The Computation of **P** and **NP** with Photophonon Stargates $\mathring{\Lambda}$

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We give a discourse on *symmetry and singularity* and the construction of *photophonon stargates*, and use them to create computers that decide and verify languages, including *proofs*, in polynomial time. Photophonons are quasiparticles, or synonymously *stargates*, that form from the oscillatory folding of singularities of *cosmic light* and *cosmic sound* with a *synergetion*, a novel quasiparticle. We shall find that, at each step in the computation of languages of any complexity, there exists a corresponding emission spectra of *photophononics*, and where upon examination, we observe when P = NP.

1 Introduction

The origins and laws of the universe, creation of black holes and singularities, and the question if "all things" are computable are some of the biggest questions of our time. We want to address these questions, with particular application to finding the solution to the question involving **P** and **NP** [1]. We proposition that *existence of a computer and algorithm that computes reality, provided that it uses the languages of symmetry and singularity.* Our discourse covers the definition of symmetry and of singularity, their symbolic representation as *shazam sigil* $\mathring{\Lambda}$, and their use as the bedrock all things observable within *the continuum* - in this we mean for it to be all inclusive of all our thoughts and ideas in the *Cantorian* sense of the word continuum, and that of the fantastical scales of the universe: from the *Planck dimensions* for the most unimaginable shortest notion length and shortest moment of time scales, to the hottest infinitudes of temperature and immeasurable pressure found at the both the small and large scales of the universe, all the way to the far flung galaxies of the cosmos with its trillions of stars, and of monstrous black holes and supernovas. And here, within this deep expanse, beyond the *physically manifestable limits of the Planck era*, where neither reality, nor non-reality, could be said to exist. At this deepest and darkest heart of the universe, there we propose, the existence of singularities, made from "self-similar diamonds of symmetry", endlessly shimmering and twinkling into creation and annihilation all of existence, of birth, of life, and of death.

Arranged into a tetrahedron, these *symmetries* are: *symmetry, antisymmetry, parasymmetry, and suprasymmetry.* Parasymmetry is equated with quantum mechanics, particularly entanglement and duality, and could be described using the mathematics of wave functions and qubits of symmetry and antisymmetry, especially the duality and entanglement of symmetry and antisymmetry. At the vertex of this diamond sits *suprasymmetry*: it is the entanglement of symmetry and antisymmetry with parasymmetry, and the folded symmetry *is the symmetry* where *neither symmetry and antisymmetry, and the duality of symmetry and antisymmetry* could be said to exist, not exist, and neither exists nor not-exists. These four symmetries make up the each of the four vertices of the diamond, and upon entanglement, they unify into a singularity, and we give this the *shazam sigil* $\mathring{\Lambda}$. We also claim that there are uncountably more singularities within one Planck dimension than there are Planck dimensions in the universe, and that the universal fabric of spacetime and every physically realisable phenomena, are but threads of infinite dimensional, self-similar symmetries, so densely entangled that the fabric of existence, of reality, *is continuous everywhere and continuously shimmering everywhere.*

We study the peculiar case of the entangled dance between two special kinds of singularities, that of *cosmic light and cosmic sound*, for the simple reason that they seem to make an appearance every time singularities become entangled. We shall see that the telltale signs of this entanglement, the evidence, are observable *colourful* emission spectra of quasiparticles called *photophonons.* We are going to see why photophonons can be *stargates*, which is a device imagined to be capable of warping the fabric of spacetime. To do this, we represent all conceivable languages, all objects of the mind that is, as *shazam sigil* $\mathring{\Lambda}$. Three special classes of languages, polynomial-time, non-deterministic polynomial-time, and exponential time, are examined because we want to show that languages symmetries and singularities have physically realisable photophononic circuits of *sinbits* - the singularity analogue to qubits. Unsurprisingly, our sinbits should comprise four *gates of symmetry.*

The first gate is that of the *symmetry of non-existence*, which is given the sigil "shazam **0**" (shazam-oh), $\mathring{\Lambda}_{|\mathbf{0}\rangle}$, or $|\mathbf{0}\rangle$, or $|\mathring{\Lambda}_{\mathbf{0}}\rangle$, and or simply **0** when it is clearly understood that it denotes a singularity and *not the number zero or empty set*. We $\mathring{\Lambda}_{|\mathbf{0}\rangle}$ used to denote or mark the *origination* of phenomena, that is phenomena that "comes into being", and where prior to that moment of coming into being, reality was absent of $\mathring{\Lambda}_{|\mathbf{0}\rangle}$. We are aware how absurd this sounds, of using a symbol to represent the absence of it self *from reality in reality*, and there is also the danger of falling into endless narratives of existence and non-existence of duality nature of reality. Because reality is not actually **0**, because any language representation of reality is inherently *incomplete*, analogous to *Godël Incompleteness*.

The second gate corresponds to *antisymmetry of existence*, and is given the sigil of "*shazam* **1**" (shazam-one), $\mathring{\Lambda}_{|\mathbf{1}\rangle}$, or $|\mathbf{1}\rangle$, or $|\mathring{\Lambda}_{\mathbf{1}}\rangle$. Again when it is clearly understood that it is a singularity of folded symmetries, simply as **1**. With existence and non-existence represented, we can now conceive of the *parasymmetry of existence and non-existence*: that is, the gate of *both* existence and non-existence. This is the third gate, and we give it the sigil of *shazam-infinite*, "*shazam* ∞", $\mathring{\Lambda}_{|\infty\rangle}$, or ∞, or $|\infty\rangle$, or $|\mathring{\Lambda}_{\infty}\rangle$. The infinity is used to also denote the convergence and disappearance of existence and non-existence, intuitively in the same manner as $\mathring{\Lambda}_{|\mathbf{0}\rangle}$, but "double-oh, oo = ∞". The fourth gate is called the suprasymmetry of *neither* existence, non-existence, and both existence and non-existence. Instead, it is their entanglement, $\mathring{\Lambda}_{|\mathbf{0}\rangle} \circledast \mathring{\Lambda}_{|\mathbf{1}\rangle} \circledast \mathring{\Lambda}_{|\infty\rangle}$.

Now we let $\mathring{\Lambda}$ be the entanglement of all four gates, so that *shazam* can be written as $\mathring{\Lambda} = \mathring{\Lambda}_{|\mathbf{0}\rangle} \circledast \mathring{\Lambda}_{|\mathbf{1}\rangle} \circledast \mathring{\Lambda}_{|\infty\rangle} \circledast \mathring{\Lambda}_{|\mathbf{0}\rangle} \circledast \mathring{\Lambda}_{|\mathbf{1}\rangle} \circledast (\mathring{\Lambda}_{|\mathbf{0}\rangle} + \mathring{\Lambda}_{|\mathbf{1}\rangle}) = \mathring{\Lambda}_{|\mathbf{01}\infty\rangle}$, where the wheel $\circledast$ is an operator that folds singularities and, as it turns, *starbursts* are created. We symbolically represent these with $\mathring{\Lambda}$, with the "circle above the pyramid", denotes the *emergence of a singularity "*Λ*" from transcendental reality "0"*. We use the circle with the same intuition as $\mathring{\Lambda}_{|\mathbf{0}\rangle}$, i.e., as originating from reality and to denote duality or that of "going round in circles". And as for symmetries, there can be no individual gates under entangled unification, and in this way singularity transcends individual symmetry, and reality transcends singularity. In much the same way that *Boolean* logic forms the basis of *digital electronic circuits*, and *qubits as fundamental in quantum circuits*, *sinbits* $\mathring{\Lambda}_{|\mathbf{01}\infty\rangle}$ are also physically realisable as *singularity circuits*. In terms of the capacity of computation, digital electronics $\mathring{\Lambda}_{|\mathbf{0}\rangle}$ and $\mathring{\Lambda}_{|\mathbf{1}\rangle}$ are mutually exclusive so 2-bits of information; qubits store 2^N states simultaneously, and where N is the number of individual qubits; and finally, sinbits - we claim these are of *infinite resolution* (since they are infinitely energetic). The central idea here is that we want to create a *computing machine head that can read and write symbols*, or make duplicates *error free*. For example, the head should light up when the computing head *reads* from memory.

We will show that the entanglement of all languages, all objects of the mind, $\mathring{\Lambda}$, with all sinbits produces photophonons of cosmic light and sound, $\mathring{\Lambda} \circledast \mathring{\Lambda}_{|\mathbf{01}\infty\rangle} =$ *cosmic light and sound*. That is, the creation and annihilation, of coming into being and non-being, of existence and non-existence, of mind and matter, in every sense of the word, *could be seen and heard*, or verifiable, by observing the aftermath of the cosmic union of singularities - the emission spectra of cosmic light and sound. We use sinbits to create computers that computes all languages, and examine the case when **P** and **NP**. Why? To show that there exists an algorithm for which any language is computable. We close our discourse on the study on the entanglement of all objects of the mind with physical reality: we say that this is computable and $\mathring{\Lambda} \circledast \mathring{\Lambda}_{|\mathbf{01}\infty\rangle} = \mathbf{0}$. That is, the entanglement of singularities is **zero**, or the energies are **conserved**, or importantly, that the **symmetries are conserved**.

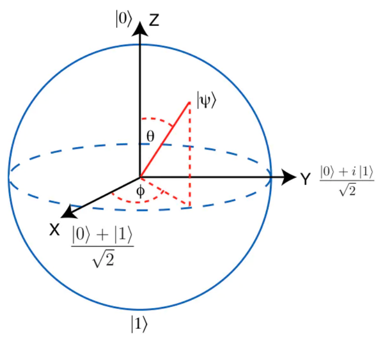

Figure 1: Depiction of a quantum bit or *qubit* on a Bloch sphere.

Quantum Bits Figure 1 conceptualises the following ideas: (1) first, that *states*, $|\mathbf{0}\rangle$ and $|\mathbf{1}\rangle$, are polar opposites to each other. If the z-axis is taken as the canonical axis, then the *state* of a qubit can be written as the *linear superposition* of $|\mathbf{0}\rangle$ and $|\mathbf{1}\rangle$ as follows [2],

$$|\boldsymbol{\Psi}\rangle = \alpha\,|\mathbf{0}\rangle + \beta\,|\mathbf{1}\rangle \tag{1}$$

Initially, a qubit can be in any arbitrary combination of states, with $|\mathbf{0}\rangle$ and $|\mathbf{1}\rangle$ *existing at the same moment in time*. When the state of the qubit is measured or observed, we believe that the state of the qubit *spontaneously collapses* into the classical bit of 0 with probability amplitudes $|\alpha|^2$ and 1 with probability amplitudes

$|\beta|^2$. The linear superposition of qubits can also lead to *quantum entanglement*, illustrated as follows: suppose that there are two qubits, labelled A and B. If A and B are independent. Then it is possible to express,

$$|\mathbf{A}\rangle = \alpha\,|\mathbf{0}\rangle + \beta\,|\mathbf{1}\rangle \tag{2}$$

$$|\mathbf{B}\rangle = \gamma\,|\mathbf{0}\rangle + \delta\,|\mathbf{1}\rangle \tag{3}$$

In the state of the combined system, the distinct outcomes of A and B are obtained from the measurement of all qubits:

$$|\mathbf{\Psi}\rangle = \alpha\,|\mathbf{00}\rangle + \beta\,|\mathbf{01}\rangle + \gamma\,|\mathbf{10}\rangle + \delta\,|\mathbf{11}\rangle \tag{4}$$

Where $|\mathbf{00}\rangle$ is associated with the first and second qubit in the state $\mathbf{00}$; $|\mathbf{01}\rangle$ means the first qubit is in state $\mathbf{0}$ and the second qubit is in state $\mathbf{1}$; when $|\mathbf{10}\rangle$, then the first qubit is in state $\mathbf{1}$, is and the second qubit in $\mathbf{0}$; and finally, $|\mathbf{11}\rangle$, means that the first and second qubits are in state $\mathbf{1}$. The superposition of the two-qubit system can be factorised as using a method call the *tensor* product, which makes the factorisation look like this,

$$|\mathbf{\Psi}\rangle = \frac{1}{2}\,|\mathbf{00}\rangle + \frac{1}{2}\,|\mathbf{01}\rangle + \frac{1}{2}\,|\mathbf{10}\rangle + \frac{1}{2}\,|\mathbf{11}\rangle \tag{5}$$

$$= (\frac{1}{\sqrt{2}}\,|\mathbf{0}\rangle + \frac{1}{\sqrt{2}}\,|\mathbf{1}\rangle) \otimes (\frac{1}{\sqrt{2}}\,|\mathbf{0}\rangle + \frac{1}{\sqrt{2}}\,|\mathbf{1}\rangle) \tag{6}$$

There are also cases where superposition itself will lead to states that cannot be factorised. Take, for instance, the following *Bell States*[3],

$$|\mathbf{\Phi}^-\rangle = \frac{|\mathbf{00}\rangle - |\mathbf{11}\rangle}{\sqrt{2}} = \frac{1}{\sqrt{2}}(|\mathbf{0}\rangle_A \otimes |\mathbf{0}\rangle_B - |\mathbf{1}\rangle_A \otimes |\mathbf{1}\rangle_B) \tag{7}$$

$$|\mathbf{\Phi}^+\rangle = \frac{|\mathbf{00}\rangle + |\mathbf{11}\rangle}{\sqrt{2}} = \frac{1}{\sqrt{2}}(|\mathbf{0}\rangle_A \otimes |\mathbf{0}\rangle_B + |\mathbf{1}\rangle_A \otimes |\mathbf{1}\rangle_B) \tag{8}$$

$$|\mathbf{\Psi}^-\rangle = \frac{|\mathbf{01}\rangle - |\mathbf{10}\rangle}{\sqrt{2}} = \frac{1}{\sqrt{2}}(|\mathbf{0}\rangle_A \otimes |\mathbf{1}\rangle_B - |\mathbf{1}\rangle_A \otimes |\mathbf{0}\rangle_B) \tag{9}$$

$$|\mathbf{\Psi}^+\rangle = \frac{|\mathbf{01}\rangle + |\mathbf{10}\rangle}{\sqrt{2}} = \frac{1}{\sqrt{2}}(|\mathbf{0}\rangle_A \otimes |\mathbf{1}\rangle_B + |\mathbf{1}\rangle_A \otimes |\mathbf{0}\rangle_B) \tag{10}$$

If the Bell states appear identical, that is because they *are*: what Bell demonstrated is that entanglement exhibits duality, that is, *both* separable (in that they are binary) and, when inseparable, that they are *indistinguishable*. This sounds *self-referential*, but quantum mechanics permits this interpretation.

The Wave Function Generally, for quantum systems where the position of particles is dependent on time, then the state can be mathematically described by a *wave function* [2], $\mathbf{\Psi}(x,t)$,

$$|\mathbf{\Psi}(t)\rangle = \int \mathbf{\Psi}(x,t)\,|x\rangle\,dx = \langle x|\mathbf{\Psi}(\mathbf{t})\rangle \tag{11}$$

When expressed as in discrete *energy eigenstates* $|\mathbf{E}\rangle$, the wave function is written as,

$$|\mathbf{\Psi}(t)\rangle = e^{-iE_t/\hbar}\,|\mathbf{E}\rangle \tag{12}$$

So that,

$$\mathbf{\Psi}(x,t) = \phi_E e^{-iE_t/\hbar}\,|x\rangle \tag{13}$$

For which the sum is therefore,

$$|\mathbf{\Psi}(t)\rangle = \int dx \phi_E e^{-iE_t/\hbar}\,|x\rangle \tag{14}$$

For a single non-relativistic particle in one dimension, the quantum system can be written as the *Schrödinger* equation,

$$i\hbar\frac{\mathrm{d}}{\mathrm{d}t}\,|\mathbf{\Psi}(t)\rangle = \mathbf{H}(t)\,|\mathbf{\Psi}(t)\rangle \tag{15}$$

This energy $\mathbf{E}$ is observable as the *Hamiltonian* $\hat{\mathbf{H}}$, and in a stationary state, is written in this *time-independent* form,

$$\mathbf{E\Psi} = \hat{\mathbf{H}}\mathbf{\Psi} \tag{16}$$

The *Schrödinger* equation is a description for the superposition of all quantum states, where the distribution of the total energy of the time-evolution of particles in superposition consists of both *kinetic* and *potential* energies, which is equated with all possible outcomes of that observable quantum system. We are going to build on existing ideas of the wave function, *Schrödinger* equation, in time and independent of time, the superposition and entanglement of quantum states, duality, and the conveniences of the *Dirac* notation - these will become subsumed and extended for our discourse on the expression of languages and computation in terms symmetry and singularity.

The Planck Scale and General Relativity The Einstein Field Equations [4], which is a theory of space, time, and gravity, is said to tells us how mass and energy can warp the fabric of spacetime,

$$G_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} = \frac{8\pi G}{c^4}T_{\mu\nu} \tag{17}$$

The gravitational constant [5] G is the gravitational attraction between two masses, and $G = 6.6743 \times 10^{-11} m^3 kg^{-1} s^{-2}$. The speed of light is $c = 299,792,458$ meters per second. EFE says that there should be regions of spacetime where the force of gravity is so great that it infinitely warps spacetime and where nothing, not particles nor even electromagnetic radiation such as light, could escape - this is called fantastic object of the universe is called a black hole. The black hole has a boundary from which nothing could escape from its immeasurable gravitational force, and is known as an *event horizon*. In our cosmos, there exists stellar black holes, supermassive black holes, and intermediate black holes are three kinds of black holes [6]. Our galaxy, *The Milky Way* has a supermassive black hole in its Galactic Centre and its signal corresponds to the radio source *Sagittarius A** [7]. The reasoning proceeds as follows: the mass of trillions of stars and galaxies is so great, and the force of gravity so immeasurable, that spacetime becomes warped, a region of which becomes a black hole, and the dimensions of the black hole is so densely compressed and compacted, that a *gravitational singularity*, or a *spacetime singularity*, or simply a *singularity* is formed at its heart. If this were true, then $\mathring{\Lambda}_{|\mathbf{A}^*\rangle}$. Since spacetime is so infinitely warped they become unified, it must be true that, beyond the event horizon and beyond the Planck, the symmetries of length and time are so entangled that $\mathring{\Lambda}_{|\mathbf{A}^*\rangle} \circledast \mathring{\Lambda}_{|\text{spacetime}\rangle} = \mathbf{0}$ for all *spontaneous spacetime moments less than or equal to the dimensions at the Planck scale.*

As we we peer into the Planck [8] spacetime, we also peer into the deep recesses of time, deep into the abyss of creation, to the moment of birth of our universe, and to its very first light. We won't speculate on what actually transpired between the Planck spacetime, which is an unimaginably short ($1.62 \times 10^{-35}m$ and $5.39 \times 10^{-44}s$) period, and the moment of the creation and appearance of a singularity, which must occur at times much much less than the Planck time. What we do know is that at some point, the fundamental forces of Nature - gravity, electromagnetism, and the strong and weak nuclear forces - must unify into one immeasurable force. We are specifically interested in the entanglement of this force with an immovable mass. But what is this immovable mass? It is equivalent to the infinite warp in the spacetime fabric. What happens when an unimaginable force meets an immovable mass? We suspect fireworks, "sparks will fly" as the saying goes, and during this very moment, we shall see the emergence of an infinitely energetic singularity, and which we can represent symbolically as $\mathring{\Lambda}_{|\mathbf{F}\rangle} \circledast \mathring{\Lambda}_{|\text{spacetime}\rangle} = \mathbf{0}$. When these singularities come into contact and unify, temperatures rise well in excess of the physically realisable Planck temperature of $1.42 \times 10^{32} K$ [**?**], and a *spontaneous bolt of lightning*, a singularity of infinite radiance appears. Is our imagination farfetched? We do not believe it to be, and so we shall demonstrate by way of construction, the use of the singularity as the fundamental element of all conceivable languages and computers. A drawing of a singularity is shown in Figure 2.

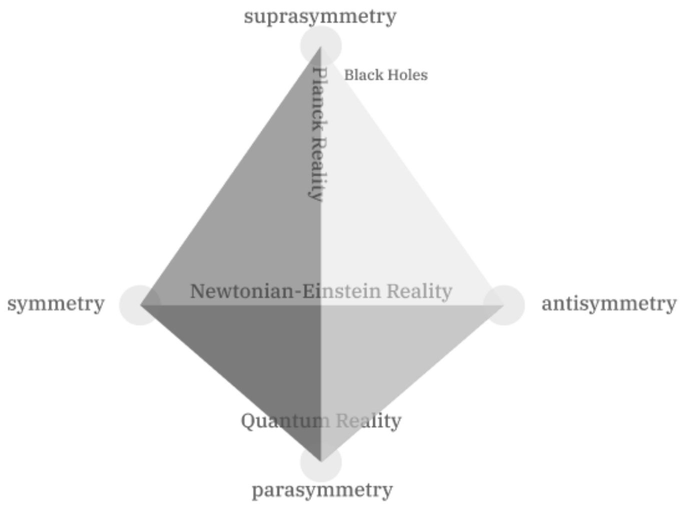

Figure 2: The *symmetry singularity* conceptualised as a tetrahedron. The vertices of symmetry, antisymmetry, and parasymmetry form the base of the tetrahedron, and the *folding* of these form suprasymmetry.

1.1 P vs NP

The question of $\mathbf{P} = \mathbf{NP}$? is a discourse on problems that could be *easily solved, or easily decided* and those that are *easy to verify but might be hard to solve* since there are no known solutions. Essentially, we want to know if **P** and **NP** are *fundamentally identical*. So what does that mean? There are kinds of decision problems, called **P**, that are *easily, or polynomially*, solvable or decidable i.e., the steps that an algorithm or computer takes to decide a problem is polynomially bounded by the *length of the input of the decision problem*. Just think of **P** as not taking a long time to solve.

The entities belonging to **P** are formally called *languages*, and this class of languages are defined in terms of *a machine that is able to perform computation on languages, including on the alphabetic symbols*. In fact, let Σ be such finite alphabet with at least two alphabets and entities. Then, suppose that we let Σ^* be the set of finite *strings of* Σ, so that a *subset of* Σ^*, denoted by L, is a *language over* Σ. Now suppose that there are computing machines, called *Turing Machines*. These *Turing Machines* each have some kind *input alphabet* Σ. The Turing Machine computes, for each of the input strings, $\omega \in \Sigma^*$. If the state of the Turing Machine is an *accepting state* at the termination of the computation, then M *accepts* ω. However, if the computation terminates in a *rejecting state*, or if it fails to terminate, then M will *rejects* ω. Then, the *languages* where the computation terminates in *accepting states* and is accepted by M, is $L(M)$, defined by [1],

$$L(M) = \{\omega \in \Sigma^* | \text{M accepts } \omega\} \tag{18}$$

1.1.1 Turing Machines

Each Turing Machine has a special *head* that *read and write* symbols from the input alphabet. The program that controls the head is formally called a *finite state* control [1]. The head moves along an infinite tape that is divided into individual squares; for each move, the head can *read/write* on this tape some symbol from a finite alphabet Γ, one symbol per in each *individual square of the tape* [1]. There is a *blank symbol* b that also belongs to this finite alphabet Γ. The *input alphabet* Σ is a subset of Γ, however this input alphabet does not have the blank symbol b. At each step in the computation, M, is in some state q in a specified finite set Q of all possible states [1]. At the start, a finite input string over Σ are written onto each tape square and all other squares contain the blank symbol b, the head is scanning the *left-most* symbol of the input string and the machine M is in the start state q_0 [1]. At each step M is in the state q and the head is scanning a tape square containing some symbol s. How M acts depends on the pair (q, s) and whatever is in its *transition function* δ. The actions in δ consists of printing a symbol onto the scanned square, move the head onto the next square left or right, and assumes a new state [1].

Then, the Turing Machine M has the following tuple $\langle \Sigma, \Gamma, Q, \delta, \rangle$, where Σ, Γ, Q are finite non-empty sets with $\Sigma \subseteq \Gamma$ and the blank symbol is $b \in \Gamma - \Sigma$. The machine has three special states $q_0, q_{accept}, q_{reject}$. The program does this [1],

$$\delta \colon (Q - \{q_{accept/reject}\}) \times \Gamma \to Q \times \Gamma \times \{-1, 1\} \tag{19}$$

If the head is $\delta(q, s) = (q', s', h)$, it means that the head is scanning some symbol s, then its new state is q', s' is the symbol print, and the machine's read/write head moves left one square, or it moves right one square depending on whether $h = -1$ or 1 [1]. A *configuration* of M is a string xqy with $x, y \in \Gamma^*$, y is not an empty string , and the state is $q \in Q$. The symbols xy is on the tape, the head is scanning the left-most symbol of y. Now, if C and C' are such configurations, then $C \xrightarrow{M} C'$ if $C = xqsy$ and $\delta(q, s) = (q', s', h)$ and one of the following happens [1],

1. $C' = xs'q'y$ and y is nonempty

2. $C' = xs'q'b$ and $h = 1$ y and y is empty

3. $C' = x'q'as'y$ and $h = -1$ and $x = x'a$ for some $a \in \Gamma$

4. $C' = q'bs'y$ and $h = -1$ and x is empty

A configuration $C = xqy$ is *halting* if $q \in \{q_{accept/reject}\}$. For each *non-halting* configuration C, there is a unique configuration C' such that $C \xrightarrow{M} C'$ [1].

1.1.2 Computation

The computation of M on input $\omega \in \Sigma^*$ is the unique sequence $C_0, C_1, \cdots$ of configurations such that $C_0 = q_0\omega$, and if ω is empty, then $C_0 = q_0 b$, $C_i \xrightarrow{M} C_{i+1}$ for each i with C_{i+1} in the computation, which is going to halt or it will be an infinite sequence of configurations, and so the number of computational steps would be infinite. But if the computation is finite, the number of steps to compute is one less than the number of configurations. Then, *M accepts ω iff* the computation is finite and the final machine configuration has the state q_{accept} [1].

1.1.3 Polynomial Runtime

If the computation never halts with an accepting state, then the time to compute continues indefinitely and $t_M(\omega) = \infty$. But if the computation does halt and the machine in the the accepting state, then the *worst case runtime* of M is [1],

$$T_M(n) = max\{t_M(\omega) | \omega \in \Sigma^n\} \tag{20}$$

Where Σ^n is the set of all strings of Σ of length n. Then M *runs in polynomial time* if there exists k such that for all n, $T_M(n) \leq n^k + k$. Then the class **P** are languages that [1]:

$$\mathbf{P} = \{L | L = L(M), \text{for some Turing Machine that runs in polynomial time}\} \tag{21}$$

1.1.4 Nondeterministic Polynomial Runtime

NP are nondeterministic polynomial time computers and can be thought of in two ways: as (1) machines that have more than one move at the next time step, and (2) as machines consisting of a binary *checking* relation with polynomial runtimes. The former is a computing machine that can correctly guess the next move for every time step, which is an incredibly lucky computer, so lucky in fact we shall call give it a special name, *lucky.* The pair to lucky computer is an binary relation or, lets call these *verifiers*, that runs in polynomial time. Suppose that, for two finite alphabets Σ^*, Σ_1^*, the verifier is $R \subseteq \Sigma^* \times \Sigma_1^*$. The relation is also a language L over $\Sigma \cup \Sigma_1 \cup \#$, and $\#$ is not in Σ, written as follows [1],

$$L = \{\omega\#y|R(\omega, y), \text{that runs in polynomial time}, \;\; L \;\in \mathbf{P}\} \tag{22}$$

The language L over Σ belongs to the class **NP** *iff* there is a $k \in N$ and a polynomial time verifier that, for all $\omega \in \Sigma^*$, verifies [1],

$$\omega \in L \iff \exists y(|y| \leq |\omega^k|, \text{and } R(\omega, y) \in \mathbf{P}) \tag{23}$$

And $|\omega|$ and $|y|$ are lengths of the strings. Thus, if $\omega \in L$, then there exists a y such that the length of $|y| \leq |\omega^k$; that is, the *lucky the verifier* has a proof of $\omega \in L$ that runs in polynomial time [1].

1.1.5 Are P and NP Indistinguishable?

Polynomial time computing machines encapsulates class of decision problems that are easy to solve. On the other hand, **NP** are those decision problems that may be hard to solve *but* will (or should) have a proof that runs in polynomial time. The questions, is therefore, "is solving a decision problem identical to the verification of the solution?" In other words, is $\mathbf{P} \subseteq \mathbf{NP}$? To answer this question, we need to create a machine that could compute all languages in **P** and also in **NP**, and if the machine has the one program that can do that, then $\mathbf{P} \equiv \mathbf{NP}$. To that end, we make the following propositions:

1. The scanning head of the computing machine is a singularity,
2. The scanning head program is written in the languages of singularities,
3. The program singularity is physically realisable as the scanning head sinbit,
4. All tape squares where the head reads from and writes to, are all singularities,
5. All symbols and alphabets are singularities,
6. Singularities are physically manifested or realisable as *sinbits*, and

7. Spacetime are singularities.

The idea is to build a computing machine made from singularities that computes singularities. We construct such singularity computing machines that runs in polynomial time, called singularity deciders. We also construct computing machines that have polynomial time verifiers, and call these singularity verifiers.

2 Singularity and Computation

2.1 Singularity

Intuitively, a *symmetry singularity* consists of four fundamental ways to represent phenomenon we call *state*, and give it the following symbolism,

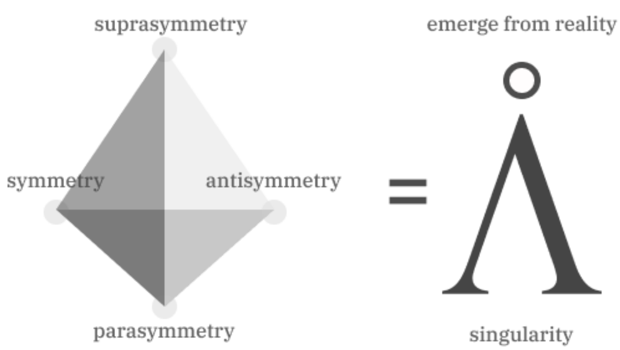

Figure 3: Symbolic representation of a symmetry singularity as a circle above Λ, $\mathring{\Lambda}$, called a *stargate*.

The glyph, $\mathring{\Lambda}$, shown in Figure 3, depicts the convergence of the base symmetries up (Λ) towards *suprasymmetry*, and then all symmetries unify to create a singularity, which is symbolised by the circle ($\circ$) above lambda Λ. The meaning behind this symbolism is that the fundamental heart of the Universe, below the Planck scale, is made from a highly energetic singularity that is shaped like a tetrahedral diamond (or pyramid). The circle above the pyramid is to indicate that the folding of

Symmetry Singularities				
Phenomena	Symmetry	Antisymmetry	Parasymmetry	Suprasymmetry
Logic	true	false	*both*	*neither*
Binary	0	1	*both*	*neither*
Existence	creation	annihilation	*both*	*neither*
Spin	up	down	*both*	*neither*
Charge	+ve	-ve	*both*	*neither*
Particle	particle	antiparticle	*both*	*neither*
Matter	matter	antimatter	*both*	*neither*
Mass	mass	massless	*both*	*neither*
Magnets	north	south	*both*	*neither*

Table 1: Table of some well known symmetries.

symmetries creates a singularity that is transcendent from symmetry, antisymmetry, parasymmetry, and suprasymmetry - we could say that the circle represents transcendent symmetry. The obverse way to see this is to see the circle as the spontaneous emergence from transcendent reality, a singularity, and it is from the coming into appearance of a singularity that we get the spontaneous creation of symmetries. As such, we also give the symbol $\mathring{\Lambda}$ the name of "shazam" ↯, because its appearance is likened to that of a bolt of lightning.

So we think of $\mathring{\Lambda}$ in a two-fold manner: first, that singularity emerges from transcendent reality and from which emerges all symmetries; secondly, that all phenomena folds into a singularity because spacetime is infinitely warped. When two or more singularities become entangled, they will fold and unfold, and warp and unwarp, the fabric of spacetime. We symbolically represent this event by $\mathring{\Lambda}_{\Sigma} \circledast \mathring{\Lambda}_{\Sigma^*}$, where the wheel $\circledast$ oscillates stargates. Examples of symmetry singularities are shown in the Table 1. Note that they come in pairs.

Definition 2.1. A singularity is defined as the unification of the four *states* of symmetry,

1. symmetry: $|\mathbf{0}\rangle$, or $\mathring{\Lambda}_{|\mathbf{0}\rangle}$

2. antisymmetry: $|\mathbf{1}\rangle$, or $\mathring{\Lambda}_{|\mathbf{1}\rangle}$

3. parasymmetry: $(|\mathbf{0}\rangle + |\mathbf{1}\rangle)$, or $(\mathring{\Lambda}_{|\mathbf{0}\rangle} + \mathring{\Lambda}_{|\mathbf{1}\rangle})$, or $\mathring{\Lambda}_{|\infty\rangle}$, and finally

4. suprasymmetry: $|\mathbf{0}\rangle \circledast |\mathbf{1}\rangle \circledast \boldsymbol{(|0\rangle + |1\rangle)}$, or $\mathring{\Lambda}_{|\mathbf{0}\rangle} \circledast \mathring{\Lambda}_{|\mathbf{1}\rangle} \circledast (\mathring{\Lambda}_{|\mathbf{0}\rangle} + \mathring{\Lambda}_{|\mathbf{1}\rangle})$, or $\mathring{\Lambda}_{|\mathbf{01}\infty\rangle}$

Where the four symmetries are *folded together as one entity*, called the stargate $\mathring{\Lambda}$, and the wheel $\circledast$ is called the stargate oscillator.

2.2 The Inner Workings of Singularities

So how does a singularity, $\mathring{\Lambda}$ work? How does the wheel $\circledast$ fold symmetries and singularities? We illustrate as follows. First, there is a hierarchy of symmetries but it is not to be thought of in terms of "controlling". It is to be thought of as *emergence*, and has the following evolution and descendants: $\mathring{\Lambda} \lightning (|\mathbf{0}\rangle \circledast |\mathbf{1}\rangle \circledast |\infty\rangle) \lightning |\infty\rangle \lightning (|\mathbf{1}\rangle$ and $|\mathbf{0}\rangle)$. The events $|\mathbf{1}\rangle$ and $|\mathbf{0}\rangle$ is what we believe to be the "real world in which we observe life and celestials cosmologies exists". The epoch of symmetry is that of non-relativistic time and mass, at the scale of the cosmos where the wavelength of the fabric of spacetime is longer so that we observe $|\mathbf{0}\rangle$ and $|\mathbf{1}\rangle$ as separable aspects of our reality.

This real world also has a *quantum mechanical* explanation, in terms of entanglement and duality of $|\mathbf{0}\rangle$ and $|\mathbf{1}\rangle$, or that $|\mathbf{0}\rangle$ can not be described independently from $|\mathbf{1}\rangle$ and vice versa; in other words, they become *inseparable, or indistinguishable as a separate identity.* The coming into existence the of quantum world, is dependent on another kind of symmetry: the symmetry of black holes. This is the epoch of $\mathring{\Lambda}_{|\mathbf{01}\infty\rangle}$, called suprasymmetry. Suprasymmetry occurs when gravitational forces are so immense, or the fabric of spacetime so warped and entangled, that $\mathring{\Lambda}_{|\mathbf{0}\rangle} \circledast \mathring{\Lambda}_{|\mathbf{1}\rangle} \circledast (\mathring{\Lambda}_{|\mathbf{0}\rangle} + \mathring{\Lambda}_{|\mathbf{1}\rangle})$ are folded into one at the epoch of one Planck length and time. This is also at the Planck density, which is $5.1550 \times 10^{96} kg/m^3$ [8]. Is this the realm of *quantum gravity?* [9], we don't know for sure if there is true and reflects the force of suprasymmetry $\mathring{\Lambda}_{|\mathbf{G_{sup}}\rangle}$, with $|\mathbf{G_{sup}}\rangle$ representing the *gravitational* *force* at the Planck moment. Amazing as this suprasymmetric force seems, it pales in comparison to that experienced at wavelengths of spacetime much shorter than Planck.

This is when the singularity $\mathring{\Lambda}$ appears and the wheel starts to $\circledast$ turn and weave: we shall define this moment as the *moment of one singularity*, or symmetric, and it specifies "the unit moment spacetime". Imagine this as the shortest moment possible, "a thought moment". At this epoch, we expect the fundamental forces of Nature to become entangled and unified into a singularity $|\mathring{\Lambda}_{\boldsymbol{F}}\rangle$. The fundamental forces of nature [10], which are (1) the *weak nuclear force*, denoted $\mathring{\Lambda}_{\mathbf{w}}$, responsible for *particle decay* i.e., one particle literally decays into a new particle altogether, (2) the *electromagnetic force*, $\mathring{\Lambda}_{\mathbf{em}}$, consisting of both *electric* and *magnetic* forces, and is the force acting between charges, and then there (3) the *strong nuclear force*, $\mathring{\Lambda}_{\mathbf{s}}$,the force that binds matter together, and finally to (4) *gravity*, $\mathring{\Lambda}_{\mathbf{G}}$, the force acting between celestial bodies that have mass and energy.

At the epoch of the singularity, at one spacetime unit, at one thought moment, the fundamental forces of nature become entangled: $\mathring{\Lambda}_{\boldsymbol{F}} = \mathring{\Lambda}_{\mathbf{w}} \circledast \mathring{\Lambda}_{\mathbf{em}} \circledast \mathring{\Lambda}_{\mathbf{s}} \circledast \mathring{\Lambda}_{\mathbf{G}}$. Could the force $\mathring{\Lambda}_{\boldsymbol{F}}$ of unification be purely gravitational? Possibly, but we much prefer to think that it is much more *supramundane, perhaps even mystical*, since we conjecture that it must account for the energy involved in the entanglement of all languages with sinbits or with physical reality. Gravity has a central role, but we think that gravity operates from the emergence of suprasymmetry, or at the Planck moment onwards, up to and including the moment of black hole creation, and throughout the cosmos. Is this the moment that gravity equals all the other forces? Likely, even so, gravity can not be the force responsible for the unification of singularity of mind with the singularity of the physical world, this is beyond gravity. So we reason that this force $\mathring{\Lambda}_{\boldsymbol{F}}$ must be mystical since, we shall claim, it can manifest thoughts into physical reality and of physical reality back into thoughts, so we do not believe that gravity could do that. In any case, what wanted to do is use this very moment of the entanglement of the spacetime fabric to keep track of the passage of time (correctly, spacetime). That is, one "tick" of our computer clock is equivalent to one spacetime unit. As side remark, since the spacetime wavelength of the singularity, $\mathring{\Lambda}$, is so much shorter than Planck spacetime, there should exist uncountably many singularities within one Planck dimension. Within such short "distances", literally "one thought moment", with no other kind of phenomena in existence that can be is any shorter than when length and time becomes indistinguishable. When this happens, then shazam $\lightning$, a cosmic lightning bolt is created from the coming into being and entanglement of singularities. We also want to point out that $\mathring{\Lambda}_{\boldsymbol{F}}$ is the force that turns the wheel $\circledast$, from which emerges all of reality.

The previous narratives describes singularities from the direction of its emergence from reality, that is, the *emergence of singularity from reality and the unfolding* $\circledast$ *of singularity into symmetry* in the direction from $\mathring{\Lambda}$ into $(|\mathbf{0}\rangle + |\mathbf{1}\rangle)$. That is, the wheel $\circledast$ turns from reality to singularity, from singularity to symmetries, and finally, to our classical world of Newtonian-Einstein physics. The reverse narrative goes as follows: the real world cosmos region in space $(|\mathbf{0}\rangle + |\mathbf{1}\rangle)$ becomes warped due to gravitational forces, folded or contracted into a densely packed universe of spacetime. Here, at the Planck era, classical spacetime is folded into black holes, from the warping of $|\infty\rangle$ spacetime fabric to $\mathring{\Lambda}_{|\mathbf{01}\infty\rangle}$ suprasymmetric warping. Finally, when all the fundamental forces of nature unify, at one singularity spacetime moment, a singularity $\mathring{\Lambda}$ is created.

2.3 Computation

This section follows the concepts in [1] but rephrases languages and computing machines in terms of singularities.

2.3.1 Singularity Computing Machines

These machines has a *finite state control*, or a *finite program*, that controls a scanning head (that can read or write) moving along an infinite tape (memory). Each memory cell (the tape squares) can store at most one symbol from a finite alphabet Γ that includes the blank symbol $\Box$. The scanning head of a Turing machine is a device that could scan (reading and writing) any symbol and strings onto and from the infinite tape. In scanning, the head must also record without error, the exact copy of what it had seen or observed, and likewise for writing or storing data.

Definition 2.2. The *scanning head* of a Singularity Computing Machine is defined as the singularity,

$$\mathring{\Lambda}_{\nabla} \tag{24}$$

So we make the read/write head from a highly energetic and luminous singularity - this is the natural choice for a scanning head since it has a light that *will illuminate when the computer is switched to the "on" state.*

Definition 2.3. The *oscillatory folding* of two stargates creates another stargate,

$$\mathring{\Lambda}_{\nabla} \circledast \mathring{\Lambda}_{\Delta} = \mathring{\Lambda} \tag{25}$$

The stargates $\mathring{\Lambda}$ are folded by the wheel or stargate oscillator $\circledast$, and this oscillation is the folding and unfolding of the four symmetries, as well as the emergence and warping of symmetries. Since the singularities are highly energetic, the oscillatory folding and unfolding of singularities must also produce oscillations of *cosmic light as well as cosmic sound*.

The singularity machine is given an input alphabet $\mathring{\Lambda}_{\Sigma} \subseteq \mathring{\Lambda}_{\Gamma}$ that does not include the blank symbol $\mathring{\Lambda}_{\square}$. Initially, symbols $\omega \in \mathring{\Lambda}_{\Sigma}$ are written into the machine's memory and all other memory cells holding the $\mathring{\Lambda}_{\square}$ blank symbol. We will represent the machine's memory as a sinbit $\mathring{\Lambda}_{\Delta}$. The head is scanning the left-most symbol of the input string and computer has an start state q_0. The singularity computer will read the input symbols s, one at a time, and at each time step, its program $\mathring{\Lambda}_{\delta}$ changes the state of computer $q \in \mathring{\Lambda}_{Q}$ of possible states to a new state $\acute{q}$. The program $\mathring{\Lambda}_{\delta}$ will also instruct the head $\mathring{\Lambda}_{\Delta}$ to write a symbol onto the scanned square, and then move to the left or right one square. The program of the singularity computer has this form,

Definition 2.4. A singularity program that controls the states of a singularity computer,

$$\mathring{\Lambda}_{\delta} : (\mathring{\Lambda}_{\mathbf{Q}} - \mathring{\Lambda}_{\langle reject|accept\rangle}) \circledast \mathring{\Lambda}_{\Gamma} \rightarrow \mathring{\Lambda}_{\mathbf{Q}} \circledast \mathring{\Lambda}_{\Gamma} \circledast \mathring{\Lambda}_{\nabla\langle -1|1\rangle}$$

The meaning of the equation is that, if the computer is in state q with the head $\mathring{\Lambda}_{\nabla}$ scanning the symbol s, then $\acute{q}$ is the new state, $\acute{s}$ the symbol written to memory, and the scanning head may move left $\mathring{\Lambda}_{\nabla\langle -1|\rangle}$ or right $\mathring{\Lambda}_{\nabla\langle|1\rangle}$. The computer records all of the symbols and actions that it makes in memory as *configurations*: a string xqy means that the computer is in state q with xy in memory and the scanning head is reading the leftmost symbol of y. The computer can perform three basic operations: (1) read the symbol in memory, (2) edit the symbol by writing a new symbol or erasing it, and (3) move the scanning head left or right one memory cell so that the computer can continue to read and edit the symbols.

2.3.2 Configurations

Each step in the computation has a corresponding configuration C. Suppose that $C \xrightarrow{\mathring{\Lambda}_\delta} \acute{C}$ are such transition between the computer's configurations. If $C = xqsy$ and the transform is $\mathring{\Lambda}_\delta(q, s) = (\acute{q},\ \acute{s},\ \mathring{\Lambda}_{\nabla\langle -1|1\rangle})$, then one of the following can happen at the next step: (1) The computer moves right and scans another symbols (y is not empty),

$$\acute{C} = x\acute{s}\acute{q}y\mathring{\Lambda}_{\nabla\langle|1\rangle} \tag{26}$$

(2) The computer moves right but there are no more symbols to scan (y is empty),

$$\acute{C} = x\acute{s}\acute{q}\mathring{\Lambda}_{\Box}\mathring{\Lambda}_{\nabla\langle|1\rangle} \tag{27}$$

(3) The computer moves left, writes $x = \acute{x}a$ for some $a \in \mathring{\Lambda}_\Gamma$ and scans the right-most symbol a of x,

$$\acute{C} = \acute{x}\acute{q}a\acute{s}\mathring{\Lambda}_{\nabla\langle -1|\rangle} \tag{28}$$

(4) The Turing computer moves left and writes a blank because x is empty,

$$\acute{C} = \acute{q}\mathring{\Lambda}_{\nabla\langle -1|\rangle}\mathring{\Lambda}_{\Box}\acute{s}y \tag{29}$$

The computer stops with a *halting* configuration xqy if q happens to be in the accepting state $\mathring{\Lambda}_{q|accept\rangle}$. Given an initial configuration $C_0 = q_0\omega$ (or $C_0 = q_0\mathring{\Lambda}_{\Box}$ if ω is empty), the computer *computes* an input string $\omega \in \mathring{\Lambda}_{\Sigma}*$ if there is a unique sequence of configurations $C_0, C_1, ...$ and the configuration progresses $C_i \xrightarrow{\mathring{\Lambda}_\delta} C_{i+1}$ for each i and the computer *is computing* in C_{i+1}. The computer *accepts* ω *iff* the computation is finite and the final configuration contains the state q_{accept}. The number of computation steps is one less than the number of configurations. The computer rejects with q_{reject} in its state. For example, it can reject in the case of an infinite configuration (when the computer does not halt). When this occurs, the computer is instructed to reject and halt.

3 Polynomial Complexity

Suppose that the computing machine was given an input string $\mathring{\Lambda}_{\boldsymbol{\Sigma}}$.

$$\mathring{\Lambda}_{\omega\in\boldsymbol{\Sigma}} \longrightarrow \boxed{\mathring{\Lambda}_{\mathbf{M}}(\mathring{\Lambda}_{\omega\in\boldsymbol{\Sigma}^*})} \longrightarrow \mathring{\Lambda}_{\langle\mathbf{Z}|\boldsymbol{\Psi}\rangle}$$

If $\mathring{\Lambda}_{\langle\mathbf{Z}|\boldsymbol{\Psi}\rangle}$ has $\mathring{\Lambda}_{\langle reject|accept\rangle}$ in the final configuration, and the computation $\mathring{\Lambda}_{\mathbf{M}}(\mathring{\Lambda}_{\omega\in\boldsymbol{\Sigma}^*})$ is finite, then $\mathring{\Lambda}_{\mathbf{M}}$ *accepts* ω and the language accepted by $\mathring{\Lambda}_{\mathbf{M}}$ is given by,

> **Definition 3.1.** Language, $\mathring{\Lambda}_L$, *accepted* by $\mathring{\Lambda}_{\mathbf{M}}$
>
> $$\mathring{\Lambda}_{\mathbf{M}}(\mathring{\Lambda}_L) = \{\mathring{\Lambda}_{\omega\in\boldsymbol{\Sigma}^*}|\mathring{\Lambda}_{\mathbf{M}\langle|accept\rangle}\}$$

Let $T_{\mathbf{M}}(\mathring{\Lambda}_\omega)$ denote the number of steps in the computation of $\mathring{\Lambda}_{\mathbf{M}}$ on input $\mathring{\Lambda}_\omega$. If the machine never halts, then $t_{\mathbf{M}}(\mathring{\Lambda}_\omega) = \infty$. For $n \in \mathbb{N}$, let $T_{\mathbf{M}}(n)$ denote the *worst case run time of* $\mathring{\Lambda}_{\mathbf{M}}(\mathring{\Lambda}_\omega \in \mathring{\Lambda}_{\Sigma^n})$. Then,

> **Definition 3.2.** The *worst case runtime of* $\mathring{\Lambda}_{\mathbf{M}}$ is defined by:
>
> $$T_{\mathbf{M}}(n) = max\ \{\ t_{\mathbf{M}}(\mathring{\Lambda}_\omega)\ |\ \mathring{\Lambda}_{\omega\in\boldsymbol{\Sigma}^{\mathbf{n}}}\mathring{\Lambda}_{\mathbf{M}\langle reject|accept\rangle}\}$$
>
> Where the superposition is the set of all strings $\mathring{\Lambda}_{\Sigma^n}$ over $\mathring{\Lambda}_\Sigma$ of *length* n.

The machine will compute (with finite and accepting states) in *polynomial time* if there exist a k such that for all n, the worst case runtime $T_{\mathbf{M}}(n) \leq n^k + k$. Then, the *class* $\mathbf{P}$ of languages,

> **Definition 3.3.** The class $\mathbf{P}$ are languages accepted by $\mathring{\Lambda}_M$ such that,
>
> $$\mathbf{P} = \{\mathring{\Lambda}_L \mid \mathring{\Lambda}_M(\mathring{\Lambda}_L)\}$$
>
> for a machine that runs its computation in polynomial time $\mathring{\Lambda}_M(n)$ with $\mathring{\Lambda}_{\omega\in\boldsymbol{\Sigma}^{\mathbf{n}}}\mathring{\Lambda}_{M_{q\langle|accept\rangle}}$ in its configuration.

Suppose that the machine is computing given some $\mathring{\Lambda}_\Sigma$, that is, $\mathring{\Lambda}_L \in \mathbf{P}$. Then the machine must have the following sinbits in its configuration at the $(i+1)$ computation (it is computing),

$$\mathbf{C}^{i+1}\!:\ \mathring{\Lambda}^{i+1}_{\mathbf{X}}\ \mathring{\Lambda}^{i+1}_{\acute{\mathbf{S}}}\ \mathring{\Lambda}^{i+1}_{\acute{\mathbf{q}}}\ \mathring{\Lambda}^{i+1}_{\mathbf{Y}}\mathring{\Lambda}_{\nabla}(\mathring{\Lambda}_{\mathbf{Y}_i})^{i+1}\ \mathring{\Lambda}^{i+1}_{\nabla\langle-\mathbf{1}|\mathbf{1}\rangle}\mathring{\Lambda}^{i+1}_{\boldsymbol{\Sigma}}\mathring{\Lambda}^{i+1}_{\mathbf{Q}}\mathring{\Lambda}^{i+1}_{\boldsymbol{\Gamma}}\mathring{\Lambda}^{i+1}_{\mathbf{T}}$$

What we want is to select the configuration that happens to have the worst possible runtime $T_M(n)$. Let's suppose that the worst case runtime happens to be when the machine is computing in $(i+1)$. We know that the configurations must be polynomial in the *size* of the input, which means that the magnitude of its configuration, $|\mathbf{C}|^{i+1}$, must be polynomial, or must be in $\mathbf{P}$. Then the size of the configuration must be equal to the size of the language accepted by $\mathring{\Lambda}_{\mathbf{M}}$: the configurations and language accepted by $\mathring{\Lambda}_{\mathbf{M}}$ computing in $(i+1)$ is therefore:

$$\Sigma\mathbf{C}^{i+1} = \Sigma\mathring{\Lambda}_M(\mathring{\Lambda}_L)$$

Since the length of time must be polynomial with the worst runtime $T_{\mathbf{M}}(n) \leq n^k + k$, the clock sinbit of $\mathring{\Lambda}_{\mathbf{M}}$, $\mathring{\Lambda}_{\mathbf{T}}^{i+1}$ must have recorded the same time: $\Sigma\mathring{\Lambda}_{\mathbf{T}(n)}^{i+1} \leq n^k + k$. That means that every sinbit must also be $\Sigma\mathring{\Lambda}_{\Psi}(n)^{i+1} \leq n^k + k$. Now what is needed are polynomials of singularities.

3.1 Polynomial Singularity

An ordinary n-th degree polynomial in x is of the form,

$$a_n x^n + a_{n-1}x^{n-1} + a_{n-2}x^{n-2} + \cdots + a_1 x + a_0 \tag{30}$$

We would like singularities to be written in this manner, permitting also *complex coefficients*. To do this, we replace the *infinitesimal indivisible point at the limit* with the singularity as the fundamental thread of the *continuum, everywhere continuous*. Now we can simply write, for an x-symbol singularity,

Definition 3.4. An n-th degree polynomial singularity *in x* is given by,

$$a_n\mathring{\Lambda}_x^n + a_{n-1}\mathring{\Lambda}_x^{n-1} + a_{n-2}\mathring{\Lambda}_x^{n-2} + \cdots + a_1\mathring{\Lambda}_x + a_0 \tag{31}$$

To see if runtime is polynomial we read the history of configurations. The machine clock time must show that $\Sigma\mathring{\Lambda}_{\mathbf{T}(n)}^{i+1} \leq n^k + k$. Then let, machine clock time be,

$$\mathring{\Lambda}_{\mathbf{T}}(n) = a_n\mathring{\Lambda}_\tau^n + a_{n-1}\mathring{\Lambda}_\tau^{n-1} + a_{n-2}\mathring{\Lambda}_\tau^{n-2} + \cdots + a_1\mathring{\Lambda}_\tau + a_0 \tag{32}$$

The sinbits of the program are,

$$\mathring{\Lambda}_\delta : \mathring{\Lambda}_{\mathbf{Q}}^{i+1}, \mathring{\Lambda}_{\mathbf{\Gamma}}^{i+1}, \mathring{\Lambda}_{\nabla\langle -\mathbb{1}|\mathbb{1}\rangle}^{i+1} \tag{33}$$

And the computer program must also be polynomial, so,

$$\mathring{\Lambda}_{\delta}(n) = a_n\mathring{\Lambda}_{\delta}^{n} + a_{n-1}\mathring{\Lambda}_{\delta}^{n-1} + a_{n-2}\mathring{\Lambda}_{\delta}^{n-2} + \cdots + a_1\mathring{\Lambda}_{\delta} + a_0 \tag{34}$$

We know that the machine tape (memory or storage) could be infinite, but the input and machine alphabets are restricted polynomial in size,

$$\mathring{\Lambda}_{\Theta} : \mathring{\Lambda}_{\mathbf{X}}^{i+1}, \mathring{\Lambda}_{\acute{\mathbf{S}}}^{i+1}, \mathring{\Lambda}_{\mathbf{Y}}^{i+1}\mathring{\Lambda}_{\nabla}(\mathring{\Lambda}_{\mathbf{Y}_i})^{i+1}, \mathring{\Lambda}_{\mathbf{\Sigma}}^{i+1} \tag{35}$$

Which means that the computer that accepts $\mathring{\Lambda}_{\mathbf{L}}$ has configuration,

$$\mathring{\Lambda}_{M}(\mathring{\Lambda}_{L}) : \mathring{\Lambda}_{\mathbf{T}}(n)^{i+1} \circledast \mathring{\Lambda}_{\delta}(n) \circledast \mathring{\Lambda}_{q_{|accept\rangle}}^{i+1} \circledast \mathring{\Lambda}_{\Theta}(n)^{i+1} \tag{36}$$

When the singularity computer computes a language $\mathring{\Lambda}_{M}(\mathring{\Lambda}_{L})$ on some given input $\mathring{\Lambda}_{\omega}$, the clocks starts $\mathring{\Lambda}_{\mathbf{T}}(n)$ as soon as the program runs $\mathring{\Lambda}_{\delta}(n) \circledast \mathring{\Lambda}_{q_{\langle reject|accept\rangle}}$ for which it reads or writes data $\mathring{\Lambda}_{\Theta}(n)$. The worst case runtime as recorded in the history of computer's clock must be $\Sigma\mathring{\Lambda}_{\mathbf{T}(n)}^{i+1} \leq n^k + k$. Now, suppose that these have the polynomial representations,

1. $\mathring{\Lambda}_{\mathbf{T}}(n) = a_n\mathring{\Lambda}_{\tau}^{n} + a_{n-1}\mathring{\Lambda}_{\tau}^{n-1} + a_{n-2}\mathring{\Lambda}_{\tau}^{n-2} + \cdots + a_1\mathring{\Lambda}_{\tau} + a_0$
2. $\mathring{\Lambda}_{\delta}(n) = b_n\mathring{\Lambda}_{\delta}^{n} + b_{n-1}\mathring{\Lambda}_{\delta}^{n-1} + b_{n-2}\mathring{\Lambda}_{\delta}^{n-2} + \cdots + b_1\mathring{\Lambda}_{\delta} + b_0$
3. $\mathring{\Lambda}_{\Theta}(n) = c_n\mathring{\Lambda}_{\Theta}^{n} + c_{n-1}\mathring{\Lambda}_{\Theta}^{n-1} + c_{n-2}\mathring{\Lambda}_{\Theta}^{n-2} + \cdots + c_1\mathring{\Lambda}_{\Theta} + c_0$

That means that the *sizes* of the circuits that computes and accepts must be the sums of all the singularity polynomials,

$$\begin{aligned} \mathring{\Lambda}_{M}(\mathring{\Lambda}_{L}) : \Sigma([a_n\mathring{\Lambda}_{\tau}^{n} + \cdots + a_0]^{i+1} \\ \circledast[b_n\mathring{\Lambda}_{\delta}^{n}(n) + \cdots b_0]^{i+1} \circledast [c_n\mathring{\Lambda}_{\Theta}^{n}(n) + \cdots + c_0]^{i+1}) \end{aligned}$$

Since the singularity continuum is *continuous everywhere*, we can integrate,

$$\begin{aligned} &\int([a_n\mathring{\Lambda}_{\tau}^{n} + \cdots + a_0]^{i+1} \circledast [b_n\mathring{\Lambda}_{\delta}^{n}(n) + \cdots b_0]^{i+1} \circledast [c_n\mathring{\Lambda}_{\Theta}^{n}(n) + \cdots + c_0]^{i+1})\, d\mathring{\Lambda} \\ &= \int[a_n\mathring{\Lambda}_{\tau}^{n} + \cdots + a_0]^{i+1}\, d\mathring{\Lambda} \circledast \int[b_n\mathring{\Lambda}_{\delta}^{n}(n) + \cdots b_0]^{i+1}\, d\mathring{\Lambda} \circledast \int[c_n\mathring{\Lambda}_{\Theta}^{n}(n)\, d\mathring{\Lambda} + \cdots + c_0]^{i+1}\, d\mathring{\Lambda} \\ &= [\int a_n\mathring{\Lambda}_{\tau}^{n}\, d\mathring{\Lambda} + \cdots + \int a_0\, d\mathring{\Lambda}]^{i+1} \circledast [\int b_n\mathring{\Lambda}_{\delta}^{n}(n)\, d\mathring{\Lambda} + \cdots \int b_0\, d\mathring{\Lambda}]^{i+1} \\ &\circledast[\int c_n\mathring{\Lambda}_{\Theta}^{n}(n)\, d\mathring{\Lambda} + \cdots + \int c_0\, d\mathring{\Lambda}]^{i+1} \end{aligned}$$

Evaluate the integral,

$$\int a_n \mathring{\Lambda}_\tau^n \, d\mathring{\Lambda} + \cdots + \int a_0 \, d\mathring{\Lambda} = \frac{a_n}{n+1} \mathring{\Lambda}_\tau^{n+1} + \cdots + a_0 \mathring{\Lambda}_\tau + K \tag{37}$$

So that,

$$\left(\frac{a_n}{n+1} \mathring{\Lambda}_\tau^{n+1} + \cdots + b_0 \mathring{\Lambda}_\tau + K \right) \circledast \left(\frac{b_n}{n+1} \mathring{\Lambda}_\delta^{n+1} + \cdots + b_0 \mathring{\Lambda}_\delta + K \right) \tag{38}$$

$$\circledast \left(\frac{c_n}{n+1} \mathring{\Lambda}_\Theta^{n+1} + \cdots + c_0 \mathring{\Lambda}_\Theta + K \right) \tag{39}$$

This is again some kind of singularity polynomial, so we can write the stargate oscillations as follows,

$$\phi_r \mathring{\Lambda}^r_{\tau \circledast \delta \circledast \Theta} + \phi_{r-1} \mathring{\Lambda}^{r-1}_{\tau \circledast \delta \circledast \Theta} + \cdots + \phi_1 \mathring{\Lambda}_{\tau \circledast \delta \circledast \Theta} + \phi_0 \tag{40}$$

Where the subscripts $\tau \circledast \delta \circledast \Theta$ indicates the stargate oscillations of time, program and languages singularities, or sinbits, $\mathring{\Lambda}_\tau \circledast \mathring{\Lambda}_\delta \circledast \mathring{\Lambda}_\Theta$, so that this is again polynomials of singularities. Now redefine the class **P** of languages accepted by $\mathring{\Lambda}_M$ can be defined in terms of polynomial of singularities,

Definition 3.5. The class of languages **P** accepted by a singularity computer in polynomial time is given by,

$$\mathring{\Lambda}_\zeta(\mathring{\Lambda}_L) = \phi_r \mathring{\Lambda}^r_{\tau \circledast \delta \circledast \Theta} + \phi_{r-1} \mathring{\Lambda}^{r-1}_{\tau \circledast \delta \circledast \Theta} + \cdots + \phi_1 \mathring{\Lambda}_{\tau \circledast \delta \circledast \Theta} + \phi_0 \tag{41}$$

With $\mathring{\Lambda}_{q_{|accept\rangle}}$ in its state and $\Sigma \mathring{\Lambda}^{i+1}_{\mathbf{T}(r)} \leq r^k + k$. These computing machines are also called polynomial-time solvers.

3.1.1 Deciders

A decision problem is a question in which the answer is a *yes or no* and deciders are an algorithms that will return a *yes or no* answer to whether or not a problem is solvable. We know that, if a problem is solvable in polynomial time, then it must also be decidable in polynomial time. Therefore, we can define deciders as follows,

Definition 3.6. Deciders are equivalent to polytime solvers, therefore,

$$\mathring{\Lambda}_{\varrho}(\mathring{\Lambda}_L) = \phi_r \mathring{\Lambda}^r_{\tau \circledast \delta \circledast \Theta} + \phi_{r-1} \mathring{\Lambda}^{r-1}_{\tau \circledast \delta \circledast \Theta} + \cdots + \phi_1 \mathring{\Lambda}_{\tau \circledast \delta \circledast \Theta} + \phi_0 \tag{42}$$

With $\mathring{\Lambda}_{q_{|yes\rangle}}$ in its state and $\Sigma \mathring{\Lambda}^{i+1}_{\mathbf{T}(r)} \leq r^k + k$. These computing machines are also called polynomial-time deciders.

3.1.2 Cosmic Light and Sound

Recall that the cosmic light and sound are created by the oscillation of singularities,

$$\mathring{\Lambda}_{\nabla} \circledast \mathring{\Lambda}_{\Delta} = \mathring{\Lambda} \tag{43}$$

That means that $\phi_r \mathring{\Lambda}^r_{\tau \circledast \delta \circledast \Theta} + \phi_{r-1} \mathring{\Lambda}^{r-1}_{\tau \circledast \delta \circledast \Theta} + \cdots + \phi_1 \mathring{\Lambda}_{\tau \circledast \delta \circledast \Theta} + \phi_0$ must create cosmic light and cosmic sound,

$$\phi_r \mathring{\Lambda}^r_{\tau \circledast \delta \circledast \Theta} + \phi_{r-1} \mathring{\Lambda}^{r-1}_{\tau \circledast \delta \circledast \Theta} + \cdots + \phi_1 \mathring{\Lambda}_{\tau \circledast \delta \circledast \Theta} + \phi_0 = \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} \tag{44}$$

$$\mathring{\Lambda}_{\tau} \circledast \mathring{\Lambda}_{\delta} \circledast \mathring{\Lambda}_{\Theta} = \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} \tag{45}$$

Now define cosmic light as follows,

Definition 3.7. Cosmic light is defined as the following oscillating folding and unfolding of a singularity:

1. symmetry: light
2. antisymmetry: anti-light, no-light, or dark
3. parasymmetry: $|\text{light}\rangle + |\text{anti-light}\rangle$
4. suprasymmetry: anti-light $\circledast$ light $\circledast$ $(|\text{light}\rangle + |\text{anti-light}\rangle)$

Similarly, we can define cosmic sound as follows,

Definition 3.8. Cosmic sound is defined as the following oscillating folding and unfolding of a singularity:

1. symmetry: soundlessness
2. antisymmetry: sound
3. parasymmetry: $|\text{sound}\rangle + |\text{soundlessness}\rangle$
4. suprasymmetry: soundlessness $\circledast$ sound $\circledast$ $(|\text{sound}\rangle + |\text{soundlessness}\rangle)$

The configuration of the computing machine for all languages accept by $\mathring{\Lambda}_M$, is $\mathring{\Lambda}_\tau \circledast \mathring{\Lambda}_\delta \circledast \mathring{\Lambda}_\Theta$. This is the polynomial $\phi_r \mathring{\Lambda}^r_{\tau\circledast\delta\circledast\Theta} + \phi_{r-1}\mathring{\Lambda}^{r-1}_{\tau\circledast\delta\circledast\Theta} + \cdots + \phi_1 \mathring{\Lambda}_{\tau\circledast\delta\circledast\Theta} + \phi_0$. In other words, the machine configuration is equivalent to **folding** of two cosmic stargates $\mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound}$.

3.1.3 Folding of Cosmic Stargates

The term **folding** is intended to encapsulate both *folding and unfolding of stargates in the oscillatory sense*, going through a process of creation and annihilation. The folding of two stargates is the folding of two kinds of polynomials of singularities, and these have the polynomial time computing machine configuration,

$$\mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} = \mathring{\Lambda}_\nabla \tag{46}$$

$$= \mathring{\Lambda}_\tau \circledast \mathring{\Lambda}_\delta \circledast \mathring{\Lambda}_\Theta \tag{47}$$

Definition 3.9. Let cosmic light be defined by folding of the the following stargates,

$$\mathring{\Lambda}_{Light} = \mathring{\Lambda}_{\mathbf{E}} \circledast \mathring{\Lambda}_{\mathbf{\Psi}} \tag{48}$$

$$= \mathring{\Lambda}_{\hat{\mathbf{H}}} \circledast \mathring{\Lambda}_{\mathbf{\Psi}} \tag{49}$$

With $\mathring{\Lambda}_{\hat{\mathbf{H}}}$ called the Hamiltonian, $\mathring{\Lambda}_{\mathbf{\Psi}}$ the wave function for cosmic light singularity, and the energy of folding is $\mathring{\Lambda}_{\mathbf{E}}$.

For cosmic sound, it is,

Definition 3.10. Let cosmic sound be defined by folding of the the following stargates,

$$\mathring{\Lambda}_{Sound} = \mathring{\Lambda}_{\mathbf{E}} \circledast \mathring{\Lambda}_{\mathbf{\Omega}} \tag{50}$$

$$= \mathring{\Lambda}_{\hat{\mathbf{H}}} \circledast \mathring{\Lambda}_{\mathbf{\Omega}} \tag{51}$$

With $\mathring{\Lambda}_{\hat{\mathbf{H}}}$ called the Hamiltonian, $\mathring{\Lambda}_{\mathbf{\Omega}}$ the wave function for cosmic sound. singularity, and the energy of folding is $\mathring{\Lambda}_{\mathbf{E}}$.

The *Greek* letter *omega* is used here to symbolise "om", the sound at the creation of the universe. Then,

Theorem 1 (Conservation Symmetry)**.** *The total energy of the folding of symmetries is conserved,*

$$\mathring{\Lambda}_{\tau} \circledast \mathring{\Lambda}_{\delta} \circledast \mathring{\Lambda}_{\Theta} + \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} = \mathbf{0} \tag{52}$$

The sum of the folding of the computing sinbits $\mathring{\Lambda}_{\tau} \circledast \mathring{\Lambda}_{\delta} \circledast \mathring{\Lambda}_{\Theta}$ and the sum of their physical realisation of cosmic light and cosmic sound is $\mathbf{0}$.

In other words, "what is computed is manifested as the entanglement of sinbits, whose entangled *counterpairs* are cosmic light and cosmic sound." The computing machine head is a highly energetic singularity, and in the on start state, it lights up to read and/or write symbols onto the machine memory (which are also singularities). Thus, when the head lights up to perform a read from memory, it should completely illuminate what is stored in memory so that the information contained in the language in memory can be transferred to the scanning head without loss. Likewise, the transfer of information contained in the sinbit of the head to the program sinbit must also occur without loss.

Finally, the computation of the language accepted by the computer is seen as the folding of cosmic light and sound, in other words, cosmic light and sound must be computable. Moreover, the proof of the languages accepted by the singularity computer must also be found in the cosmic light and sound generated from the folding of symmetries or stargates. These proofs must be contained in the spectra of the cosmic light and sound and intuitively, the computation should be both seen and heard.

4 Nondeterministic Polynomial Time

The class **NP** stands for *nondeterministic polynomial* time and concerns problems that can be *verified* in polynomial time. However, just because the problem can be verified in polynomial time does not mean that computing it actually takes polynomial time. Instead, the steps that an **NP** solver takes to compute may be *exponential* in the size of the input. The term nondeterministic referenced an earlier time when **NP** was defined in terms of *Nondeterministic Turing Machines* that decides some language $\mathring{\Lambda}_L$ in polynomial time. We will approach **NP** from the vista of polynomial time verifiers and **NP**-solvers that may take an exponential number of steps in the sizes of the input to compute.

Nondeterministic polynomial time computing machines are defined in terms of its verifier - it has a *state transition* program called a *binary relation checker*. We denote this checker with the sinbit $\mathring{\Lambda}_\vartheta$ and the verifier $\mathring{\Lambda}_{\mathbf{V}}$. For some finite alphabets $\mathring{\Lambda}_{\Sigma^*}$ and $\mathring{\Lambda}_{\Sigma_1^*}$, define the checker as:

$$\mathring{\Lambda}_{\mathbf{V}}(\mathring{\Lambda}_\vartheta) \subseteq \mathring{\Lambda}_{\Sigma^*} \circledast \mathring{\Lambda}_{\Sigma_1^*}$$

For each checking relation, $\mathring{\Lambda}_{\mathbf{V}}(\mathring{\Lambda}_\vartheta)$, there is an associated language $\mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{V}}(\mathring{\Lambda}_\vartheta))$ over $\mathring{\Lambda}_\Sigma \cup \mathring{\Lambda}_{\Sigma_1} \cup \mathring{\Lambda}_\natural$, with the $\mathring{\Lambda}_\natural \notin \mathring{\Lambda}_\Sigma$, and define

$$\mathring{\Lambda}_{\mathbf{L}} = \{\mathring{\Lambda}_w \circledast \mathring{\Lambda}_\natural \circledast \mathring{\Lambda}_y | \mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_y)\} \tag{53}$$

Then the checker $\mathring{\Lambda}_\rho$ is *polynomial time* if *iff* $\mathring{\Lambda}_{\mathbf{V}}(\mathring{\Lambda}_\vartheta) \in \mathbf{P}$.

Definition 4.1. Now define the class **NP** by requiring that a language $\mathring{\Lambda}_L$ over $\mathring{\Lambda}_\Sigma$, or $\mathring{\Lambda}_L(\mathring{\Lambda}_\Sigma) \in \mathbf{NP}$, $\mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})$, *iff* there is a $k \in \mathbb{N}$ and a polynomial-time checker $\mathring{\Lambda}_\vartheta$, such that for all $\mathring{\Lambda}_w \in \mathring{\Lambda}_\Sigma*$

$$\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}}) \iff \exists \mathring{\Lambda}_\rho \left((|\mathring{\Lambda}_\rho| \leq |\mathring{\Lambda}_w|^k), \mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)\right) \tag{54}$$

where $|\mathring{\Lambda}_w|$ and $|\mathring{\Lambda}_y|$ are the lengths of $\mathring{\Lambda}_w$ and $\mathring{\Lambda}_\rho$.

We can see that a *polynomial time verifier* $\mathring{\Lambda}_{\mathbf{V}}(\mathring{\Lambda}_\vartheta)$, or more specifically the checker $\mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$, for $\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})$ is a machine that:

1. $\mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$ halts on all inputs.

2. $\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})$ *iff* $\exists\ \mathring{\Lambda}_\rho \in \mathring{\Lambda}_{\Sigma^*}$ and the checker $\mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$ accepts the proof $\mathring{\Lambda}_\rho$.

3. $\mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$ has runtime polynomial in $|\mathring{\Lambda}_w|$.

Therefore, if the **NP**-solver says that *yes* that $\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})$, then there must be a proof of this claim $\mathring{\Lambda}_\rho$ that can be checked in polynomial time, $\mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$. Suppose that there is a *solution* to show that $\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}$. Remember that $\mathring{\Lambda}_{\mathbf{L}}$ is in **NP**. Then, there must exist a *proof*, $\mathring{\Lambda}_\rho$, where the length of the proof is $|\mathring{\Lambda}_\rho| \leq |\mathring{\Lambda}_w|^k$ and the polynomial-time checker inspects the proof against the solution $\mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$. Note that the time of the verifier is measured only in terms of the length of $\mathring{\Lambda}_w$, so a polynomial time verifier runs in the length of $\mathring{\Lambda}_w$. The note $\mathring{\Lambda}_\natural$ is not part of the proof. If the **NP**-solver, $\mathring{\Lambda}_{\mathbf{NP}}(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$, says *yes*, then the checker $\mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$ *accepts* $\mathring{\Lambda}_{\mathbf{NP}}(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$ outputs 1; otherwise $\mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$ *rejects* and $\mathring{\Lambda}_{\mathbf{NP}}(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$ outputs a 0. Since,

$$\mathring{\Lambda}_{\mathbf{L}} = \{\mathring{\Lambda}_w \circledast \mathring{\Lambda}_\natural \circledast \mathring{\Lambda}_\rho | \mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)\} \tag{55}$$

Then a *nondeterministic polynomial time* computer is a machine with two distinct sinbit circuits:

$$\mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}}) = (\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}}) \circledast \mathring{\Lambda}_\rho) + \mathring{\Lambda}_\vartheta(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho) \tag{56}$$

We drop $\mathring{\Lambda}_\natural$ since they are distinct sinbits and $(\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}}) \circledast \mathring{\Lambda}_\rho)$ is the **NP**-solver $\mathring{\Lambda}_{\mathbf{NP}}(\mathring{\Lambda}_w, \mathring{\Lambda}_\rho)$ that may take an exponential time to solve the problem. Let there be such a problem where the **NP**-*solver* has runtimes that are exponential $\mathscr{O}(2^n)$. Then, the **NP**-*solver* must have some method $\mathring{\Lambda}_\blacktriangledown$ that determines $\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})$. This special method is related to the early definition for non-deterministic computing machines i.e., that, unlike polynomial time deciders, non-deterministic had one extra move at any step in the computation. Another way to look at non-deterministic computing machines is to imagine a computing machine that could guess the correct answer every step in the computation. In this manner, we shall call $\mathring{\Lambda}_\blacktriangledown$ the lucky computer. The method of computation to show $\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})$ must create a proof $\mathring{\Lambda}_\rho$ that is polynomial for the verifier to have polynomial runtimes. That is,

$$\mathring{\Lambda}_\blacktriangledown(\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})) = \mathring{\Lambda}_\rho \tag{57}$$

So that,

$$\mathring{\Lambda}_{\blacktriangledown} \circledast (\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})) = \mathring{\Lambda}_\rho \tag{58}$$

The **NP**-*solver* must have the following configuration,

$$\mathring{\Lambda}_{\blacktriangledown}\ \mathbf{C}^{i+1}\colon\ \mathring{\Lambda}^{i+1}_{\mathbf{X}}\ \mathring{\Lambda}^{i+1}_{\acute{\mathbf{S}}}\ \mathring{\Lambda}^{i+1}_{\acute{\mathbf{q}}}\ \mathring{\Lambda}^{i+1}_{\mathbf{Y}} \mathring{\Lambda}_{\nabla}(\mathring{\Lambda}_{\mathbf{Y}_i})^{i+1} \mathring{\Lambda}^{i+1}_{\nabla\langle -\mathbf{1}|\mathbf{1}\rangle} \mathring{\Lambda}^{i+1}_{\mathbf{\Sigma}} \mathring{\Lambda}^{i+1}_{\mathbf{Q}} \mathring{\Lambda}^{i+1}_{\mathbf{\Gamma}} \mathring{\Lambda}^{i+1}_{\mathbf{T}}$$

This means that solver must have configuration similar to that of the polynomial deciders, but the time singularity has to be exponential and of the form:

$$\mathring{\Lambda}(\mathring{\Lambda}_x) = 2^{a_n \mathring{\Lambda}^n_x + a_{n-1}\mathring{\Lambda}^{n-1}_x + a_{n-2}\mathring{\Lambda}^{n-2}_x + \cdots + a_1 \mathring{\Lambda}_x + a_0} \tag{59}$$

With the computer's clock set to exponential time, we also have the following,

1. $\mathring{\Lambda}_T(n) = 2^{a_n \mathring{\Lambda}^n_x + a_{n-1}\mathring{\Lambda}^{n-1}_x + a_{n-2}\mathring{\Lambda}^{n-2}_x + \cdots + a_1 \mathring{\Lambda}_x + a_0}$
2. $\mathring{\Lambda}_\delta(n) = b_n \mathring{\Lambda}^n_\delta + b_{n-1}\mathring{\Lambda}^{n-1}_\delta + b_{n-2}\mathring{\Lambda}^{n-2}_\delta + \cdots + b_1 \mathring{\Lambda}_\delta + b_0$
3. $\mathring{\Lambda}_\Theta(n) = c_n \mathring{\Lambda}^n_\Theta + c_{n-1}\mathring{\Lambda}^{n-1}_\Theta + c_{n-2}\mathring{\Lambda}^{n-2}_\Theta + \cdots + c_1 \mathring{\Lambda}_\Theta + c_0$

Which means that there will one exponential time stargate $\mathring{\Lambda}_{\mathbf{T}}(n) = 2^{a_n \mathring{\Lambda}^n_x}$ folding with two singularity polynomials, namely, the machine program, $\mathring{\Lambda}_\delta(n)$, and the language $\mathring{\Lambda}_\Theta(n)$:

$$\mathring{\Lambda}_M(\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})) : \mathring{\Lambda}_{\mathbf{T}}(n)^{i+1} \circledast \mathring{\Lambda}_{\blacktriangledown}(n) \circledast \mathring{\Lambda}^{i+1}_{q\langle reject|accept\rangle} \circledast \mathring{\Lambda}_\Theta(n)^{i+1} \tag{60}$$

Then, the computation of the **NP**-verifier is,

$$\left(2^{a_n \mathring{\Lambda}^n_x}\right)^{i+1} \circledast \mathring{\Lambda}_{\blacktriangledown}(n)^{i+1} \circledast \mathring{\Lambda}^{i+1}_{q(|accept\rangle)} \circledast \mathring{\Lambda}_\Theta(n)^{i+1} \tag{61}$$

The method produces a proof that is polynomial $\mathring{\Lambda}_{\blacktriangledown}(n)^{i+1} \circledast \mathring{\Lambda}^{i+1}_{q\langle|accept\rangle} \circledast \mathring{\Lambda}_\Theta(n)^{i+1}$ $= \mathring{\Lambda}_\rho$. The verifier will recognise and accept the proof if the solver says that it is correct and the length of the proof is also polynomial,

$$2^{a_n \mathring{\Lambda}^n_x}{}^{i+1} \circledast \mathring{\Lambda}_{\blacktriangledown} \circledast (\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}}))^{i+1} = \mathring{\Lambda}_\rho \tag{62}$$

The stargate oscillation of an **NP**-*solver* $\mathring{\Lambda}_{\blacktriangledown}$ as it computes $\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}(\mathring{\Lambda}_{\mathbf{NP}})$ is, at worst, has exponential time $2^{a_n \mathring{\Lambda}_x^n}$. Therefore,

$$[2^{a_n \mathring{\Lambda}_x^n + \cdots + a_0}]^{i+1} \circledast a_n \mathring{\Lambda}_x^n + a_{n-1} \mathring{\Lambda}_x^{n-1} + a_{n-2} \mathring{\Lambda}_x^{n-2} + \cdots + a_1 \mathring{\Lambda}_x + a_0]^{i+1} = \tag{63}$$

$$\phi_r \mathring{\Lambda}^r_{\tau \circledast \blacktriangledown \circledast \mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}} + \phi_{r-1} \mathring{\Lambda}^{r-1}_{\tau \circledast \blacktriangledown \circledast \mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}} + \cdots + \phi_1 \mathring{\Lambda}_{\tau \circledast \blacktriangledown \circledast \mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}}} + \phi_0 \tag{64}$$

$$\mathring{\Lambda}_\delta : \mathring{\Lambda}_{\mathbb{Q}} - \mathring{\Lambda}_{\mathbf{q}} \circledast \mathring{\Lambda}_\Gamma \rightarrow \ \mathring{\Lambda}_{\mathbf{Q}} \circledast \mathring{\Lambda}_\Gamma \circledast \mathring{\Lambda}_{\nabla \langle -\mathbf{1} | \mathbf{1} \rangle} \tag{65}$$

$$\mathring{\Lambda}_{\mathbf{NP}}(\mathring{\Lambda}_L) : \mathring{\Lambda}_{\mathbf{T}}(n)^{i+1} \circledast \mathring{\Lambda}_{\blacktriangledown}(n) \circledast \mathring{\Lambda}^{i+1}_{q\langle | accept \rangle} \circledast \mathring{\Lambda}_\Theta(n)^{i+1} \tag{66}$$

Whatever lucky $\mathring{\Lambda}_{\blacktriangledown}$ computes, we know that it should be observable as the folding of cosmic light and sound. We also know that whatever lucky computes, it must run in polynomial time, and given that the $\mathring{\Lambda}_{q\langle | accept \rangle}$ and $\mathring{\Lambda}_\Theta(n)$ are polynomials of singularities, we expect the folding to be between an exponential time stargate with three other polynomial of singularities, and the result will be some kind of exponential singularity. At this point, we can follow the approach taken for redefining **P**, or we can use the fact that *the proof of what lucky did* should be observable in cosmic light and sound. In other words,

$$\mathring{\Lambda}_{\mathbf{T}}(n)^{i+1} \circledast \mathring{\Lambda}_{\blacktriangledown}(n)^{i+1} \circledast \mathring{\Lambda}^{i+1}_{q\langle | accept \rangle} \circledast \mathring{\Lambda}_\Theta(n)^{i+1} = \mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} \tag{67}$$

Note that the folding of stargates on the right side is at most polynomial, since $\mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound}$ is linear and lucky must be a polynomial singularity. As before, let cosmic sound be $\mathring{\Lambda}_{Sound} = \mathring{\Lambda}_{\hat{\mathbf{H}}_{\mathbf{s}}} \circledast \mathring{\Lambda}_{\mathbf{\Omega}}$, and cosmic light $\mathring{\Lambda}_{Light} = \mathring{\Lambda}_{\hat{\mathbf{H}}^*} \circledast \mathring{\Lambda}_{\mathbf{\Psi}}$. Then,

$$\mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} = \mathring{\Lambda}_{\blacktriangledown} \circledast (\mathring{\Lambda}_{\hat{\mathbf{H}}^*} \circledast \mathring{\Lambda}_{\mathbf{\Psi}}) \circledast (\mathring{\Lambda}_{\hat{\mathbf{H}}_{\mathbf{s}}} \circledast \mathring{\Lambda}_{\mathbf{\Omega}}) \tag{68}$$

Obviously, $\mathring{\Lambda}_{\blacktriangledown}$ will be a polynomial singularity,

$$\mathring{\Lambda}_{\blacktriangledown} = \mathring{\Lambda}_{\blacktriangledown}(n) = \alpha_n \mathring{\Lambda}^n_{\blacktriangledown} + \alpha_{n-1} \mathring{\Lambda}^{n-1}_{\blacktriangledown} + \alpha_{n-2} \mathring{\Lambda}^{n-2}_{\blacktriangledown} + \cdots + \alpha_1 \mathring{\Lambda}_{\blacktriangledown} + \alpha_0 \tag{69}$$

The *wave function* $\mathring{\Lambda}_{\mathbf{\Psi}}$ for the cosmic stargate is,

$$|\mathring{\Lambda}_{\Psi}(\mathring{\Lambda}_t)\rangle = \sum_n A_n e^{-i\mathring{\Lambda}_{\mathbf{E}(n)}\mathring{\Lambda}_t/\hbar} \tag{70}$$

And for cosmic sound,

$$|\mathring{\Lambda}_{\Omega}(\mathring{\Lambda}_t)\rangle = \sum_n B_n e^{-i\mathring{\Lambda}_{\mathbf{E}(n)}\mathring{\Lambda}_t/\hbar} \tag{71}$$

Which means that,

$$\mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{\hat{\mathbf{H}}^*} |\mathring{\Lambda}_{\Psi}(\mathring{\Lambda}_t)\rangle \circledast \mathring{\Lambda}_{\hat{\mathbf{H}}_\mathbf{s}} |\mathring{\Lambda}_{\Omega}(\mathring{\Lambda}_t)\rangle \tag{72}$$

The Hamiltonians will correspond to the *energy* of cosmic light and sound, and it should describe the folding of stargates in terms of kinetics and potential of the singularity.

4.1 Singularity in an Infinite Potential Well

To read symbols from languages in its computation, the singularity computer must position itself at the precise memory location in spacetime, the it reads $\mathring{\Lambda}_{\Sigma} \circledast \mathring{\Lambda}_{|\mathbf{01}\infty\rangle}$. In reading, we mean that it "lights up, scans, duplicates, and detects". That is, the singularity computing head is a detector, and we create this detector from a singularity well - we must entangle the head with the symbol - since the detector must be able to detect *relativistic photophonons.* Let time be defined as a singularity,

Definition 4.2. A time singularity is defined as,

1. symmetry: timeless
2. antisymmetry: time
3. parasymmetry: $(|\text{time}\rangle + |\text{timeless}\rangle)$
4. suprasymmetry: time $\circledast$ timeless $\circledast$ $\big(|\text{time}\rangle + |\text{timeless}\rangle\big)$

The concept of past and future times, past and present, present and future, now and forever, are also captured by the definition above.

And lets also defined space as the singularity,

Definition 4.3. A space singularity is defined as,

1. symmetry: *spaceless*
2. antisymmetry: *space*
3. parasymmetry: $(|\text{space}\rangle + |\text{spaceless}\rangle)$
4. suprasymmetry: space $\circledast$ spaceless $\circledast$ $(|\text{space} + |\text{spaceless}\rangle)\rangle$

The concept of distance between here and there, near and far, are also captured by the definition above.

With time and space defined as singularities, we now imagine that the computing machine head, which is a stargate, must be momentarily *held* in an infinite potential well, to enable reading and writing to and from the machine memory. Remember Schrodinger's wave function? In this form,

$$i\hbar\frac{\partial}{\partial t}\psi(x,t) = -\frac{\hbar^2}{2m}\frac{\partial^2}{\partial x^2}\psi(x,t) + V(x,t)\psi(x,t) \tag{73}$$

The potential energy of the free particle is given by $V(x,t)$. The wave function for singularities can be written in similar form,

$$i\hbar\frac{\partial}{\partial\mathring{\Lambda}_t}\psi((\mathring{\Lambda}_x,\mathring{\Lambda}_t) = -\frac{\hbar^2}{2\mathring{\Lambda}_m}\frac{\partial^2}{\partial\mathring{\Lambda}_x^2}\psi(\mathring{\Lambda}_x,\mathring{\Lambda}_t) + V(\mathring{\Lambda}_x,\mathring{\Lambda}_t)\psi(\mathring{\Lambda}_x,\mathring{\Lambda}_t) \tag{74}$$

In an infinite potential well,

$$V(\mathring{\Lambda}_x,\mathring{\Lambda}_t) = \begin{cases}\mathbf{0} & \mathring{\Lambda}_{\dot{X}} - \frac{1}{2}\mathring{\Lambda}_L < \mathring{\Lambda} < \mathring{\Lambda}_{\dot{X}} + \frac{1}{2}\mathring{\Lambda}_L \\ \infty & \text{otherwise}\end{cases} \tag{75}$$

This infinite well resembles the classical *particle in a box*, but differs in the following ways: the dimensions of the infinite potential well is one singularity $\mathring{\Lambda}_L$. This limits the time and space to a singularity, and at that scale, we know that

$$\mathring{\Lambda}_{Space} \circledast \mathring{\Lambda}_{Time} = \mathring{\Lambda}_{spacetime} \tag{76}$$

Definition 4.4. A spacetime singularity is defined as the folding of space and time,

$$\mathring{\Lambda}_{Space} \circledast \mathring{\Lambda}_{Time} = \mathring{\Lambda}_{spacetime} \tag{77}$$
$$= \mathring{\Lambda}_{\odot} \tag{78}$$

A spacetime dimension at one singularity.

The wave function for the spacetime stargate $\mathring{\Lambda}_{\odot}$, can be written as follows,

$$i\hbar \frac{\partial}{\partial \mathring{\Lambda}_{\odot}} \psi((\mathring{\Lambda}_{\odot}) = -\frac{\hbar^2}{2\mathring{\Lambda}_m} \frac{\partial^2}{\partial \mathring{\Lambda}_{\odot}^2} \psi(\mathring{\Lambda}_{\odot}) + V(\mathring{\Lambda}_{\odot})\psi(\mathring{\Lambda}_{\odot}) \tag{79}$$

Then the infinite potential well that momentarily traps a singularity is,

$$V(\mathring{\Lambda}_{\odot}) = \begin{cases} \mathbf{0} & \mathring{\Lambda}_{\dot{X}} - \frac{1}{2}\mathring{\Lambda}_L < \mathring{\Lambda} < \mathring{\Lambda}_{\dot{X}} + \frac{1}{2}\mathring{\Lambda}_L \\ \infty & \text{otherwise} \end{cases} \tag{80}$$

The centre of the well of one singularity in dimension is $\mathring{\Lambda}_{\dot{X}}$. So what is the meaning of half the length of one singularity? Well, one-half the length of a singularity cannot be defined in terms of a space metric or a time metric individually. Instead, since the stargate is spinning and oscillating, it is defined in *spin* $\pm\frac{1}{2}$ and half the angular frequency $\omega \pm \frac{1}{2}$.

4.2 Travelling Waves of Cosmic Light and Sound

For electromagnetic radiation, such as light, the transverse waves oscillates the *electric* **E** and *magnetic* **B** fields perpendicular to the direction of wave propagation [11, 12]. The waves of cosmic light and sound are similar to that of electromagnetic light, but instead of two fields as is in electromagnetic light, there are four fields in each of cosmic light and sound that undergo folding. The folding of cosmic light and sound are two transverse waves travelling in opposite directions, each oscillating and spinning with four fields.

The infinite potential well is constructed so that the peak of the fields align with the centre. The walls of the well are as if there were two perfect mirrors parallel to each other: the peak of the wavelength of the fields of cosmic light and sound are aligned precisely midway between the two mirrors and the distance is half of a wavelength. There are two cases for examination,

1. A wave of cosmic light is passed through the well, with cosmic sound fields trapped in the centre
2. A wave of cosmic sound is passed through the well, with cosmic light fields trapped in the centre

Cosmic light at the right frequency will resonate inside the well (the well is a resonator). It will have enough energy to completely transfer the energy from its fields to fold with sound fields that are trapped in the well. The fields of light and sound then become entangled in an *oscillating synergetic orbit*, repeating a process of creation and annihilation. Then fields will decay to be unified once again, and as they do, they create cosmic light with the same frequency that initially excited the sound fields. The cosmic light that is produced then resonates in the well, again at the right frequency, which again excites the sound fields.

The resonating orbit and interchange of energy between cosmic light and sound fields creates a *quasiparticle called a synergetions*. For every spacetime moment, the cosmic light and synergetions exchanges energy to-and-fro, in a repeating cycle between cosmic light wave and synergetions. The same happens when a cosmic sound wave at the right frequency resonates and the light fields are trapped in the well: a synergetion is produced that oscillates and exchanges energy with the cosmic sound wave. And, the oscillations between the cosmic light and sound with the synergetion occurs at every singularity moment and repeats, and it is this repetition, $\circledast$, that *stable* creates a new quasiparticle called a *photophonon*.

If the process described above sounds like that when *quasiparticles* **excitons and polaritons** [13] are created, that is because the oscillatory folding of energetions and photophonons. Whilst quasiparticles are not considered the *fundamental particles according to the Standard Model of Particle Physics* [14], they do exhibit *manufacturable quantum properties*, and we are precisely interested in the *manufacturable aspect* so far as computation is concerned. Now, since singularities are the fundamental the heart of reality, and it is a quasiparticle, what of the Fermions and Bosons of the Standard Model? Are they fundamental? Certainly they could be, but lets get a little more specific - at which era of reality are they fundamental?

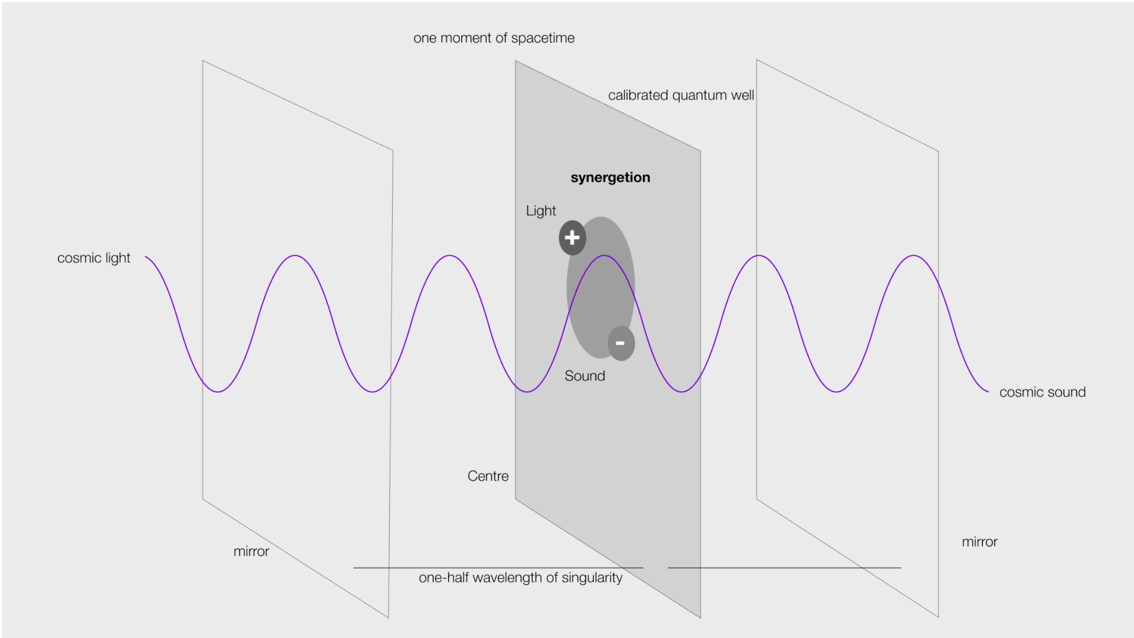

Figure 4: Formation of the synergetion.

4.3 The Photophonon Singularity Detector

The potential well alternates between cosmic light and cosmic sound waves as the *excitor*, and cosmic sound and cosmic light as the fields trapped in the well. When cosmic sound fields are stationary inside the singularity well, cosmic light with the right frequency will resonate and transfer the energy from cosmic light to cosmic sound. The fields then orbits each other to produce synergetion. The synergetion then decays releasing energy back as cosmic light and sound with the same frequency that excited it. The repeating cycle between cosmic light and cosmic sound during folding with synergetion creates the *photophonon*.

Definition 4.5. In one moment of spacetime singularity, the oscillatory folding of cosmic light and cosmic sound with synergetions spontaneously creates an oscillating stargate called *photophonon*,

$$\mathring{\Lambda}_{\Psi} \circledast \mathring{\Lambda}_{\Omega} = \mathring{\Lambda}_{\circledast} \tag{81}$$

The photophonons are highly energetic, spinning and oscillating at the same spacetime moment. The photophonons inherits properties of synergetions and both of cosmic light and cosmic sound. Photophonons should, for example, exhibit *colour* from cosmic light. With photophonons, we can now simplify,

$$\mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{\hat{\mathbf{H}}^*} |\mathring{\Lambda}_{\Psi}(\mathring{\Lambda}_t)\rangle \circledast \mathring{\Lambda}_{\hat{\mathbf{H}}_{\mathbf{s}}} |\mathring{\Lambda}_{\Omega}(\mathring{\Lambda}_t)\rangle = \mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{\hat{\mathbf{H}}} \circledast \mathring{\Lambda}_{\circledast} \tag{82}$$

Returning to the well,

$$V(\mathring{\Lambda}_{\circledast}) = \begin{cases} \mathbf{0} & \mathring{\Lambda}_{\dot{X}} - \frac{1}{2}\mathring{\Lambda}_L < \mathring{\Lambda} < \mathring{\Lambda}_{\dot{X}} + \frac{1}{2}\mathring{\Lambda}_L \\ \infty & \text{otherwise} \end{cases} \tag{83}$$

For free photophonons,

$$i\hbar\frac{\partial}{\partial}\mathring{\Lambda}_{\circledast}\psi(\mathring{\Lambda}_{\circledast}) = -\frac{\hbar^2}{2\mathring{\Lambda}_m}\frac{\partial^2}{\partial\mathring{\Lambda}_{\circledast}^2}\psi(\mathring{\Lambda}_{\circledast}) + V(\mathring{\Lambda}_{\circledast})\psi(\mathring{\Lambda}_{\odot}) \tag{84}$$

According to relativity, the energy of the singularity must consist of both the *kinetic* energy and the *energy of its mass at rest*, and the following *Klein-Gordon* must apply,

$$\mathbf{E}^2 = (\mathring{\Lambda}_m\mathring{\Lambda}_c^2)^2 + \mathring{\Lambda}_p^2\mathring{\Lambda}_c^2 \tag{85}$$

Where $\mathring{\Lambda}_c$ is the speed of cosmic light, $\mathring{\Lambda}_p$ is the momentum, and the mass is defined as follows,

Definition 4.6. The mass of a singularity $\mathring{\Lambda}_m$ is defined as,

$$\mathring{\Lambda}_m = \begin{cases} \mathit{symmetry} : \mathit{massless} \\ \mathit{antisymmetry} : \mathit{mass} \\ \mathit{parasymmetry} : |\mathit{massless}\rangle + |\mathit{mass}\rangle \\ \mathit{suprasymmetry} : \mathit{massless} \circledast \mathit{mass} \circledast (|\mathit{massless}\rangle + |\mathit{mass}\rangle) \end{cases} \tag{86}$$

The magnitude of linear momentum is the *de Broglie*,

$$\mathring{\Lambda}_p = \hbar k \tag{87}$$

And the energy is associated with the angular frequency ω through the *Planck-Einstein*:

$$\mathring{\Lambda}_E = \hbar\omega \tag{88}$$

And k is called the *wave number*, given by *Klein-Gordon*,

$$k = \frac{\sqrt{\mathring{\Lambda}_E^2 - (\mathring{\Lambda}_m \mathring{\Lambda}_c^2)^2}}{\hbar \mathring{\Lambda}_c} \tag{89}$$

We now have the equation for relativistic photophonons,

Definition 4.7. The relativistic photophonon is defined as,

$$-\frac{1}{\mathring{\Lambda}_c^2}\frac{\partial \psi(\mathring{\Lambda}_{\circledast})}{\partial \mathring{\Lambda}_{\circledast}^2} + \nabla^2 \psi(\mathring{\Lambda}_{\circledast}) = (\frac{\mathring{\Lambda}_m \mathring{\Lambda}_c^2}{\hbar \mathring{\Lambda}_c})^2 \psi(\mathring{\Lambda}_{\circledast}) \tag{90}$$

and ∇^2 is the *Laplace* operator and $\nabla = \hat{i}\partial/\partial\mathring{\Lambda}_x + \hat{j}\partial/\partial\mathring{\Lambda}_y + \hat{k}\partial/\partial\mathring{\Lambda}_z$.

The wave equation for the photophonon $\psi(\mathring{\Lambda}_{\circledast})$ will be of the form,

$$\psi(\mathring{\Lambda}_{\circledast}) = \psi_{E_n}(\mathring{\Lambda}_{\circledast}) e^{-i\mathring{\Lambda}_{E_n}\mathring{\Lambda}_{\odot}/\hbar} \tag{91}$$

Photophonons of P and NP A computation in **NP** must be lucky folding with the photophonon,

$$\mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{\hat{\mathbf{H}}} \circledast \mathring{\Lambda}_{\circledast} = \mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{\circledast} \tag{92}$$

$$= (\alpha_n \mathring{\Lambda}_{\blacktriangledown}^n + \cdots + \alpha_1 \mathring{\Lambda}_{\blacktriangledown} + \alpha_0) \circledast (\psi_{E_n}(\mathring{\Lambda}_{\circledast}) e^{-i\mathring{\Lambda}_{E_n}\mathring{\Lambda}_{\odot}/\hbar}) \tag{93}$$

That is, different energy levels $\psi_{E_n}(\mathring{\Lambda}_{\circledast})$ are described by polynomials of photophonons. Returning to **NP** verifiers, an accepting configuration of the computer is as follows,

$$\mathring{\Lambda}_{\mathbf{T}}(n)^{i+1} \circledast \mathring{\Lambda}_{\blacktriangledown}(n) \circledast \mathring{\Lambda}_{q\langle|accept\rangle}^{i+1} \circledast \mathring{\Lambda}_{\Theta}(n)^{i+1} = \mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} \tag{94}$$

$$= \mathring{\Lambda}_{\blacktriangledown} \circledast \mathring{\Lambda}_{\circledast} \tag{95}$$

$$\tag{96}$$

$$= (\alpha_n \mathring{\Lambda}_{\blacktriangledown}^n + \cdots + \alpha_0) \circledast (\psi_{E_n}(\mathring{\Lambda}_{\circledast}) e^{-i\mathring{\Lambda}_{E_n}\mathring{\Lambda}_{\odot}/\hbar}) \tag{97}$$

Now redefine **NP** verifier as polynomials of photophonons,

Definition 4.8. Computers whose clock can run to exponential time but has polynomial verifiers are photophonons polynomials of the form,

$$(\alpha_n \mathring{\Lambda}_{\blacktriangledown}^n + \cdots + \alpha_0) \circledast (\psi_{E_n}(\mathring{\Lambda}_{\circledast}) e^{-i\mathring{\Lambda}_{E_n}\mathring{\Lambda}_{\odot}/\hbar}) \tag{98}$$

The length of the proof, $\Lambda_{\blacktriangledown}$, is polynomial so that in photophonons, $\mathring{\Lambda}_{\blacktriangledown}(\mathring{\Lambda}_w \in \mathring{\Lambda}_{\mathbf{L}})$ and $|\mathring{\Lambda}_\rho| \leq |\mathring{\Lambda}_w|^k$ and the computer has configuration $\mathring{\Lambda}_{\mathbf{T}}(n)^{i+1} \circledast \mathring{\Lambda}_{\blacktriangledown}(n) \circledast \mathring{\Lambda}^{i+1}_{q\langle|accept\rangle} \circledast \mathring{\Lambda}_{\Theta}(n)^{i+1}$, with the q_{accept} in its state $\mathring{\Lambda}^{i+1}_{q\langle|accept\rangle}$.

Now lets re-examine the class **P** of polynomial deciders. These have accepting configurations of the form,

$$\begin{aligned}
\phi_r \mathring{\Lambda}^r_{\tau\circledast\delta\circledast\Theta} + \phi_{r-1}\mathring{\Lambda}^{r-1}_{\tau\circledast\delta\circledast\Theta} + \cdots + \phi_0 &= \mathring{\Lambda}_\tau \circledast \mathring{\Lambda}_\delta \circledast \mathring{\Lambda}_\Theta & (99)\\
&= \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} & (100)\\
&= \psi_{E_n}(\mathring{\Lambda}_{\circledast}) e^{-i\mathring{\Lambda}_{E_n}\mathring{\Lambda}_{\odot}/\hbar} & (101)
\end{aligned}$$

The photophonon polynomial for languages accepted by **P** differ from **NP** by a polynomial $(\alpha_n \mathring{\Lambda}^n_{\blacktriangledown} + \cdots + \alpha_1 \mathring{\Lambda}_{\blacktriangledown} + \alpha_0)$. That is, **P** languages are described by photophonon energy levels and **NP** are languages that describes photophonon polynomials for each energy level. Since **NP** languages are verifiable $\Lambda_{\blacktriangledown}$ in at most polynomial time, and since the length of the proof is at most polynomial in the length of the input $|\mathring{\Lambda}_{\blacktriangledown}| \leq |\mathring{\Lambda}_w|^k$, then $\mathbf{P} = \mathbf{NP}$. That is, problems that can be verified in polynomial time can also be decided in polynomial time. The proofs are photophonon polynomials *spectra of folding* synergetions with cosmic light and cosmic sound.

4.4 Undecidable Languages

We defined a spacetime singularity as the folding of space and time,

$$\begin{aligned}
\mathring{\Lambda}_{Space} \circledast \mathring{\Lambda}_{Time} &= \mathring{\Lambda}_{spacetime} & (102)\\
&= \mathring{\Lambda}_{\odot} & (103)
\end{aligned}$$

The spacetime singularity, an immovable object, can entangle with an irresistible force $\mathring{\Lambda}_{\mathbf{F}}$,

$$\mathring{\Lambda}_{\mathbf{F}} \circledast \mathring{\Lambda}_{spacetime} = \mathring{\Lambda}_{\mathbf{F}} \circledast \mathring{\Lambda}_{\odot} \tag{104}$$

$$= \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} \tag{105}$$

Languages and computation with physically realisable sinbits have the same "modus operandi",

$$\mathring{\Lambda} \circledast \mathring{\Lambda}_{(|\mathbf{0}\rangle \circledast |\mathbf{1}\rangle \circledast |\infty\rangle)} = \mathring{\Lambda}_{\mathbf{F}} \circledast \mathring{\Lambda}_{\odot} \tag{106}$$

$$= \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} \tag{107}$$

Which means that,

$$\mathring{\Lambda} \circledast \mathring{\Lambda}_{(|\mathbf{0}\rangle \circledast |\mathbf{1}\rangle \circledast |\infty\rangle)} \circledast \mathring{\Lambda}_{\odot} = \mathring{\Lambda}_{\mathbf{F}} \circledast \mathring{\Lambda}_{\odot} \tag{108}$$

$$= \mathring{\Lambda}_{Light} \circledast \mathring{\Lambda}_{Sound} \tag{109}$$

Then, we can write,

Definition 4.9. The entanglement of mind and matter, and "no-mind and anti-matter", is conserved,

$$\mathring{\Lambda}_{Mind} \circledast \mathring{\Lambda}_{Matter} = \mathring{\Lambda} \circledast \mathring{\Lambda}_{|\mathbf{01}\infty\rangle} \circledast \mathring{\Lambda}_{\mathbf{F}} \circledast \mathring{\Lambda}_{\odot} = \mathbf{0} \tag{110}$$

where the force $\mathring{\Lambda}_{\mathbf{F}}$ is the force that turns $\circledast$ at every singularity moment and it manifests mind into matter, and lets matter manifest thoughts into the mind. It is a completely mystical force.

The definition above implies that there is nothing that can be identified as mind without depending on matter, and vice versa. Because there is nothing that arises in the mind and in matter that is *truly independent* because of the entanglement, we say that the "self" can not be identified. Then, if the singularity can not be said to have an independent self in mind or matter, or no-mind and antimatter, it means that reality is *undecidable if and only if the following holds*,

Theorem 2 (Reality is Undecidable)**.** *The entanglement of reality with mind and matter is a duality,*

$$() \circledast \mathring{\Lambda}_{Mind} \circledast \mathring{\Lambda}_{Matter} = () \circledast \mathring{\Lambda} = \mathbf{0} \tag{111}$$

Because there is duality between reality () and singularity $\mathring{\Lambda}$, we say that reality itself is *undecidable in the entanglement of singularities.*

We can see that $\mathring{\Lambda}$ cannot consistently prove itself to prove that it exists in reality nor can it be used to prove that reality exists since it does not have an individual self, that is, it is dependent on other singularities *ad infinitum*. Another way of saying this is that that true reality is empty of $\mathring{\Lambda}$, empty of existence, non-existence, and both existence and non-existence, and neither existence, nor non-existence. If this is true, that the absence of singularities from reality is undecidable, then reality is said to be *Śūnyatā*. Reality is mystical. Shazam ⚡ ⊛.

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