EINSTEIN THEORIZED, BUT THE UNIVERSE, LIKE OLD MAN RIVER, JUST KEEPS ROLLING ALONG

Vladimir F. Tamari

http://vladimirtamari.com/physicsandmath.html

A Universe without aim or intent, and without the brilliant but problematic theories of Einstein is proposed.

March 3, 2017
revised May 2017
Tokyo, Japan


FIX PHYSICS!
Dear Albert, some old ideas you ditched should be the new new!
A
A'
PAUL ROBESON
VOICE OF THE PEOPLE
Vladimir Tamari copyright 2017

1.1 Introduction

To answer the question posed by FQXI's 2017 Essay Contest[1], I do not think mathematical or physical laws can give rise to a will or intent within the workings of the Universe. Outside the rich and often beautiful heritage of religious belief, most modern physicists have concluded that although the Universe does behave according to many widely applicable laws, such as the inverse square law of Newtonian gravity or the laws of motion, none of these laws aim for a physical state or goal. In fact the prevailing view is that at its smallest scale, quantum behavior is chaotic. In my own work I have concluded that at the subatomic scale, Nature is exquisitely ordered, with its evolution carried out through interactions of adjacent building blocks that self-assemble as cellular automata (CA)[2], to make up everything - matter, energy and space itself.[3] There is no time dimension, however, and everything evolves in a state of 'now' across the Universe. In such a Universe there can be no will to reach a goal, other than in the minds of intelligent entities such as human beings, but we came very late in the evolution of the Universe.

1.2 Enter Einstein, Singing

Albert Einstein was one human being who had a great sense of purpose. Apart from being the foremost physicist of the 20th century, he was a great campaigner for World Peace, and racial equality, with his friend Paul Robeson, the African-American singer. Robeson is most famous for his song "Ol' Man River" from the musical *Show Boat*.[4] One can well imagine Einstein watching the Universe as the protagonist of the song watched the Mississippi, flowing according to its own laws of hydrodynamics, oblivious of human existence:

"I must keep livin' until I'm dyin,/ But Ol' Man River,/ He jes' keeps rollin' along!"
- From the song "Ol' Man River" in *Show Boat* 1927[5]

The fixed absolute Universe of Newton was turned upside down when Einstein's Special Relativity (SR) decreed that any observed corner of the Universe changes attributes depending on the speed at which the observer is moving. Robeson is not on record as having tried to defend the song's view of things separating the observer from the workings of Nature.[6]

1.3 Einstein's Problematic Heritage in Physics

In this essay I will attempt to show how some of Einstein's ideas not only created brilliant new physics, but also created some fundamental obstacles that are blocking the path of progress there, as will be discussed below, and is summarized in the chart on page 6. It may be presumptuous of me to attack the finest physical theories of the 20th century, but I do so in the hope, and with the intuition that beautiful simple unified theories are possible, once we let go of the old ossified notions however successful they are in the specific and limited areas they are applied.

Einstein, an atheist, sought to understand the secrets of what he whimsically referred to as the "Old One", and in doing so proposed various physical laws that for more than a century held sway. Among them were:

1- The speed of light is constant but space and time change according to the speed of the observer in a frame of reference; 2- Light is a point particle, the photon, a notion that introduced the concept of wave-particle duality in the behavior of Nature at the smallest level; 3- Gravity is equivalent to acceleration, and is due to the effects of matter to shrink space and dilate time in the so-called geometry of spacetime of the gravitational field surrounding the particle or mass.

There is no need to give in detail how Einstein's brilliant contributions helped launch great developments in physics and its applications in modern technology. They have led to brilliant accurate predictions about how the smallest things in Nature behave, and how the Universe itself functions at the largest scales starting from the Big Bang. The equivalence of mass and energy, $E=mc^2$, had been formulated by Poincaré before Einstein, but it was the latter's success in other findings that associated the equation solely with Einstein. Mass-energy equivalence lead to nuclear power (nuclear weapons notwithstanding). His other theories led to lasers, GPS and many other inventions that would otherwise not have existed. Recently the experimental confirmation that gravitational waves exits, as predicted by his theory of gravity, added to the awe in which Einstein is held. In the popular imagination and even among most mainstream physicists today, the common consensus is that Einstein is infallible except in one or two well known cases. He himself however was a humble person who wore his sandals without socks, ready until the end of his life to question his own ideas and to abandon them if new and contradictory evidence emerged.

It is high time we physicists do the same. It will be argued in the second part of this essay that apart from the Equivalence Principle that gravity = acceleration, the three key ideas Einstein listed above have been formulated in an unnecessarily complicated manner, based on *ad hoc* unproven assumptions about Nature, such as the speed of light being constant. In the case of the point photon, they were simply wrong. Einstein was too clever for the good of physics - the explanatory success of his theories distracted from older, simpler or alternative theories that fit better together and would have given the same results. As outlined in the chart below, accepting Einstein's fundamental assumptions of 1905 and 1915 uncritically has lead physics to a virtual dead-end.

It is only fair for my own credibility and to Einstein, whom I greatly admire despite my faultfinding, to list (with my reservations in parentheses) what I believe to be his five unassailable discoveries that will stand the test of the centuries:

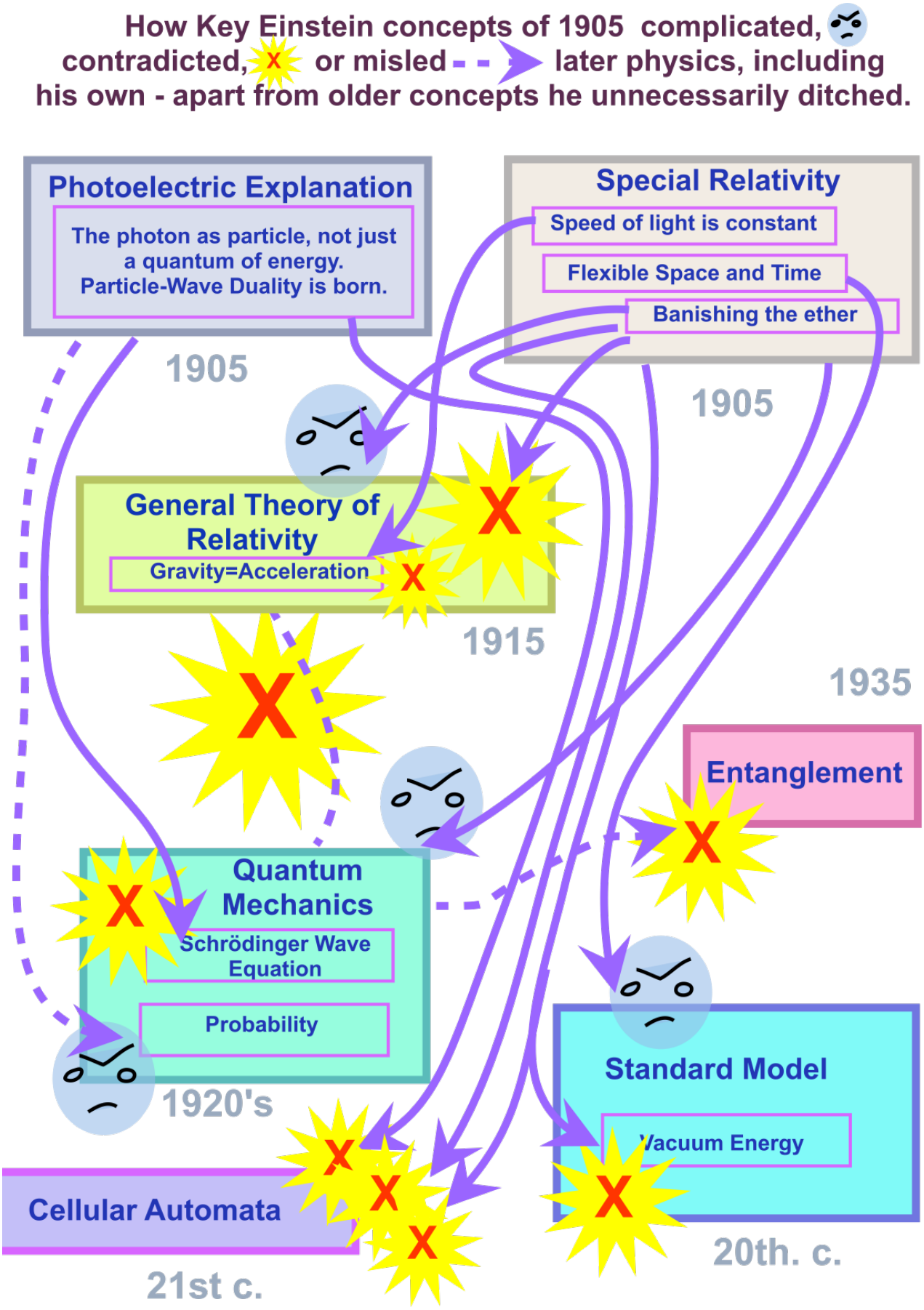
1 His singling out light as fundamental with a maximum (but not constant) speed c;
2- The quantum nature of light (but not as a photon, a particle) in the Photoelectric Effect.
3-The equivalence of gravity and acceleration (but not in space-time) in General Relativity.
4- The fact and implications of entanglement at the atomic level (but no hidden variables involved since there is no probability to start with).
5- The notion of spontaneous emission that has led to the invention of the laser.
Special Relativity with its $E=mc^2$ is not on this list because earlier formulations by Lorentz, Poincaré and others had covered the same ground (Einstein failed to credit them in his famous 1905 paper.)

A word needs to be added that mainstream physicists in academia are wary of enunciating any of the points above. Objecting to Einstein is left to retired electrical engineers, brash non-academic inventors and other researchers free to object without fear of misleading students, losing their reputations or their tenure. Our findings are published in obscure journals, in our websites or in physics discussion forums, but even in some of the latter there is intolerance to any questioning of Einstein's physics. The Emperor insists on remaining naked despite our protestations.

2. MEANDERING TOWARDS A UNIFIED PHYSICS, WITHOUT EINSTEIN'S EXTRA BAGGAGE

2.1 Banishing particle-wave duality

In 1905 Einstein published his three groundbreaking papers. In "On a Heuristic Point of View about the Creation and Conversion of Light" dealing with the photoelectric effect, he explained the phenomena of electrons being emitted when quanta of light shine on a charged metal. For various reasons he also stated without proof that this 'photon' of electromagnetic energy is a compact point particle which does not spread out like a wave as it hurtles at great speed through space. This work later earned him a Nobel Prize, but the photon being a point was contested by no less than Max Plank, Millikan and others who preferred a wave explanation for emission and absorption of faint light. Light is emitted suddenly when the atom reaches a threshold of energy, but absorption is gradual. This nicely explains the double slit experiment with low light. But such was Einstein's charisma and growing reputation that Compton's explanation - that wave phenomena as well as particle collisions, were also adequate to account for his eponymous Effect - was ignored. Particle-wave duality was born and accepted and to this day is still regarded as a bedrock of modern physics, despite its having lead directly to the problematic notion of probability that has bedeviled Quantum Mechanics (QM) since its foundation until now. Recently Eric Reiter, an American independent non-academic researcher and a friend, has experimentally proven that gamma rays cannot be point particles, showing that duality is false.[7]


How Key Einstein concepts of 1905 complicated, contradicted, or misled later physics, including his own - apart from older concepts he unnecessarily ditched.
Photoelectric Explanation
The photon as particle, not just a quantum of energy. Particle-Wave Duality is born.
1905
Special Relativity
Speed of light is constant
Flexible Space and Time
Banishing the ether
1905
General Theory of Relativity
Gravity=Acceleration
1915
1935
Entanglement
Quantum Mechanics
Schrödinger Wave Equation
Probability
1920's
Standard Model
Vacuum Energy
20th. c.
Cellular Automata
21st c.

2.2 Ditching Quantum Probability

Is Einstein responsible for the idea that electrons and all other particles behave probabilistically? Not directly, for when it arose he protested loudly, saying that "God does not play dice". And yet ironically it is Einstein who singlehandedly gave physics the idea of duality, that the photon can act either as a wave or a particle, depending on the experiment it is sensed in. To explain the alleged duality, Louis de Broglie suggested that every particle, electrons included, is guided by its own 'pilot wave'. Max Born soon hit on the idea that the square of this wave can be regarded as the 'probability' of the particle being found at a given time and place. Quantum weirdness was born, preventing a simple, logical, local and causal understanding of the behavior of particles.

As a result of attempts to understand Nature's alleged probabilistic behavior, the unification of QM with General Relativity, GR, became impossible. GR does not include a concept of probability as QM does. This among other differences prevents the creation of a unified fundamental theory of Nature, a Theory of Everything. Physics now has a split personality. Probability led to many Quantum paradoxes as caricatured by Schrödinger's zombie cat who can be both dead or alive until observed. Putting the cat in a transparent glass box, however, shows that the cat is never 'both dead and alive' - just one or the other.

To disprove Bohr's Copenhagen Interpretation of quantum phenomena, Einstein and others proposed the EPR *gedankenexperiment* (thought experiment) when twin photons are released by one atom and dart off in different directions. The two photons are entangled, but not due to hidden variables, as he proposed. There is no spooky action at a distance, simply because there is no probability to start with. The particles have opposite polarization from the very start and their angle does not change when it is measured. The lay reader will have a hard time believing the decades of endless discussions in conferences, books, and in the Internet about such questions raised by Quantum weirdness as "Is It All In the Mind of the observer?" or the Multiple Universe madness where we are told to accept that each moment of time a particle - even 'massive' objects like you or I - exists in different quantum states, one for each Universe it occupies! All this because when one starts with probability the mathematics can match such a scenario, as well as the more realistic Schrödinger Wave explanation.

2.3 Jettisoning Special Relativity

In his third paper of 1905 "*On the Electrodynamics of Moving Bodies*", Einstein presented the theory that came to be known as Special Relativity (SR), which postulates that the speed of light c= constant and the laws of physics are the same for all observers). In SR interactions are absolute (the speed of light with which we observe and measure is constant), but the Universe itself becomes magically relative (space contraction and time dilation in inertial frames relative to an hypothetical observer whose position and motion are accounted for at all times, whether an actual observer is present or not.This too-clever reformulation of Henrik Lorentz's Transformations justified the null ether results of Michelson and Morley, but at a great cost, complicating physics in nearly every major theory presented since then, including Einstein's own theory of gravity, GR. By imposing an observer into every situation, SR provided a practical way to calculate observed physical changes due to motion in a so-called light-cone of possible communication geometries. But in the vast majority of interactions in the Universe, for example when light passes

past a star, or two atoms form a molecule, there simply is no need to account for an observer. Equally clever and disruptive at the same time was how SR banished the need for a ‘background’ - a universal ether of space - now an essential part of the Standard Model of particle physics which predicted that the Higgs boson is embedded in a vacuum with vast inherent energy.

SR’s ‘spacetime’, the merging of space with time, is a tool of observer-based physics. Light speed c is constant but that means space itself and time itself as dimensions must flex as the observer's velocity increases: physical length contracts but clock time slows down. These effects are physically real, only the theoretical explanation is flawed - “light speed is absolute but space and time as dimensions in the Universe are relative to the observer” is a philosophically ridiculous concepts full of 20th century hubris: the Universe evolved for millions of years without any help from human observation or intervention, thank you kindly.

Instead of SR, earlier 19th century ideas such as Lorentz’ Relativity in an absolute Universe, combined with Hertz’ electric ether, could have been amalgamated. In Lorentz's Transformations whose results Einstein used but did not cite in his paper, the Universe’s space and time dimensions are absolute - not depending on an observer- but its interactions are relative - it is actual length that changes, not space as as a dimension, and it is the clocks's mechanism that slow down as their mass increases, not time as a dimension as Einstein proposed. I now believe that light speed has a maximum of c, but it slows down in fields of variable density and in gravitational potential fields.

2.3 Dropping General Relativity

Einstein’s greatest contribution to physics was the idea that gravity is equivalent to acceleration. Unfortunately because of his own SR, he had to use flexible spacetime to mathematically present his theory, greatly complicating it conceptually and in terms of making practical computations. In mechanics, deceleration involves curvature, as when a bicycle slows down to take a curve. Einstein belatedly realized light has to slow down in a gravitational field, but he was committed to the SR dictum that c was constant. General Relativity GR, our best theory of gravity, is to this day (pun alert) weighed down with the need to impose an observer even when two black holes collide to make gravitational waves, hardly a place an observer is liable to be present! The concept of spacetime in GR is at odds with the concept of time in Quantum Mechanics, contributing to the famous dichotomy preventing a unified theory of everything in physics. This impasse, whose causes were discussed above, has led to wildly impractical proposals such as String Theory and others, that have wasted the efforts of a whole generation of physicists with no workable results so far.

A much simpler theory of gravity is possible: in a gravitational field the local energy density of the ether acts like an optical field of variable index of refraction, bending light as it does in a desert mirage, where heat creates layers of air with decreasing density, refracting light and making it curve. This idea was first presented by Arthur Eddington[8], the man whose eclipse observations proved that a star’s gravity curves light, just as GR predicted, thereby catapulting Einstein into world fame. In my own theory of gravity this density is due to the spin of qubit-like dielectric nodes making up the ether lattice, the proposed building blocks of the Universe[9]

2.4 Enter Cellular Automata

It sounds easier to banish, ditch, jettison or drop the cornerstones of 20th century physics than to reconstruct it anew from first principles. But in hindsight Einstein and the other pioneers have given us valuable lessons about the workings of Nature, however overcomplicated and mutually contradictory their results. It is not within the scope of this paper to detail the alternate rudimentary theories that may one day replace QM, SR, GR and the Standard Model of particle physics. I can be forgiven if I single out the promise of Cellular Automata. Stephen Wolfram in his *New Kind of Science*[10] was an early explorer of how physics can emerge in a CA. Gerard 't Hooft, the renown Nobel Prize winning physicist, has just published a book[11] arguing that QM can emerge naturally out of CA, but 't Hooft's work is still weighed down by the useless baggage of spacetime, and he does not yet discuss gravity in CA. Far less professional, "Beautiful Universe"[12] my own version of a CA so-called Theory of Everything, is still in its outline form of 2005, although some recent successes in simulation it are encouraging.

In a discussion forum thread[13] initiated by 't Hooft about his book, I complained, speaking of my experience with physicists I had contacted about my work in the past, "If esteemed academics are hesitant to discuss the foundations of quantum mechanics you can imagine the situation for us independent researchers trying to re-examine some basic long-held premises!" Professor 't Hooft's kind response was surprising and encouraging: "@Vladimir … I am perfectly aware of the truth of what you are trying to say. So feel comforted by my observation that even a Nobel Prize does not always guarantee that you will be listened to."

I would like to express my gratitude to my wife Kyoko for her patience and encouragement, my daughter Mariam for checking the text and my friend D who does not wish to be known. He is responsible for my knowledge of the Einstein-Robeson friendship and for valuable textual suggestions.

REFERENCES

[1] Wandering Towards a Goal: How can mindless mathematical laws give rise to aims and intention? http://fqxi.org/community/forum/category/31425 *This essay covers similar ground tn more technical detail o a pervious* FQXI contest entry by the author, *Questioning the Foundations(2012) " Fix Physics! – Reverse Engineer Relativity, Quantum Mechanics and the Standard Model, Get Rid of Outdated Assumptions, Consolidate, and Reconstruct on New First Principles "* http://fqxi.org/community/forum/topic/1323(Web: 1 March 2017)

[2] Cellular Automata are an ordered arrangement of units that interact with their neighbors according to a given set of rules. See http://mathworld.wolfram.com/CellularAutomaton.html (Web: March 1, 2017)

[3] Tamari, V.F., Beautiful Universe: Reconstructing Physics from New First Principles http://vladimirtamari.com/beautiful_univ_rev_oct_2011.pdf (Web: Feb 27, 2017)

[4] https://www.youtube.com/watch?v=yyJtGNk9iEU (Web: 3 March 2017)

[5]From the lyrics by Oscar Hammerstein https://en.wikipedia.org/wiki/Ol'_Man_River (Web: 3 March, 2017)

[6] They were also allies in a sustained attempt to change their country's social attributes, together battling racism, inequality. In addition Einstein was a vocal supporter of Arab rights in Palestine, and vehemently condemned Zionist terror. Einstein once famously called narrow nationalism "an infantile disease: the measles of mankind!"

[7] Eric Reiter's website: http://www.thresholdmodel.com/home.html (Web: 1 March 2017)

[8] Eddington, A. Space Time and Gravitation, Camb. Univ. Press 1920, pp. 107-109

[9] Tamari, V. Beautiful Universe: Towards Reconstructing Physics from New First Principles. (2005) http://vladimirtamari.com/beautiful_univ_rev_oct_2011.pdf (Web: March 2, 2017)

[10] Wolfram, S. , https://www.wolframscience.com/nksonline/chapter-9 (Web: March 2, 2017)

[11] 't Hooft, G. The Cellular Automaton Interpretation of Quantum Mechanics (Springer, 2016) http://www.springer.com/gp/book/9783319412849 (Web: March 2, 2017)

[12] Op. Cit. Tamari 8.

[13] Research Gate thread started by Gerard 't Hooft on September 12, 2016 entitled "1. Wrapping up the proofs for my book on "The Cellular Automaton Interpretation of Quantum Mechanics. 2: The pure-state theory for black holes using antipodal identification." https://www.researchgate.net/project/1-Wrapping-up-the-proofs-for-my-book-on-The-Cellular-Automaton-Interpretation-of-Quantum-Mechanics-2-The-pure-state-theory-for-black-holes-using-antipodal-identification (Web: March 3, 2017)