of the sun. The radius (r) of the sun is approximately 700,000 km, and its normalized mass (m) is approximately 1.5 km. Hence 2(m/r) at the surface of the sun is approximately (2x1.5/700,000), which is 4.3x10-6 or 4.3 parts per million. With this tiny value for the maximum value of 2(m/r), the values of g00 and g11 for the **Yilmaz and Schwartzschild solutions are essentially identical.** Consequently, one cannot distinguish between the Yilmaz and Schwartzschild solutions from experimental tests performed within our solar system (as far as the g00 and g11 terms are concerned).

The fact that the speed of light varies strongly with direction is a severe theoretical weakness of the Schwartzschild solution. To correct this problem, the Isotropic Solution was developed by modifying the Schwartzschild solution. In the Isotropic solution, the speed of light is the same in all directions. This issue is explained in the website article 5,2. The Isotropic solution is generally used when General Relativity theory is applied for calculations within our solar system. **Within the weak gravitational fields of our solar system, the Yilmaz and Isotropic solutions are quantitatively indistinguishable.**

Equation 41 describes the static solution of the Yilmaz theory, which holds when the gravitational field does not vary with time. This static solution of the Yilmaz theory was published by the prestigious Physical Review in 1958 [8]. In 1973, Yilmaz [9] published the much more complicated time-varying solution of his theory. The time-varying solution has proven that the simple static solution gives a very accurate approximation when the gravitational field varies slowly relative to the speed of light, and so the static solution is adequate for nearly all applications. **The metric tensor for the static Yilmaz theory is always diagonal, whereas the metric tensor for the Einstein theory is diagonal only for very simple physical models.**

The Yilmaz Gravitational Field Equation

The Riemann-Ricci mathematical theory of curved space provides complicated equations for calculating the components of the Ricci tensor from the components of the metric tensor. For a general 16-component metric tensor, these equations can have millions of terms, and so can only be solved on a computer. Professor Herbert Dingle solved these equations for the case of a diagonal metric tensor, and expressed the results in terms of the 16 components of the Einstein tensor Gab. These equations by Herbert Dingle were published by Tolman [5], and are repeated in this website in the article 5,B (Einstein

Tensor and Christoffel Symbols for a Diagonal Metric Tensor) Section 5, Eqs 35 to 47.

Equations 42 to 45 completely define the Yilmaz gravitational field equation (at least for the static case). All of the tensors of the Yilmaz equation are true tensors, and therefore achieve Covariance. **This Yilmaz gravitational field equation was derived rigorously; whereas, Einstein developed his gravitational field equation in an intuitive manner**.

The author derived the Yilmaz gravitational field equation by applying the equations by Herbert Dingle, which are given in the website article 5,B (Einstein Tensor and Christoffel Symbols for a Diagonal Metric Tensor). (This calculation was achieved without error by using a word processor, which allows sections of equations to be repeated without error.) Yilmaz originally derived his gravitational field equation in a different manner by using complicated Lagrangian analysis. **When Yilmaz submitted the original paper on his theory to the Physical Review, it was rejected.** Yilmaz claimed that his gravitational field equation (described by Eqs 42, 43, and Eq F1 of Appendix F) was the solution to his metric tensor in Eq 41.

In the rejection of the paper, the reviewer stated that the calculation for obtaining the Ricci tensor from the metric tensor involves “ten nonlinear coupled partial differential equations, with three variables and numerous singularities.” He asked, “What is the chance that the predicted solution will be achieved? **The claim is absurd!**”

Yilmaz did not know what to do. He was unable to solve the complicated equations by Herbert Dingle without making multiple errors. Yilmaz was working at the Sylvania Applied Research Laboratory in Waltham, Massachusetts. **The Director of the Laboratory, Dr. Leonard Sheingold, had faith in Dr. Yilmaz.** He assigned the problem to three mathematicians (all women) in different locations in the company. They were given the equations for the components of the Einstein tensor (derived by Prof. Dingle for a diagonal metric tensor), along with the Yilmaz metric tensor components. They were told that (ϕ) varies with the (x, y, z) position variables, but not with time.

After a few weeks, **all three mathematicians found the same answer, which agreed with the prediction by Yilmaz. Armed with this evidence, a revised version of the manuscript was rapidly accepted, and the original paper on the Yilmaz theory was published by the prestigious Physical Review in 1958. [8]**

When these very complicated equations are applied to the components of the Yilmaz metric tensor given in Eq 41, nearly all of the terms cancel themselves out, and the result that remains reduces to the simple formulas given in Eqs 42 to 45, which specify the Yilmaz gravitational field equation. This fact proves that the Yilmaz theory has profound mathematical integrity. **The Yilmaz theory has a general metric tensor solution (Eq 41) that accurately matches its general gravitational field equation (Eqs 42 to 45). No other solution of the principles of General Relativity can even begin to compare with this achievement.**

In contrast, when the Yilmaz theory is applied, the metric tensor is computed directly from the physical model, because the Yilmaz theory has general formulas for the metric tensor components. The Yilmaz gravitational field equation is not needed when the Yilmaz theory is applied to a physical problem. **Nevertheless, the Yilmaz gravitational field equation is still very important, because it establishes the theoretical validity of the Yilmaz theory .**

The General Time-Varying Yilmaz Theory

Yilmaz published the static version of his theory in 1958. In 1973 he developed the much more complicated general time-varying solution to his theory. The derivation of the general time varying Yilmaz theory is presented in the website articles 5,5 and 5,F (General Time-Varying Yilmaz Theory, and Stress-Energy Tensors for General Yilmaz Theory). Appendix B of this article presents a simplified form of the equations for applying the time-varying Yilmaz theory.

The static solution of the Yilmaz theory consists of the following matched set of equations: (1) formulas for the metric tensor components, and (2) the Yilmaz gravitational field equation. The time-varying solution consists of a similar matched set of equations. The analyses presented in the website articles 5,5 and 5,F prove that the Yilmaz time-varying gravitational field equation is an exact solution to the Yilmaz time-varying metric tensor. By “time-varying” we mean that the gravitational field can vary with time. As with the static solution, the time-varying gravitational field equation is generally not used when the time-varying theory is applied.

Section 5 of the website article 5,5 (General Time-Varying Yilmaz Theory) shows that the simple static solution of the Yilmaz theory gives an accurate approximation of the time-varying solution when the velocities of bodies are much less than the speed of light. **Consequently the simple static Yilmaz solution is nearly always more than adequate for practical applications**.

Einstein's Search for a Unified Field Theory

After developing his General theory of Relativity, Einstein devoted most of his efforts in a search for a Unified Field Theory. This would have combined into a single integrated theory the effects of gravitational fields, electromagnetic fields, and atomic nuclear fields. Einstein realized that if he could solve this problem he would make a revolutionary advance in physics. He struggled with this task to his last days but never succeeded. **A fundamental problem that Einstein faced is that his gravitational field equation is inconsistent with quantum mechanics**.

String Theory is a complicated mathematical theory that tries to make the Einstein gravitational field equation consistent with quantum mechanics. This highly publicized theory postulates that physical reality is made up of infinitesimal and unobservable vibrating strings, which vibrate in eleven independent dimensions (seven of which are unobservable).

Analyses by Yilmaz [13] and by Alley [12] have proven that the Yilmaz gravitational field equation is consistent with quantum mechanics. This finding makes research on String Theory irrelevant. Einstein had the wisdom to realize that a Unified Field Theory may be achievable, and should lead to great advances in physics. **Since the Yilmaz theory is consistent with quantum mechanics, it should provide the key for achieving Einstein's elusive Unified Field Theory**.

1,1,4 Deficiency of Einstein Equation

The Yilmaz theory is a refinement of the Einstein General theory of Relativity, which applies all of the principles of the Einstein theory, except that it has a different gravitational field equation. The Yilmaz gravitational field equation does not allow a singularity, nor does it have the other deficiencies of the Einstein gravitational field equation, which will now be discussed.

Professor Carroll O. Alley of the University of Maryland is one of the few experts on General Relativity who has applied the theory to practical problems. He supervised laser measurements with retro-reflectors on the moon, which included relativistic corrections to measure distances to the moon to an accuracy of 3 centimeters. Alley measured the relativistic time delay of an atomic clock carried in an aircraft, and he was intimately involved in applying General Relativity corrections to the Geophysical Positioning System (GPS). [11]

Alley became impressed by the Yilmaz theory and has worked closely with Yilmaz. Alley proved that the Einstein theory is incapable of achieving a two-body solution having interacting gravitational fields. Alley devised a model consisting of two infinite slabs of matter separated by a fixed distance, a model that is sufficiently simple for General Relativity to be applied analytically. The General Relativity analysis of this Alley model predicts that there is absolutely no gravitational attraction between the two slabs, a result that severely conflicts with experimental evidence. No one has ever been able to refute this analysis. [12]

The Yilmaz Gravitational Field Equation can easily handle a multi-body model, because it has a tensor that characterizes the stress and energy of the gravitational field. The Yilmaz stress-energy tensor for the gravitational field is generally not zero in the vacuum of space, and so the Einstein and Ricci curvature tensors are generally not zero in the vacuum of space.

In addition to the failure of the Einstein gravitational field equation to achieve an interacting multi-body solution, that equation has other serious weaknesses. As shown in Story [2], Chapter 13, these include:

(1) The Einstein equation does not achieve conservation of matter-plus-energy; (2) The Einstein equation is over-constrained, and so can allow multiple, conflicting solutions; (3) The Einstein equation is not rigorous.

1,1,5 What is General Relativity?

To apply the Einstein General Theory of Relativity, one needs only two tools: (1) the Riemann Ricci mathematical theory of curved space; and (2) the Einstein gravitational field equation, including the definition of the energy-momentum tensor. The Riemann-Ricci mathematical theory of curved space was borrowed by Einstein and incorporated into General Relativity.

This article has stated that the Yilmaz theory applies all of the principles of General Relativity, except that it has a different gravitational field equation. One may ask: If we remove the Einstein 29 gravitational field equation, what is left of the Einstein theory? Is not the Einstein gravitational field equation essentially the whole Einstein General theory of Relativity, except for the portion that Einstein borrowed from Riemann and Ricci?

Most people believe that Einstein must have been a great genius, because his theory is so complicated that practically no one can understand it. However the mathematical complexity of General Relativity came from the Riemann-Ricci mathematical theory of curved space, which was not developed by Einstein. This general attitude concerning Einstein's genius is nonsense! The genius of Einstein is displayed in the profound nature of the physical principles behind his mathematics, not in the mathematical details themselves.

The Covariance Principle

Einstein considered his Special theory of Relativity to be a "special case" of General Relativity, which is incorporated into his General theory of Relativity. But how is this achieved? There is no Lorentz transformation in the equations of General Relativity.

Einstein recognized that the paradox concerning the speed-of-light measurement (which led to his Special Relativity theory) was due to error in translating measurement data between two coordinate systems moving at different velocities. The general answer to this problem, and to all relativity problems, is to have a mathematical system that maintains Covariance when measurement data are transferred from one coordinate system to another. Einstein's primary goal was to satisfy the Principle of Covariance, which can be stated simply as: The general laws of nature are to be expressed by equations that hold in all coordinate systems…..